Towards a conceptual framework for strategic cost management

- The concept, objectives, and instruments -

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Ibrahim Abd El Mageed Ali El Kelety

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Gutachter: Prof. Dr. Uwe Götze
Prof. Dr. Dr. h.c. Jürgen Bloech
Prof. Dr. Peter Schuster

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<td>ABC/M</td>
<td>Activity-based Costing and Management</td>
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<td>ABM</td>
<td>Activity-based Management</td>
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<td>BM</td>
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<td>Business Process Improvement</td>
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<td>Business Process Reengineering</td>
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<td>DFMA</td>
<td>Design For Manufacture &amp; Assembly</td>
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1. Introduction

The Problem

During the last years, we have seen a significant shift in the cost accounting and management (Maher and Deakin 1994:10, Günther 1997:97 and Götze 2004:261). This shift is the result of an increasing competitive environment due to the introduction of new manufacturing and information technologies, the focus on the customer, the growth of worldwide markets, and the introduction of new forms of management organization (Blocher et al. 1999:8).

Accounting information plays a vital role in determining the most appropriate strategic direction for the organization. It guides managerial actions, motivates behaviors, and supports and creates the cultural values necessary to achieve an organization's strategic objectives (Ansari et al. 1997a:2). In particular, cost management information (both financial and non-financial information) is a critical type of information to the success of the company. For this reason the role of cost accounting and management has expanded. Accountants are now participants on multifunctional management teams.

Cost management systems are important, but equally important is knowing how and when to apply them to achieve long-term success. Cost management systems help managers understand cost structure and behavior. Therefore, they can make decisions that will enable the organization to achieve or exploit a strategic competitive advantage (Buckingham and Loomba 2001:12). In taking a strategic emphasis, cost management looks to the long-term competitive success of the firm. Strategic cost management plays an important role in management functions especially strategic management; it can facilitate the developing and implementing of business strategy where the accountant is viewed as a business partner rather than a mere bookkeeper (Shank 1989:50).

Strategic management seeks to develop the competitive position in which the firm's competitive advantage provides continued success. A strategy is a set of goals and specific action plans, which, if achieved, will provide the desired competitive advantage (Thompson 1995:7). Strategic management involves the identification and implementation of these goals and action plans. Effective strategic management is critical to the success of the firm. The growing pressures of global competition, technological innovation, and changes in business processes have made strategic cost management much more critical and dynamic than ever
Managers must think competitively, and to do so requires a strategy. They need to think about the long term and to think integratively.

Long-term thinking involves anticipating changes; products and production processes are designed to accommodate expected changes in customer demands. Where flexibility is important. The ability to make fast changes is critical, as illustrated by the new management concepts of speed to market and agile manufacturing (Blocher et al. 1999:5). In addition, product life cycles, the time from the introduction of new product to its removal from the market, are expected to get shorter and shorter. Success in the short time is no longer a measure of ultimate success; it is long-term success firms seek, and that goal requires strategic, long-term thinking (Blocher et al. 1999:5 and Hungenberg 2000a:5).

The strategic emphasis also requires integrative thinking, that is, the ability to identify and solve problems from a cross-functional view (Hansen and Mowen 2000:14). The business functions are often identified as marketing, production, finance, and accounting/controllership (Blocher et al. 1999:6). Instead of viewing a problem as a production problem, or a marketing problem, or a finance and accounting problem, the integrative approach combines skills from all the functions at the same time, using cross-functional teams. The integrative approach is necessary in a dynamic and competitive environment; it organizes a set of specialists from different departments into cross-functional teams that all strive for a certain goal such as cost, quality, and lead time, forming an integrated planning and execution system (Holland et al. 2000:232). The firm’s attention is focused on satisfying the customers’ needs, and all the firm’s resources, from all the functional areas, are directed to that goal.

Because the strategic variables (e.g. cost, quality and time) are growing in their importance to management, cost management has moved from a traditional role of product costing and operational control to a broader, strategic focus - to strategic cost management (Cooper and Slagmulder 1998a, Blocher et al. 1999, McNair 2000, Hansen and Mowen 2000 and Hilton et al. 2001). The new focus is on a management-facilitating role - the development of cost and other information to support the management of the firm, and the achievement of its strategic goals. Before the changes in the business environment, a focus on detailed methods for product costing and control at the department level was appropriate for the high-volume, standardized, infrequently-changing manufacturing systems of that time. Now, the firm’s cost
management systems must be more dynamic to deal with the more rapidly changing environment and the increasing diversity of products and manufacturing processes. The cost management systems must be able to assist management in this dynamic environment by facilitating strategic management.

While traditional cost management focuses on using unit-based drivers, allocation-intensive, narrow and rigid product costing, managing costs, little activity information, maximization of individual unit performance, using financial measures of performance, internal orientation and short-term perspective, strategic cost management, on the other hand, focuses on using unit and non-unit-based drivers, tracing-intensive, broad product costing, managing activities, detailed activity information, system-wide performance maximization, using of both financial and non-financial measures of performance, both internal and external orientation and long-term perspective (Wilson and Chua 1993:530, Fischer 1993:129, Shank and Govindarajan 1993:217 and McNair 2000:31). Strategic cost management is not only cost management but also can increase revenues, improve productivity and customer satisfaction, and at the same time improve the strategic position of the company. The key is that costs must be viewed by looking simultaneously at the value they provide. In other words, strategic cost management is "strategic success-driver" of the company and contributes to shaping the future of the company.

Although cost management has moved from a traditional role to a strategic role, strategic cost management is understood in different ways in the literature. Cooper and Slagmulder (1998a:14) and Welfie and Keltyka (2000:33) argued that strategic cost management is the application of cost management techniques to reduce costs and at the same time improve the strategic position of the company. Shank and Govindarajan (1993:6f.) defined strategic cost management as the managerial use of cost information to support the strategic objectives of the company. Horvath and Brokemper (1998:585) stated that strategic cost management is the process that influences the behavior, structure, and level of the costs in order to attain and sustain a strategic competitive advantage.

In addition, strategic cost management has been discussed from many aspects in the literature. Strategic cost management has been studied through the use of various instruments such as target costing (Seidenschwarz 1993 and Ansari et al. 1997b), activity based costing and

In some cases, strategic cost management has been discussed through some key concepts such as value chain, cost drivers and strategic positioning. A notable approach in strategic cost management that gained attention internationally was by Shank and Govindarajan (1993). It is based on Porter’s work. This conceptual approach comprises three key concepts: value chain, cost drivers and strategic positioning. Shank and Govindarajan (1993) emphasized some important aspects of managing costs in value chain. This approach introduced only three key concepts for the strategic cost management-framework. These key concepts remain rather separate pillars of the framework. This approach also ignores some important aspects of strategic cost management-framework or other pillars such as the activities and objects, instruments, and key support factors.

Other studies focused on objects (resources, processes and products) and analysis fields & activities (cost behavior-, cost structure-, and cost level management) of strategic cost management (Männel 1995, Corsten and Stuhlmann 1996 and Arnaout et al. 1997). In his study, Kajüter (2000) argued that the cost management system and cost management structure are the two basic parts of the conceptual framework for cost management. According to Kajüter (2000) the elements of the cost management system include activities (cost planning and cost monitoring), objects (resources, processes and products) and the techniques that support cost management activities. Kajüter (2000) emphasized that the cost management structure is an important aspect of the framework of cost management. This includes the definition of responsibilities (who shall execute the cost management activities?), and the choice of coordinating mechanisms. Kajüter (2000) concentrated on cost planning, cost monitoring and organizational issues.

Some studies stressed the behavioral and organizational aspects of strategic cost management (Shields and Young 1989 and Cooper 1995a). These studies argued that factors influencing the success of implementing cost management systems involve behavioral and organizational
factors. For example, these factors include top management support, linkage of the cost management systems to competitive strategies, linkage of the cost management systems to performance evaluation and compensation, sufficient internal resources, training, commitment, motivation, etc.

Therefore, in the literature, the conceptual approaches of strategic cost management in generally are rare. The existing conceptual approaches only consider certain individual contributions and therefore focus on specific aspects of strategic cost management. There is a need for a comprehensive conceptual framework for strategic cost management that covers the concept, the concerns and objectives, the principles, the analysis fields & activities, the objects, the instruments and the key support factors of strategic cost management.

The Objectives

“Cost management is like wringing out a wet towel. The biggest reaction is obtained first, but we must keep wringing. Even when the towel appears dry to the touch we must wring it to extract more” (Tanaka et al. 1993:4). To achieve this level of performance and success in strategic cost management, requires the commitment of resources, the formulation and application of appropriate polices and procedures, and the establishment of objects, activities and instruments. Strategic cost management is in its infancy. Researches and studies are still in an early exploratory stage and have not yet developed a consistent theory for strategic cost management.

In view of this, the main objective of this study is to suggest a comprehensive conceptual framework for strategic cost management. The suggested framework attempts to answer the key questions:

- What is strategic cost management?
- What are the concerns and objectives of strategic cost management?
- What are the pillars of the strategic cost management-framework?
- To what degree do these pillars contribute to strategic cost management?
- What are the relationships between these pillars?
Besides this main objective of the study, there are some sub-objectives. They are:

- Discuss the primary trends and changes in the business environment and show how cost management systems can be adapted to meet the needs of the business environment.
- Discuss strategic management and competitive strategies as an answer to trends and changes in the business environment.
- Show that traditional cost management might not be relevant according to requirements of the business environment changes and supporting long-term firm's success.
- Explain that there is a need for new accounting concepts and methods - strategic cost management and its instruments - that contribute to the overall success of the company.

Structure of the Thesis

The thesis is divided into ten chapters. After the introduction (Chapter 1), in Chapter 2, we briefly discuss the primary trends and changes of the business environment and their effects on accounting and management methods and concepts, particularly cost accounting and management. We analyze changes of the markets and a greater focus on the customer, shifts in the basis of competition, advances in the manufacturing and information technologies and finally new forms of management organization. Trends and changes in the business environment may be the greatest strategic challenge managers face. Therefore, they must recognize these changes, understand how these changes will affect the success of the company’s strategy, and adjust the strategy of the company and the internal context according to these changes. Thus, in Chapter 3, we briefly discuss strategic management and competitive strategies as an answer to trends and changes in the business environment.

In Chapter 4, we evaluate traditional cost management in the light of the trends and changes in the business environment. This Chapter attempts to answer the question: “Are traditional cost management systems relevant according to requirements of the current business environment and supporting long-term firm’s success?” In this Chapter, we assure that traditional cost management should move to strategic cost management, and there are many demands for this change. In Chapter 5, we discuss strategic cost management - concept, objectives, and the suggested framework. Firstly, we explain the issue of terminology and the
strategic importance of cost management. Secondly, we deeply review the concept of strategic cost management in the literature, and introduce the concept of strategic cost management that will be used in the suggested framework. Thirdly, we explain the concerns and objectives of strategic cost management. Finally, we introduce the suggested framework for strategic cost management. The theme of strategic cost management is supported by many sub-theme which we called "pillars". The proposed pillars of the suggested framework for strategic cost management are: (1) The guiding principles of strategic cost management, (2) The key concepts of strategic cost management, (3) The objects of strategic cost management, (4) The analysis fields & activities of strategic cost management, (5) The instruments of strategic cost management, and (6) the key support factors of the suggested framework. Each of these pillars will be explained more fully in the remainder of this study.

In Chapter 6, we discuss the first and the second pillars of the suggested framework: guiding principles and key concepts of strategic cost management. To reach the desired objectives of strategic cost management, many principles have been identified in the literature. The study explains the significant principles that serve the suggested framework. In this Chapter we explain and analyze the second critical pillar that affects the strategic cost management-framework; key concepts (cost drivers and value chain). We define the concept of cost driver and show that managers need to understand how costs behave and what cost structure is to make informed decisions about products, processes, and resources, to plan, and to evaluate performance. We introduce and analyze two views of cost drivers - traditional view and strategic view. The traditional views of cost drivers according to Schmalenbach (1963), Rummel (1949), Gutenberg (1973) and Kilger (1993) will be discussed and analyzed. In today's competitive business environment, to achieve a major cost advantage, an organization must focus not only on traditional cost drivers but also on strategic cost drivers. Thus, the strategic views of cost drivers according to Shank and Govindarajan (1993) and Porter (1998a) will be discussed and analyzed. According to the traditional and strategic views of cost drivers, we develop the basic outline of cost drivers and analyze the interrelated relationships among cost drivers. Moreover, we explain ways of identifying cost drivers and benefits of cost drivers. To manage costs and make recommendations for improving the company's cost position and creating value for customer, this requires not only identifying and analyzing cost drivers, but also value chain analysis. Thus, in this Chapter, we define the
concept of value chain and discuss the principal stages of value chain analysis for strategic cost management.

In Chapter 7, we discuss the third pillar of the suggested framework - the objects of strategic cost management. The main question in any cost management system is what is the object or objects of cost management? Costs are influenced by certain actions that relate to specific objects within the value added process. These objects must be distinguished: resources that are the input for any value-added process, the process itself, and the product that is the output. Firstly, we discuss and analyze the product as a strategic cost management-object. Product cost management begins with the product definition and design because approximately from seventy to eighty percentage of the product cost is determined by decisions made during the product development cycle. Thus, we focus on product design and development approaches and product cost management.

Secondly, we discuss and analyze the process as a strategic cost management-object. Cost advantage or disadvantage of a company may attribute to its processes. We define the concept of process and show the importance of the process orientation. Managing and improving business processes require classifying them. Thus, we discuss the schemes that describe the business processes and focus in many dimensions. Managing and improving business processes require also selecting the processes that consider critical processes a company should focus on. Thus, we explain the approaches of process selection for improvement. Moreover, we discuss two different levels of process improvement - continuous process improvement and business process reengineering. From these two levels of process improvement, we develop three major dimensions to manage process cost, quality, and time. These dimensions are: business process adjustment, chaining business process by streamlining, and moving the business process.

Finally, in this Chapter, we discuss and analyze the resources as a strategic cost management-object. We define the concept of resources in the field of cost management and identify the dimensions of resources that are the focus of strategic cost management. The first dimension is the type of resource acquired. A company acquires and uses many resources. Because of multiplicity of acquired resources, a company should focus on the most important resources. Purchases of materials and services and human resources consider an important portion of the
cost structure of many companies. Thus, the focus in this dimension will be on the purchasing and human resources.

The second dimension is how resources are used in the value chain. Understanding the product costs incurred before, during, and after the manufacturing cycle is critical. Thus, the focus in this dimension will be on the resources of upstream, manufacturing and downstream activities. The third dimension is traceability of resources. Traceability of resources is the key in building accurate resources assignment and then cost management. Thus, we discuss the methods that are used to assign resource costs to activities, and cost objects. In this dimension, we differentiate also between supplied resources and used resources. Distinguishing between supplied and used resources can help management to manage the resources or the capacity. The last dimension is the level of cost driver and resource cost management. In this dimension, we explain that acquiring and using the resources result from various levels or types of cost drivers and determining the proper cost drivers help management to identify, measure, and manage the resources needed to perform activities and produce products.

In Chapter 8, we discuss the fourth pillar of the suggested framework - the analysis fields & activities of strategic cost management. Since strategic cost management considers a task, it comprises several activities that form the fourth pillar of the strategic cost management-framework. Such activities are cost behavior-, cost structure-, and cost level-management. The analysis fields & activities of strategic cost management are interrelated. We identify the concept of cost behavior, the concept of cost behavior management and the objectives of cost behavior management. Moreover, we deeply analyze the significant factors or the key drivers that are used to manage cost behavior and then cost level. In this Chapter, we emphasize that cost level and cost structure management stand in close relationship to each other. We identify the concept and objects of cost level and cost structure management and explain the implications of cost level and cost structure. Since overhead costs and fixed costs form a special problem in the field of strategic cost management, we deeply discuss and analyze overhead cost management, fixed cost management and their instruments.

In Chapter 9, we discuss the fifth and sixth pillars of the suggested framework - the instruments of strategic cost management and the key support factors of the suggested
framework. In the literature, various cost management-instruments are discussed, but the important thing, is which instrument can be strategic, integrated and interacted with other instruments to achieve the strategic cost management objectives. According to these important considerations, activity based costing and management, target costing, life cycle costing, and benchmarking are chosen as integrated instruments for strategic cost management-framework. For the first instrument - activity based costing and management - we discuss the origins of activity based costing and management, and show the problem with traditional costing systems and the need for activity based costing and management. The concept, objectives and applications of activity based costing and management will be explained. Moreover, we discuss the stages of activity based costing and the components or steps that form the framework of activity based management. We explain the stages of the implementation process of activity based costing and management and examine the factors that may influence adoption and implementation of activity based costing and management. Finally, we explain the advantages and disadvantages of activity based costing and management.

For the second instrument - target costing - we discuss origins and development of target costing, the concept of target costing, key principles and objectives of target costing. We deeply explain the stages of target costing process and show the factors that help companies to develop and implement target costing successfully. In the context of the suggested framework for strategic cost management, we discuss the integration aspects between target costing and activity based costing and management. Finally, we explain the advantages and disadvantages of target costing.

For the third instrument - life cycle costing - we discuss the concept and the significance and objectives of life cycle costing. The producer’s perspective of life cycle costing, the customer’s perspective of life cycle costing and the relationship between these two perspectives will be explained. We discuss cost reduction and revenue enhancement under life cycle costing from the perspective of the producer. Moreover, we explain that successful application of life cycle costing can provide the company with a competitive advantage. In the context of the suggested framework for strategic cost management, we discuss the relationships between life cycle costing and target costing and life cycle costing and activity-
based costing and management. Finally, we explain the advantages and disadvantages of life cycle costing.

For the fourth instrument - benchmarking - we briefly discuss the development of benchmarking and explain the concept and characteristics of benchmarking. Types of benchmarking and the benchmarking process will be discussed. We also show the pitfalls and success factors of benchmarking. In the context of the suggested framework for strategic cost management, we explain that benchmarking (especially cost benchmarking) can be linked to the instruments of strategic cost management. The relationships between cost benchmarking and target costing, life cycle costing and activity based costing and management will be discussed. Finally, in this Chapter, we briefly discuss the key support factors to develop and implement the strategic cost management-framework. In the final Chapter (Chapter 10), the summary and conclusions will be presented.
2. Trends and Changes in the Business Environment

"In today's environment, nothing is constant or predictable - not market growth, customer demand, product life cycles, the rate of technological change, or the nature of competition" (Hammer and Champy 1993:17). Many trends and changes in the business environment in recent years have caused significant modification in accounting and management concepts and methods. We briefly discuss the primary trends and changes of the business environment and their effects on accounting and management methods and concepts, particularly cost accounting and management. We analyze change of the markets and a greater focus on the customer, shifts in the basis of competition, advances in the manufacturing and information technologies and finally new forms of management organization.

2.1. Change of the Markets and a Greater Focus on the Customer

A key development that drives the extensive changes in the contemporary business environment is the growth of international markets and trade. Organizations, as well as consumers and regulators, are all significantly affected by the rapid growth of economic interdependence and increased competition from other countries. The growing number of alliances between large multinational firms makes it clear that the opportunities for growth and profitability lie in global markets. Most consumers benefit as low-cost, high-quality goods are traded worldwide. Managers and business owners know the importance of pursuing sales and production activities in foreign countries, and investors benefit from the increased opportunities for investment in foreign firms. As a result of an increasing competition and globalization of markets, the markets have changed gradually from seller's to buyer's markets.

In the early years of mass production, nearly products that were produced could be sold, because of the large production quantities of like products; the costs were low enough that they become affordable for most customers (Fralix 2001:3).

Over the years, manufacturers got accustomed to demand exceeding supply. The attitude of most manufacturers was: this is what we make - if you want it, buy it (Johnson 1992:74). In a seller's market, customers take what they can get; in the extreme, they even accept having to pay a high price for a standard product of marginal quality with a long or unpredictable lead-time for delivery. In other words, the company can sell whatever it builds. In this environment, the strategy for business and the imperative for manufacturing is simple: increase output. Nearly nothing else matters. Therefore, in most cases, manufacturers learned
to produce to their own specifications, not to customer specifications. In recent years, however, the seller's markets have dried up. In a buyer's market, it is simply not enough to get the product out; customers are more sophisticated than in the past, they are more knowledgeable, less loyal, and more cautious. Today, customers demand products that meet or exceed explicit expectations; are delivered on time, are defect-free, and have low prices and low cost of ownership (Lynch 1999:31).

The figure 2.1 shows the change from a seller's market to a buyer's market, on the left-hand side of the figure 2.1, where the headline is technology orientation; the company develops its products according to its technical and technological abilities. The customers buy what is produced for a price that is based on total production cost plus profit. As shown in the figure 2.1, if prices fall due to increasing competition and changing of markets then the company cannot develop products any more, which may be technically excellent but are too expensive for the customers.

![Price and Costs Diagram]

Figure 2.1: Change from a seller's market to a buyer's market

In such cases, the company must orient itself more towards the market and determine the product costs more consciously as shown in the figure 2.1. In addition, an effective cost management during development and design stages as well as production stage is necessary. Broadly, market orientation is concerned with the processes and activities associated with creating and satisfying customers by continually assessing their needs and wants, and doing
so in a way that there is a demonstrable and measurable impact on business performance (Uncles 2000:1). Today, customers usually choose from a wider products range, due to this range, customers make greater demands on quality and price as well as functionality (performance) of products. "Customers now tell suppliers what they want, when they want it, how they want it, and what they will pay" (Hammer and Champy 1993:18).

Thus, the product price is no longer based only on production cost, but also is mainly determined according to the market conditions and by the value to the customer (Johnson and Kaplan 1991:217). An increase of the market transparency as well as of the customer consciousness will make it even more difficult for the company to comply with the market requirements in the future. Therefore, companies have to direct themselves more consequently and systematically towards the customers and the competitors: "Japanese companies view the customer as their primary client followed by employees, suppliers, and shareholders last. U.S. companies, on the other hand, traditionally have viewed their shareholders as their primary and only client" (Howell and Skurai 1992:29). Of all the facts of the business that management must consider, the most important is the customer. Without customers, the organization loses its ability to exist; customers provide the organization with its focus.

Companies react to the flexibility (Flexibility for Johnson (1992:92) means "improving one's ability to do whatever the customer wants, when the customer wants it, at little or no extra cost") that is required by the market for example by automation of production or with the introduction of Just-In-Time in order to improve product quality as well as reduce processing time and unit cost (Götze and Mikus 1999:346). In other words, companies can create flexibility by reducing conversion times, optimizing processes arrangement and product design, supporting efficiency measurement for constant improvement, collecting and checking customer's needs and ideas, and by workers empowerment. Flexibility requires also optimizing the flow of information within the organization and with suppliers and customers. Today's IT capacities make information processing quicker, diverse, and more efficient.

Market and technology forces affecting today's competitive environment are changing dramatically. Mass production of identical products - the business model for the industrial companies of the past - is not capable and responsive enough to cope with rapidly changing markets and shortened product life cycles (Lau 1995:18). Market niches continue to narrow.
Customer preferences shift quickly and unexpectedly. Customers demand products with lower prices, higher quality, and faster delivery - but more customized to match their unique needs. To cope with these demands, some companies are vigorously racing to embrace mass customization. In the figure 2.2, we can see the change from mass production to a flexible customer oriented production.

![Figure 2.2: Change of focus from mass production to mass customization](Gilmore 1993:26)

Mass customization is a model for low-cost, high-quality, customized products. It requires flexibility and quick responsiveness. People, processes, resources and technology are continuously reconfigured to give the customer exactly what he/she wants (Fralix 2001:3). Gilmore (1993:25) also argued that in mass customization, marketing and production processes are designed to handle the increased variety that results from delivering customized products and services to customers. Mass customization can be an effective way for an organization to compete in an industry where the price and quality expectations of many customers are met by development of human resources, manufacturing and information technology, and organizational structure. To remain competitive in today's business environment, organizations are striving to apply new technology and work methods to bring down the cost of variety. Mass customization has become a new paradigm for excellence in manufacturing.
2.2. Shifts in the Basis of Competition

Besides the customer's needs, the competition situation has also changed. In today's globally competitive environment, companies compete on the basis of not only price but also quality, product flexibility, and response time. As a result of that, companies must focus on ways to increase customer satisfaction while also earning a reasonable return. Technology advantages, which lasted long some time ago, lose their importance much quicker, because firstly the technology can be copied from the competitors and secondly technological innovations come relatively quickly (Ansari et al. 1997b:4). The competition causes an increase of research and development activities, which then lead to a constant development of new products as well as a shortening of the product's life cycle, which creates more difficulties for research and development activities.

Companies should not develop product that does not match the market demands, otherwise they will endanger their existence. The companies must focus on the development of their market positions in the new business environment by different ways in order to achieve long-term success (see, e.g., Porter 1998b and Hill and Jones 2001). They must react to market changes flexibly as well as manage their use of resources efficiently. An American industrialist describes the situation: "we have come out of an environment where we were the single world leader, we had a technology that nobody else could really match, and we were able to dominate that field. The world doesn't allow companies to do that anymore. We have got to change, and that's a very hard lesson to learn" (Bruns 1987:102).

In the past in order to strengthen one's own competitiveness it was enough to investigate the competitors with the help of reverse engineering as well as simple business comparisons. Today, the company has to realize customer's needs as early as possible and transform these needs efficiently into new products (Johnson 1992:67). By this way, the company can build successful and long-lasting customer relations. The quality of product is essential in today's competitive markets. Therefore, companies must strive to improve their products quality. One reason is to insure that existing customers are satisfied with their products; another is to meet the specifications demanded by potential new customers. Quality is now widely acknowledged as a key competitive weapon. Many companies throughout the world such as Hewlett-Packard and Ford Motor Company in United States and Canada, Fujitsu and Toyota
in Japan, British Telecom in the United Kingdom, and Samsung in Korea give quality a prominent place in their overall strategy (Horngren et al. 2000:676).

Quality is defined by the customer, and companies are committed to strive for continuous improvement and to consistently exceed customer expectations in product and service (Shetty 1987:52). Improving quality has become one of the most important strategic factors affecting most companies (Götze and Mikus 1999:327). Total quality management is a management philosophy focused on exceeding customer expectations by continuous improvement of products and services (Yusof and Aspinwall 2000:281). This is done by improving the processes that develop, produce, and deliver the product to the customer. The basic principles for the Total Quality Management (TQM) philosophy of doing business are to satisfy the customer, satisfy the supplier, and continuously improve the business processes (Dean and Bowen 1994:394). The characteristics of TQM can be best understood by contrasting it with traditional views on quality. Table 2.1 contains the key elements of TQM versus the traditional approaches to quality.

In general, the traditional view assumes a trade-off between the cost of improving quality and maintaining the status quo. Although quality is important, it may be cheaper to produce lower-quality goods and have a minimum level of defective goods. Total quality management assumes that quality can and should always be improved (Shank and Govindarajan 1993). Rather than waiting for inspections of finished products or reworking defective goods, total quality management establishes quality at the beginning of the process with zero defects being the goal. Companies that implement total quality management (TQM) are likely to find that it has little economic benefit unless the company's cost management systems support it (Shank and Govindarajan 1993). Cost management systems can help managers achieve quality goals by measuring and reporting the resources used in preventing defects, the cost of reworking defective units, the cost of doing warranty repairs, lost sales from selling poor quality products, new investment needed for increasing product quality, and by determining whether the spending on quality is producing tangible financial benefits (Blocher et. al 1999:13).
<table>
<thead>
<tr>
<th>Traditional Paradigm</th>
<th>TQM Paradigm</th>
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<tbody>
<tr>
<td>Responsibility for quality</td>
<td></td>
</tr>
<tr>
<td>Workers are responsible for poor quality.</td>
<td>Everyone is responsible for poor quality.</td>
</tr>
<tr>
<td>Quality problems start in operations.</td>
<td>The majority of the quality problems start before the operations stage.</td>
</tr>
<tr>
<td>Inspect quality in.</td>
<td>Build quality in.</td>
</tr>
<tr>
<td>After-the-fact inspection.</td>
<td>Quality at the source.</td>
</tr>
<tr>
<td>Quality inspectors are the gatekeepers of quality reliability.</td>
<td>Operators are responsible for quality.</td>
</tr>
<tr>
<td>Quality control department has large staff.</td>
<td>The focus of quality control department is to monitor and facilitate the process.</td>
</tr>
<tr>
<td>The focus of the quality control department is to reject poor output.</td>
<td>Workers have the expertise; managers and engineers serve their need.</td>
</tr>
<tr>
<td>Managers and engineers have the expertise; workers serve their needs.</td>
<td></td>
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</table>

<table>
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<tr>
<th>Linkages with suppliers</th>
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<tbody>
<tr>
<td>Procure from multiple suppliers.</td>
<td>Procure from a single supplier.</td>
</tr>
<tr>
<td>Acceptance sampling of inputs at point of receipt.</td>
<td>Certify suppliers who can deliver right quantity, right quality, and on time.</td>
</tr>
<tr>
<td></td>
<td>No incoming inspection.</td>
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<tr>
<th>New product/service development</th>
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</thead>
<tbody>
<tr>
<td>Separate designers from operations.</td>
<td>Use teams with operations, marketing, and designers.</td>
</tr>
<tr>
<td>Design for performance (with more parts, more features) not to facilitate operations.</td>
<td>Design for performance and ease of processing.</td>
</tr>
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<table>
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<tr>
<th>Overall quality goal</th>
<th></th>
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<tbody>
<tr>
<td>Zero defects is not practical.</td>
<td>Zero defects is the goal.</td>
</tr>
<tr>
<td>Mistakes are inevitable and have to be inspected out.</td>
<td>Mistakes are opportunities to learn and become perfect.</td>
</tr>
<tr>
<td>It costs too much money to make defect-free products.</td>
<td>Quality is free.</td>
</tr>
<tr>
<td>A reasonable tradeoff is the key.</td>
<td>Perfection is the key: perfection is a journey, not a destination.</td>
</tr>
</tbody>
</table>

Table 2.1 Traditional view on quality versus total quality management
(Shank and Govindarajan 1993:211)

The time factor is important in a competitive environment as a strategic-success factor (Götze and Mikus 1999:338); success in competitive markets increasingly demands ever shorter new product development time and more rapid response to customer demands. Indeed, fast response itself is often a major quality attribute. Rapid response to customer can occur when work processes are designed to meet both quality and response goals. Accordingly, response time improvement should be included as a major focus within all quality improvement processes of work units. This requires that all designs, objectives, and work units activities include measurement of cycle time and responsiveness. Major improvement in response time may require simplifying and shortening the work processes and paths (Day 1990:181). Response time improvements often drive simultaneous improvements in quality and productivity as well as doing things faster helps to increase revenues and decrease costs (Horngren et al. 2000:687). Hence, high quality, low cost, speed in moving new products from design to market, speedy and reliable delivery of products and services are fundamental
virtues of any business organization, and it is no surprise that they contribute to success (Li and Lee 1994:633).

Figure 2.3 describes the different components of customer-response time. Customer response time is the amount of time between a customer's placing an order or requesting service and the delivery of the product or service to the customer (Horngren et al. 2000:687). The shorter the response time, the more competitive the company. Receipt time is the time the marketing department takes to specify to manufacturing the exact requirements in the customer's order while delivery time is the time it takes to deliver a completed order to the customer.

Manufacturing lead time (also called manufacturing cycle time) is the amount of time from when an order is received by manufacturing to when it becomes a finished good (Horngren et al. 2000:688). Advantages in response time provide leverage for all the other competitive differences that make up a company's overall competitive advantage. Many executives believe that competitive advantage is best achieved by providing the most value for the lowest cost. This is the traditional paradigm for corporate success. Providing the most value for the lowest cost in the least amount of time is the new paradigm for corporate success. An increasing number of companies such as Toyota, Federal express, The Limited, and Wilson Art are achieving success by establishing competitive response advantages (Day 1990:179).

The emergence of continuous improvement philosophies such as just-in-time (JIT), total quality management (TQM), and theory of constraints (TOC) in the last decade has underscored the importance of time management (Blocher et. al 1999 and Horngren et al. 2000). Thus, cost management systems should provide operational and higher management with the information that supports them to achieve the time objectives of the organization.
Cost management systems can help attain the strategic objective of time by measuring and reporting lost sales and profits from late product introductions, costs of delayed deliveries from suppliers, sales from new versus old products, response time to ship customer orders, and unused capacity available for new product introductions (Blocher et. al 1999 and Horngren et al. 2000).

The list of competitive strategic options includes price/cost, quality, delivery speed, delivery reliability, customer service, flexibility, product design and product image. Since no organization can excel in all these factors simultaneously, the decision to focus on one or a mix of these factors provides a unifying directional force for competitive advantage.

2.3. Advances in the Manufacturing and Information Technologies

The manufacturing environment is undergoing revolutionary changes in many industries with the advent of advanced production techniques. Many companies are adopting new manufacturing and information technologies to remain competitive in the face of the increasing global competition. These include just-in-time production systems to reduce or eliminate waste in the total manufacturing cycle for the purposes of reducing cost, improving quality, performance, and delivery, adding flexibility, and increasing innovativeness (Modarress et al. 2000:1163). Waste is defined as any activity performed which does not add value to the product being manufactured (Zhu and Meredith 1995:21). Waste can thus include inventory, materials handling, queues and delays, quality problems and rejects.

In broad terms, just-in-time affects every aspect of the manufacturing process including the nature and volume of raw material, work in process and finished goods. Product quality and the layout of the production facilities are also influenced by just-in-time philosophy (Horngren et al. 2000:726f.). Realizing the benefits of Just-In-Time depends on the firm's ability to manage costs, not by increasing cost categories, but by being able to identify the driving force behind non-value added activities. Thus, companies may need to revise their costing systems to reflect the new realities of advanced manufacturing methods such as just-in-time.

Also, many companies around the world are adopting the methods applied in Japanese manufacturing, methods that have caused significant cost and quality improvements through
the use of quality teams and statistical quality control. Other manufacturing changes include flexible manufacturing systems, developed to reduce setup times and allow fast turnaround of customer orders. Flexible manufacturing systems use computer-controlled production processes, including computer-aided design (CAD), computer-aided manufacturing (CAM), programmable machine tools, and robots. Global competition is forcing many companies to design and implement flexible manufacturing systems that are more flexible with respect to the product variety, and more productive at the same time (Kaplan and Atkinson 1989:420). These systems can provide the flexibility required for small batch manufacturing, at levels of productivity normally achieved with large volume manufacturing (Monden 1992:160).

Flexible manufacturing systems shift the emphasis from large-scale manufacturing of standard products which was the basis of traditional cost accounting models to highly automated job shop environments (Rayburn 1996:207). Job shops manufacture items in small batches in a short time for specific customers. Thus, flexible manufacturing systems are designed to integrate the flexibility of job shops and the efficiency of mass production systems (Lee and Maneesavet 1999:111). Product costing methods have to adapt to this new technological environment. On one hand, the high production overhead cost of these systems requires a special attention to overhead allocation. On the other hand, the constantly changing setup configuration and production plans require a constant recalculation of overhead allocation and a priori estimation of the expected production cost (Koltai et al 2000:1615).

Another main area of manufacturing process change is the gradual increase in facilities costs relative to the costs of materials and labor in the product (Blocher et al. 1999:9). That is, the costs of activities which are performed to sustain the general production capability of manufacturing plant. Facilities cost have increased relative to the costs of materials and labor used in production the product. Some companies that once viewed facilities costs as uncontrollable and focused their attention on managing labor and materials costs have now redirected their attention to controlling facilities costs. In general, advanced manufacturing technologies have dramatically changed manufacturing cost-behavior patterns; for example, the direct labor costs are decreasing, while depreciation, engineering, and data-processing costs are increasing. These changes have resulted in higher overhead rates and a shrinking base of labor over which to allocate those costs.
In addition to the composition of production costs, there have been some significant changes in the composition of the so-called life-cycle costs of developing, manufacturing, and selling and servicing a product (Blocher et al. 1999:9 and Götze 2004:288f.). The upstream costs of design and of developing vendor relationships have become extremely important, because of the increased awareness that design decisions significantly affect all the costs incurred later in manufacturing, selling, and service. Products must be designed so that they deliver the quality and functionality that are demanded by customers while generating the desired level of profits for the firm (Cooper and Slagmulder 1997a:1). Similarly, the downstream costs of marketing, selling, distribution, and servicing the product are an important part of the total life cycle cost of the product. Cost management techniques must therefore be relevant for upstream and downstream costs, as well as for manufacturing costs of product. Cost management must be applied across the entire life of the product.

2.4. New Forms of Management Organization

Management organization has changed in response to the shifts in marketing and manufacturing. According to Drucker (1993:1) "Every few hundred years in Western history there occurs a sharp transformation. ... Within a few short decades, society rearranges itself - its worldview; its basic values; its social and political structure; its arts; its key institutions. ... We are currently living through such a transformation. It is creating the [post-industrial] society...". Consistent with this observation, the business literature of the 1990's has hailed the coming of new forms of organization in this societal transformation. Terms such as the information-based organization, the self-designing organization, and the cluster organization are used interchangeably to describe new, highly flexible organizational structures in which "the company is no longer a physical entity with a stable mission or location, but a shifting set of temporary relationships" (Kuttner 1997:1).

Company structures are continuing to evolve. The challenge for accountants is to keep up with the wave of change. Organizational structure refers to the way in which an organization's activities are divided, organized, and coordinated (Stoner and Freeman 1992:312). Over the past decades, organizational structures evolve in response to changing opportunities and challenges. Shields and Young (1995:26), for example, argued that throughout the 1970s, most companies were structured like a pyramid with many vertical layers (see the left-hand side of figure 2.4). This structure was used to transmit information vertically between the top
and the bottom layers of the company. Shields and Young (1995:27) also emphasized that the major issue was the horizontal span of control within a vertical layer and these pyramidal structures led to slow and distorted vertical communications, which reduced the quality of outputs and increased their time-to-market and cost. A significant change began in the 1980s. The introduction of new information processing and communication technologies allowed the tops and bottoms of pyramids to communicate more directly. This greatly reduced the need for middle managers. Some companies therefore began to transition their vertical structures from the pyramid to the hourglass form (see the middle figure in figure 2.4).

![Image of vertical organizational structures](image)

**Figure 2.4 Temporal changes in vertical organizational structures**

(Shields and Young 1995:27)

This change is continuing in the 1990s. Now it is predicted that in the future companies will be organized like flat networks, as the figure on the right-hand side of figure 2.4 illustrates (Daft 2001:253). A major strategic advantage for network structure is that the organization, no matter how small, can be truly global, drawing on resources worldwide to achieve the best quality and price and then selling products or services worldwide just as easily through subcontractors (Daft 2001:253). Many organizations are organized horizontally by product, geography or function. The dimensions of such change vary with each application, but there is a general trend towards new forms of management organization. These include such as more emphasis on skill and/or training, more team working, more decentralized autonomy, flatter structures, and closer integration between different functional areas. The following list indicates typically dimensions of change in management organization (Bessant et al. 1992:65): from sharp line staff boundary to blurred boundaries, from step pyramid to flat structure, from vertical communication to network communication, from formal control to...
"holographic" adjustments, from functional structures to product/project/customer-based structures, from differentiated status to single status, from rigid and non-participative to flexible-participative.

The development of new organization designs, such as the flat organizational structure, team based organizational structure, and network organizational structure may force accountants to seek new accounting techniques to resolve the accounting problems that are created by new organizational designs such as responsibility accounting and performance evaluation, costs allocation, information type and flow. If we do not begin to consider the problems created by new organization designs, then we may find that we do not know how to account for some organizational designs. The following Table 2.2 summarizes the primary trends and changes of the business environment.

<table>
<thead>
<tr>
<th>Comparison factors</th>
<th>Prior business environment</th>
<th>Contemporary business environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic of competition</td>
<td>Economics of scale</td>
<td>Cost</td>
</tr>
<tr>
<td></td>
<td>Standardization</td>
<td>Quality</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Functionality</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flexibility</td>
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<tr>
<td></td>
<td></td>
<td>Customer satisfaction</td>
</tr>
<tr>
<td>Manufacturing process</td>
<td>Large-scale manufacturing</td>
<td>Short-scale manufacturing</td>
</tr>
<tr>
<td></td>
<td>Long production runs</td>
<td>Short production runs</td>
</tr>
<tr>
<td></td>
<td>Significant levels of in-process and finished inventory</td>
<td>Focus on reduction of inventory levels</td>
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<tr>
<td></td>
<td></td>
<td>and other non-value-added activities and costs</td>
</tr>
<tr>
<td>Manufacturing technology</td>
<td>Assembly-line automation</td>
<td>Robotics</td>
</tr>
<tr>
<td></td>
<td>Isolated technology applications</td>
<td>Flexible manufacturing systems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Integrated technology applications connected by networks</td>
</tr>
<tr>
<td>Required labor skills</td>
<td>Machine-paced</td>
<td>Self- and team-paced</td>
</tr>
<tr>
<td></td>
<td>Low-level skills</td>
<td>High-level skills</td>
</tr>
<tr>
<td>Emphasis on quality</td>
<td>Acceptance of a normal or usual amount of waste</td>
<td>Goal of zero defects</td>
</tr>
<tr>
<td>Products</td>
<td>Relatively few variation</td>
<td>Large number of variations</td>
</tr>
<tr>
<td></td>
<td>Long product life cycles</td>
<td>Short product life cycles</td>
</tr>
<tr>
<td>Markets</td>
<td>Largely domestic</td>
<td>Global</td>
</tr>
<tr>
<td></td>
<td>Seller's market</td>
<td>Buyer's market</td>
</tr>
<tr>
<td>Type of information recorded and</td>
<td>Almost exclusively financial information</td>
<td>Financial and non-financial information</td>
</tr>
<tr>
<td>reported</td>
<td></td>
<td>The firm's strategic success factors</td>
</tr>
<tr>
<td>Management organizational structure</td>
<td>Hierarchical</td>
<td>Network-based organization forms</td>
</tr>
<tr>
<td></td>
<td>Command and control</td>
<td>Teamwork focus- employee has more responsibility and control</td>
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<tr>
<td></td>
<td></td>
<td>Coaching rather than command and control</td>
</tr>
<tr>
<td>Management focus</td>
<td>Emphasis on the short term</td>
<td>Emphasis on the long term</td>
</tr>
<tr>
<td></td>
<td>Concern for sustaining the current stock price</td>
<td>Focus on critical success factors</td>
</tr>
<tr>
<td></td>
<td>Emphasis on short-term success</td>
<td>Commitment to the long-term success of the firm, including adding</td>
</tr>
<tr>
<td></td>
<td></td>
<td>customer value and shareholder value</td>
</tr>
</tbody>
</table>

Table 2.2 Comparison of prior and contemporary business environment
Trends and changes in the business environment may be the greatest strategic challenge general managers face. Managers must recognize the changes in business environment, understand how these changes will affect the success of organization's strategy, and adjust the strategy and internal context accordingly. The changes in the business environment will probably result in consequences for the strategic orientation of an organization. These consequences will be explained in the following section in the framework of strategic management and "competitive strategies" where strategic management is a comprehensive approach to management aimed at helping organizations achieve strategic objectives and may enable them successfully to cope with trends and changes in the business environment.
3. Strategic Management

3.1. The Concept of Strategic Management

This section aims to provide a brief overview of the main features and purported benefits of strategic management and sets out some ideas, principles and terms that capture the essence of what mainstream academics and managers commonly describe as constituting strategic management. The word "strategy" comes from the Greek *strategos*, referring to a military general or 'thinking and action of a military general' and combining *stratos* (the army) and *ago* (to lead) (Jablonsky 1992:1). In ancient times, it means the art and science of managing military forces to victory (Megginson et al. 1992:197). Over the years, the term has been applied to the business world and, more specifically, to the management of corporations in their drive to improve performance and defeat competitors through strategic decision-making. Since its potential for commercial success was first realized in the early 1960s it has continued to flourish and is now established as a "sine qua non of serious management" (Collinge 1995:22).

In spite of this, strategic management remains a concept that is difficult to define. Nevertheless, a review of the literature does provide a degree of consensus about several key characteristics such as decision-making and the long-term clarification and specification of objectives that together present a coherent model of strategic management. For example, Karst (1998:10) argued that strategic management is a framework within which choices are made concerning the nature and direction of the organization and indicates that strategic decisions are of fundamental importance to the organization. Byars (1984:19) explained that at its simplest level, strategy is important because it is concerned with the definition of the organization's goals and objectives. As a result, strategic management tends to deal with decisions that affect the long-term future of the organization.

Chandler (1962:13), for example, emphasized that the determination of long-term goals and objectives as being central to strategic management. Also, he identified the capacity to decide courses of action and allocate the resources necessary to achieve them, as being crucial to the overall strategic process. Consequently, Chandler (1962) defined strategic management as "...the determination of the basic long-term goals and objectives of an enterprise, and the adoption of courses of action and the allocation of resources necessary for carrying out these goals".
Some studies (see, e.g., Quinn 1980 and Mintzberg and Quinn 1991) argued that strategic planning has a major influence on strategy literature. They stressed that strategic planning integrates an organization's major goals, polices and action sequences into a cohesive whole. Maire and Moore (1993:341) emphasize the importance of planning in the process of strategic management: "Strategic Management involves relating the goals of the organization to its operational environment - not simply in a reactive way but in a consciously planned way which is designed to exert leverage and influence, if not control over the organization". A central aim of strategic management is to help organizations adapt and respond to environment changes. As such, a planning process which evaluates environmental threats and opportunities is a necessary first step to strategic management. Strategic planning must, in fact, be the backbone for strategic management (Götze and Mikus 1999:11).

Strategic management is predicated on the assumption that the environment is in a constant state of flux and requires the organization to adapt accordingly. As Ranson and Stewart (1994:189) argued that "the distinctive purpose of strategic management is to protect the capacity of an organization to respond to change and to redirect day-by-day routines in the light of strategic choices". Also, Gälweiler (1990:84) stated that strategic management seeks to protect the capacity of organization's survival. Consequently, decision-making is conceived to be a constant process of adjustment and proactive responses to real and anticipated changes in the environment. This point is emphasized by Donaldson and Lorsch (1983:6) who defined strategic management as “a stream of decisions over time", and by Pettigrew (1985:438) who stated that "strategy is realized in practice through consistency in a stream of actions and decisions over time".

More recently, Barney (1997:27) for example, argued that strategic management is not confined to decision-making, but has major implications for all aspects of the organization. It is necessary to ensure that the organization has the right structures, processes and culture, or mind-set, to carry through a program of change. Strategic management allows an organization to be more proactive than reactive in shaping its own future; it allows an organization to initiate and influence (rather than just respond to) its environment and activities, and thus to exert control over its own destiny. In addition, by the strategic management process, an organization can take advantage of key environmental opportunities, minimize the impact of external threats, capitalize upon internal strengths, and improve internal weaknesses.
Small business owners, chief executive officers, presidents, and managers of many for-profit and non-profit organizations have recognized and realized the benefits of strategic management. Research studies indicate that organizations using strategic-management concepts are more profitable and successful than those that do not. For example, Robinson (1982:80) concluded that businesses using strategic-management concepts show remarkable improvement in sales, profitability, and productivity compared to firms without systematic planning activities. Other studies stated that a significant improvement in a firm's profitability is achieved through changes in strategic direction (Schoeffler et al. 1974:137 and Rhyne 1986:432). Companies with planning systems more closely resembling strategic-management theory generally exhibit superior long-term financial performance relative to their industry. For example, Smith and Ferris (1986:454) reported that the practices of high-performance companies reflect a more strategic orientation and longer-term focus.

Strategic management offers other tangible benefits, such as an enhanced awareness of external threats, an improved understanding of competitors' strategies, increased employee productivity, reduced resistance to change, and a clearer understanding of performance-reward relationships (Thompson 1993:9). Strategic management enhances the problem-prevention capabilities of organizations because it promotes interaction among managers at all divisional and functional levels (Greeney 1986:106). Interaction can enable companies to turn on their managers and employees by nurturing them, sharing organizational objectives with them, empowering them to help improve the product or service, and recognizing their contributions. Finally, more companies today fail as a result of change. That is, companies either fail to respond to changes in their environment or they fail to create change. Strategic management is a method by which companies can become more competitive and increase their chance of survival.

### 3.2. The Strategic Management Process

There is no one universally accepted way of practicing strategic management. Different authors use different models. However, in most cases, authors refer to strategic management as a process that includes the various aspects of strategy formulation, implementation and evaluation and control. The purpose of this section is to provide a brief overview of the strategic management process. As was stated earlier, strategic management is a comprehensive approach to management aimed at helping organizations achieve strategic
objectives. Basically, strategic management can be broken down into three phases: strategic planning, strategy implementation and strategic control (Götze and Mikus 1999:10 and Megginson et al. 1992:198). The figure 3.1 shows the basic components of strategic management, which includes not only the planning process but the implementation and control phases as well. Although the steps in strategic management process are separate and consecutive, it is important to note that considerable overlap among the steps exists. Additionally, multidirectional arrows in the figure 3.1 illustrate the importance of good communication and feedback throughout the strategic management process.

![Figure 3.1 The strategic management process](Götze and Mikus 1999:10 and Wheelen and Hunger 2002:10)

**Strategic planning** has become exceptionally important in management circles today, it includes those activities that involve defining the organization's mission, setting its objectives, analyzing the external and internal environment of the organization, and developing and selecting strategies to enable it to operate successfully in its environment (Rowe et al. 1989:12). The figure 3.1 illustrates that strategic planning starts with a clear understanding of the organizational mission. Secondly, organizational objectives must be established so that everyone knows what management wants to accomplish. Thirdly, management identifies the
strategic alternatives available to achieve those objectives. This steps entails examining the organization's strengths and weaknesses, forecasting the future environment, and so on. Finally, to complete the planning process, strategic choices are made.

**Mission.** Organizations simply cannot survive if they do not know where they are going and what they are all about. An organizational mission defines the fundamental, unique purpose that sets a company apart from other companies of its type and identifies the scope of the company's operations in terms of products (including services) offered and markets served (Wheelen and Hunger 2002:11). In other words, mission statement describes an organization's purpose, its customers, its products (often in functional terms, that say what need or needs are being met), and its technology (that is, how it delivers its products or services). Thus, it is the purpose or reason for the organization's existence.

Mission statements often reveal the company's philosophy as well as purpose (Daft 1994:188). An organizational philosophy establishes the values, beliefs, and guidelines for the manner in which the organization is going to conduct its business (David 1993:102). The organizational purpose defines the activities that the organization performs or intends to perform and the kind of organization that is or intends to be. The mission statement tells who we are and what we do as well as what we'd like to become. Organizations need clearly stated and easily understood mission statements.

Mission statements should be sufficiently narrow to help the company determine its proper market niche (Megginson et al. 1992:203). One of the easiest ways to fail is to attempt to satisfy everyone. Because of the different characteristics of customers and geographic areas, and varying product preferences, a company attempting to satisfy a large group of diverse customers is forced to make compromise decisions in virtually every aspect of its pricing, product features, and service policies. Consequently, it finds itself failing to satisfy anyone completely. Other competitors are likely to move into the industry and develop plans that focus on narrow market niches. And the original company, in its attempt to retain a large, diverse market, frequently finds this market disappearing into small slices that are served by other companies with narrower focuses. In highlighting the importance of mission statements, Drucker (1973:75) argued that the mission statement defines the organization. He stated that
"...only a clear definition of the mission and the purpose of the organization makes possible clear and realistic business objectives".

Objectives. An organization without objectives is an organization without direction. Objectives are the end results, goals, or targets that all organizational activities seek to attain (Megginson et al. 1992:174). They are an important part of planning process because they become the focal point for directing strategies. Although objectives can vary widely from organization to organization, normally they can be categorized as follow: profitability, service to customers, employee needs and well-being, social responsibility, and others. The following items provide potential areas for establishing long-term objectives for most organizations: profitability, markets, productivity, product, financial resources, physical facilities, research and innovation, organization structure and activities, human resources, customer services, social responsibility (Raia 1974:38). All organizations do not have objectives in all of these areas.

Generally, long-term objectives need to be established for every area of the organization where performance and results directly influence the survival and prosperity of the organization (Drucker 1973). Long-term objectives must support and not be in conflict with the organization's mission (Thompson 1993:122). They should be clear, concise, and quantified whenever possible and should be detailed enough so that the organization's personnel can clearly understand what the organization intends to achieve. They should span all significant units or areas of the organization and not concentrate on just one area. Objectives for different areas of the organization can serve as checks on each other, but should be reasonably consistent with each other. Finally, objectives should be dynamic in that they need to be reevaluated in light of changing conditions. They then become measurable points which indicate how the organization is making definite progress towards its mission.

Organizational mission statements, policies, objectives, and strategy are not mutually exclusive components of strategic planning process. Rather, they are highly interdependent and inseparable. One cannot talk about attaining objectives without knowing the policies that must be followed. Similarly, a strategy cannot be determined without first knowing the objectives that are to be pursued and the policies that are to be followed. Furthermore, strategy implementation impacts upon the strategic planning process. The figure 3.1, which shows the entire strategic management process as a series of sequential steps, should be
considered merely as a method for analyzing the entire process and not as a step-by-step process that should be sequentially followed.

**Internal organizational analysis and external environmental analysis.** Before an organization can set realistic objectives and establish strategies, it must determine its present status. An internal organizational analysis is designed to answer in part the question "Where are we now?" It is an evaluation of all relevant factors within the organization (Wheelen and Hunger 2002:10). In practice, a checklist of factors is used in performing an internal organizational analysis. A typical checklist might include the following factors: financial position, organizational structure, quantity and quality of personnel, product line, competitive position, condition of facilities and equipment, marketing capability, research and development capability, past objectives and strategies (Brauchlin and Wehrli 1991:62). Based on understanding of these areas, managers can determine their company's weaknesses or strengths vis-à-vis other companies.

The external environmental analysis is also part of the process of answering the question "Where are we now"? It includes those factors that may influence the success of the organization but are external to and not under the total control of the organization. Developing an awareness of the present and future external environment enables the organization to respond more effectively to change. An organization exists within an industry environment, the industry environment and the individual organization within the industry are influenced by political, economic, ecological, social, and technological forces as shown in the figure 3.2 (Hungenberg 2000a:73). The external environmental analysis is performed to identify the external opportunities and threats. The firm also must know its own capabilities and limitations in order to select the opportunities that it can pursue with a higher probability of success. The situation analysis therefore involves an analysis of both the external and internal environment. The external environment has two aspects: the macro-environment that affects all firms and a micro-environment that affects only the firms in a particular industry. Developing an industry profile is an important element in understanding present environmental conditions. An industry profile answers questions about key areas of a particular industry. Some of the areas that might be examined are marketing practices, market structure, financial condition, competition, operating conditions, and production techniques
(Megginson et al 1992:211). The industry environment is also influenced by forces outside the industry itself.

An organization not only must analyze its present environmental conditions but also must forecast its future environment (Hungenberg 2000a:71). Establishing objectives and strategies is much easier under stable environmental conditions. However, establishing objectives and strategies is more realistic when forecasting is made. Regardless of the strong possibility of error, to be successful organizations should forecast their future environment. Forecasting is concerned with assessing the impact of many forces (political, economic, social, and technological forces) on an organization (David 1993:78). It also focuses on developing an understanding of the expected future for the most important issues and trends.

The internal organizational analysis and the industry profile determine the organization's strengths and weaknesses. The industry profile partially indicates the threats/opportunities for the organization based on its present and future industry environment. The external environmental analysis is designed to identify the key environmental forces that have influence on an organization and its industry. The present impact of these forces helps in identifying the threats/opportunities for the organization. Forecasting the future environmental forces identifies the key forces that are most likely to affect the organization and its
threats/opportunities. David (1993:168) argued that internal strengths/weaknesses, coupled with the external opportunities/threats and a clear statement of mission, provide the basis for establishing objectives and strategies.

**Identifying strategic alternatives.** Strategies need to be set at the corporate, business, and functional levels. The formulation of these strategies follows the decision-making process (Robbins 1991:224). Specifically, management needs to identify and evaluate alternative strategies and then select a set that is compatible at each level and will allow the organization to best capitalize on its resources and the opportunities available in the environment. In choosing a strategy, an organization has a wide variety of options, therefore, evaluation of alternative strategies considers an important step in strategy formulation. Schendel and Hofer (1979:268) have described four criteria for evaluating strategic alternatives: (1) The strategy and its component parts should have consistent goals, objective, and policies; (2) It should focus resources and efforts on the critical issues identified in the strategy formulation process and separate them from unimportant issues; (3) It should deal with sub-problems capable of solution, given the organization's resources and skills; and (4) The strategy should be capable of producing the intended results - that is, it should show promise of actually working. In evaluating alternatives, it is also important to focus on a particular product or service and on those competitors who are direct rivals in offering it. A strategy that does not create or exploit the organization's particular advantage over its rivals should be rejected.

**Strategy selection and strategy implementation.** In choosing among the available possibilities, successful managers will select the strategies that are best suited to the organization's capabilities and give their organization the more favorable competitive advantage; then they will try to sustain that advantage over time. The strategic management process does not end when the organization decides what strategy or strategies to pursue. There must be a translation of strategic thought into strategic action. This translation is much easier if managers and employees of the organization understand the business, feel a part of the company, and through involvement in strategy-formulation activities have become committed to helping the organization succeed. Strategy implementation involves those activities necessary in carrying out the chosen strategy. These activities include developing an organizational structure, managing the day-to-day organizational activities, and evaluating the effectiveness of the strategy (Byars 1984:162). Implementing strategy affects an organization
from top to bottom; it impacts all functional and divisional areas of the business. Therefore, successful strategy implementation requires support, discipline, motivation, and hard work from all managers and employees.

**Strategic control.** The basic premise of strategic management is that the chosen strategy will achieve the organization's objectives. However, the possibility of this not occurring gives rise to the need for the strategic control process. In the control phase of the strategic management process, top management determines how well or whether the chosen strategy is achieving the organization's objectives. Company controllers often play a role in designing a system of strategic control. The two main questions relevant to strategic control are (1) Is the strategy being implemented as planned? and (2) Is the strategy achieving the intended results? (Aaker 1984:174).

### 3.3. Levels of Strategy

The responsibility for management of strategy-related issues will fall to different individuals, depending on the size of the organization (Daft 1994:221). In smaller enterprises, the owner may be responsible for the management of all facts of the strategic process. In larger enterprises, top management will be responsible for the entire process while middle management may be concerned with implementation in order to achieve strategic objectives. In such larger organizations, three levels of strategy can be identified: corporate-level strategy, business-level strategy, and functional-level strategy (Leontiades 1980:63 and Hamermesh 1986:115).

**Corporate-level strategy** considers the organization as a whole and identifies the most favorable portfolio of businesses for an organization to be engaged in. At this strategy level, the objectives of the organization are identified, together with the best way that these may be achieved in terms of the strategic orientation of the company. Corporate strategies define the businesses in which the organization will compete (Boone and Kurtz 1992:148). They determine the long-term objectives of organization and identify the courses of action and allocation of resources necessary to achieve these objectives. In choosing a strategy, an organization has a variety of options. The types of strategies which a corporation selects will be contingent on its unique position within its environment (Thompson 1993:495).
**Business-level strategy** is concerned with the way in which the particular businesses of the organization successfully cope with the industry environment in which they operate. It deals with such questions as: How will the business compete within its market? What products/services should it offer? Which customers does it seek to serve? How will resources be distributed within the business? (Stoner and Freeman 1992:200). Business strategies focus on how to compete in a given business. They determine the competitive approach of organizations that have a single product or the competitive approach of each strategic business unit of a multi-product organization.

**Functional-level strategy** relates to the functional areas of a business and is concerned with the process of implementing business strategies. It seeks to answer the question: How do we support the business-level strategy? (Daft 1994:222). It is developed for each functional area in the organization, such as research and development, manufacturing, marketing, human resources, and finance (Götze and Mikus 1999:185). The effectiveness of functional strategies is determined by the degree to which they support the business strategies of the organization. For example, if the business-unit strategy calls for the development of a new product, the R&D department will create plans on how to develop that product.

Although the three types of strategies involve different levels of management with each making different types of decisions, the strategies should be consistent with each other and be well integrated if the whole organization is to be successful. If corporate, business, and functional strategies do not fit, the organization will eventually encounter serious difficulties. The following sections deal with competitive strategies. This is not to demean the importance of other strategies for the success of organization.

### 3.4. Competitive Strategies and Firm Success

#### 3.4.1. Porter's Competitive Strategies

Competitive strategy is the choice of how an organization or business unit is going to compete in its particular industry or market. By far the best known and most used set of competitive strategies are Michael Porter's Generic Strategies. Michael Porter sees three ways in which a firm can gain a competitive advantage: cost leadership, differentiation, or focus. He calls these generic strategies because they can be applied to a firm in any industry. The figure 3.3 illustrates Porter's generic strategies.
### Figure 3.3 Generic competitive business strategies (Porter 1998b:39)

<table>
<thead>
<tr>
<th>Target Scope</th>
<th>Strategic Advantage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low cost position</td>
<td>Uniqueness perceived by the customer</td>
</tr>
<tr>
<td>Cost leadership strategy</td>
<td>Differentiation strategy</td>
</tr>
<tr>
<td>Focus strategy (low cost)</td>
<td>Focus strategy (differentiation)</td>
</tr>
</tbody>
</table>

#### 3.4.1.1. Cost-Leadership Strategy

This category of strategy seeks to improve efficiency and control costs throughout the organization's supply chain. It is pursued by organizations which strive to be the lowest cost producers in an industry, through approaches such as economies of scale of production, learning curve effects, tight cost control, and cost minimization in areas, for example, R&D, services, sales force, or advertising (Porter 1998b:35). They compete with each other in areas such as process technology, raw material input costs and capacity utilization. Organizations that operate in this category usually sell a standard product (Picot and Scheuble 2000:242). Examples of organizations following this strategy include Wal-Mart, Texas Instruments, Timex, and Hyundai (Barney 1997:185).

While cost leaders may be the cheapest producers in their market, they cannot ignore the basis of differentiation. If the consumer perceives that the leader's product is not comparable to its competitors then a cost leader may be forced to discount its price even further to ensure the sale. For example, when Texas Instruments entered the "affordable" watch market, but were forced to reduce the sale price of their product in the short term and carry out a major product redevelopment. This was due to the customer perception that their product was inferior to their main competitors, namely Casio. The main risk for organizations that decide to compete in this category is that there can only be one cost leader and competition can intensify, leading to a price war where no one wins (Porter 1998b:45).

#### 3.4.1.2. Differentiation Strategy

According to this strategy the company seeks to differentiate itself from its rivals by achieving a degree of uniqueness that is valued by many customer segments. The company
can charge a price premium, where the premium achieved is more than the costs incurred, leading to higher than average margins. Organizations that pursue this strategy design their products to possess one or a number of the attributes which are of value to the customer and which make their products "stand out" from their competitors. Characteristics that are common for organizations operating in this category are that they have higher than average profit margin due to being unique in the market and will continuously be updating their products to ensure that they are in touch with the needs of their customers.

This category differs from the cost leader category, since there can be more than one successful differentiation strategy within a market if there are a number of attributes that are widely valued by the buyer. Organizations have succeeded in differentiating their products through improving quality, better after-sales services and more reliable delivery as well as through increasing the functionality (Porter 1998b:38). The majority of organizations chose to operate within this category. Examples of companies following this strategy and their approaches to product differentiation include brand loyalty (Coca Cola in soft drinks), superior customer service (IBM in computer), dealer network (Caterpillar Tractors in construction equipment), product design and product features (Hewlett Packard in electronics), and/or product technology (Coleman in camping equipment) (Porter 1998b:37).

The main risk for organizations operating with strategies from this category is that the consumer may sacrifice some of the uniqueness of the differentiated product in order to avail of large cost savings. This is what happened in the US in the late eighties, where Kawasaki succeeded in taking a significant portion of Harley-Davidson’s market share due to much lower sales price for their motorcycles (Porter 1998b:46). Another risk associated with this category is that imitation by competitors will narrow the perceived differentiation between the products (Example IBM PC and IMB clone PC’s) (Hill and Jones 2001:210).

3.4.1.3. Niche Market Strategy

The focus strategy concentrates on a narrowly defined segment of the market (market niche), and attempts to make its organization the market leader within this niche (Porter 1998a:15). The segment may be a particular group of customers, a specific geographic area, or a certain part of the product or service line (Rowe et al. 1989:156). The rationale is that by specialization the organization can serve the market segment more effectively than can
competitors who attempt to cover the entire market (Dess and Miller 1994:68). The focus strategy still relies on a cost leadership or a differentiation strategy, or perhaps both, to establish a strong position within the particular market segment, or niche.

The differentiation within a focus strategy can occur by exploiting differences in the special needs or wants of a buyer in a specific market segment and tailoring products to the specialized needs of the market segment. In cost focus strategy, the organization strives to exploit differences in cost behavior of specific market segments. It can be based on finding a distinct group of customers whose needs are slightly below average. Costs are saved by meeting their needs specifically and avoiding unnecessary additional costs (Thompson 1993:216). Organizations in this category have adopted the opinion that "It is better to be a big fish in a small pond, rather than a minor swimming with whales". Some risks of focus strategies include imitation and changes in the target segments. Furthermore, the success will encourage other organizations into the market niche. This increases competition and tightens margins since the market available is not large enough to be financially viable (Porter 1998b:46). Finally, other focusers may be able to carve out sub-segments that they can serve even better. Examples of companies that have successfully adopted a niche strategy are Toyota's Lexis car market or Rolex in the "expensive" time-piece market.

3.4.1.4. A Combination of Generic Strategies - Stuck in the Middle

Porter asserted that the three strategies were distinct mutually exclusive alternatives. He argued that firms may be able to successfully pursue more than one of these strategies simultaneously, but "this is rarely possible" (Porter 1998a:17). A firm which failed to follow one of the strategies was "stuck in the middle" which guaranteed the firm low profitability as shown in the figure 3.4. An organization that is stuck in the middle is not able to sustain a competitive advantage. This often happens when a successfully differentiated organization attempts to diversify outside its area of expertise, the area where it can compete effectively. Also, focus organizations have failed by moving outside their area of focus. For example, People Express airline lost its successful geographic niche when it began to expand to a national market, where it could not compete successfully (Hill and Jones 2001:217).
Another common way for a company to get stuck in the middle arises from the normal progression of a firm from one type of strategy to another as it grows. Often, a firm will begin small and succeed through effective differentiation or focus. Then, as the firm grows and its product or service matures in the marketplace, the firm will begin to focus on cost leadership as the principal way to success. A firm must be careful to identify these stages in its growth and appropriately adapt its corporate strategies to them.

### 3.4.1.5. Support for Porter

There has been some support found for Porter's concept of generic strategies. For example, Hambrick (1983:213) in his study of capital goods producers found that among the higher producing firms all three generic strategies appeared. His analysis showed that a single strategic approach was evident, not a mixed or hybrid strategy. Dess and Davis (1984:467), in their study of firms in the paint industry, verified the construct validity of the generic strategy typology and found that a commitment to one of the three strategies will result in higher performance than those firms which are stuck in the middle. Robinson and Pearce (1988:43) in an across industries study, found that firms which pursued inconsistent strategies were under-performers.

Miller and Friesen (1986:37) examined the performance of Porter's generic strategies on strategic management in consumer durable industries in the United States, also they validated the typology. Kim and Lim (1988:821), in their study of 54 high-growth electronics firms in Korea, concluded that the performance of firms without a clear-cut strategy was less than those firms that used generic strategies. Finally, Hooley et al. (1992:75) investigated the
nature of generic marketing strategies in industries in Great Britain, the presence of generic marketing strategies which closely resembled Porter's strategies were identified. The study found that businesses that followed a “stuck in the middle” strategy were mediocre performers. Porter's generic strategies typology is robust (Kotha and Vadlamani 1995:80) and even though it is simple, it captures much of the complexity of business unit strategies (Miller and Dess 1993:453).

3.4.1.6. Criticisms of Porter

While Porter's generic strategies have received considerable support, they have been attacked on both the theoretical and empirical fronts. Porter's assertion that the generic strategies are mutually exclusive has been questioned. Hill (1988:401) contended that Porter's model is fundamentally flawed, arguing that differentiation maybe a means to overall low cost leadership, especially within emergent industries or in mature industries that are experiencing technological change. Further, Hill argued that there are many situations in which establishing a sustained competitive advantage requires the firm to simultaneously pursue both low-cost and differentiation strategies because in many industries there is no unique low-cost position particularly in mature industries.

Murray (1988:390), Wright (1987:93) and Miller (1992:37) all argued that mixed or hybrid strategies have distinct advantages and that pursuing a single generic strategy may be dangerous, leading to lower performance. There have been a number of studies that suggest that following a combination or mixed strategy is the best course, which contradicts the assertions of Porter. A study of the screw machine products industry found businesses that compete with a combination of low cost and differentiation strategies can outperform their rivals that compete with alternative strategies (Wright et al. 1991:59).

Miller and Dess (1993:577) showed in their study of manufacturers that Porter's model doesn't accurately portray strategy-performance relationships. They found that not only are combinations of the generic strategies possible, but that the combinations are also profitable, especially a combination of low cost and high differentiation. Porter's model of three generic strategies has generally been criticized for failing to describe the available strategies adequately and for espousing the appropriateness of only low cost and differentiation in the competitive, global market (Chrisman et al. 1988:418). In response to these criticisms, hybrid
strategies have been advocated as the most effective. The argument for using a combination of these strategies may be more advantageous than a pure or strict generic strategy.

In reality, many firms will choose not just one general strategy, but a combination of the three general strategies. Strategic positioning is the process of selecting the optimal mix of these three strategic approaches. The mix is selected with the objective of creating a sustainable competitive advantage. A strategy, reflecting combinations of the three general strategies, can be defined as: "... choosing the market and customer segment the business unit intend to serve, identifying the critical internal business processes that the unit must excel at to deliver the value propositions to customers in the targeted market segments, and selecting the individual and organizational capabilities required for the internal, customers, and financial objectives" (Kaplan and Norton 1996:37). As used in definition, "choosing market and customer segments" is actually focusing; "delivering value propositions" is choosing to increase customer receives and/or decrease customer sacrifice, and, therefore, entails cost leadership and/or differentiation strategies, or a combination of two. Developing the necessary capabilities to serve the segments is related to all three general strategies.

Firms have responded to the changes in business in many ways, including reengineering operational processes, downsizing the workforce, outsourcing service functions, and developing smaller, more efficient, and more society responsible organizational policies and structures. They have attempted to become adaptable as the pace of change increases. Firms also are beginning to make use of cost management to support their strategic goals. Cost management has shifted away from a focus on the stewardship role - product costing and financial reporting. The new focus is on management facilitating role - the development of cost and other information to support the management of the firm and the achieving of its strategic goals. Before the changes in business processes, a focus on detailed methods for product costing and control at the department level was appropriate for the high-volume, standardized, infrequently changing manufacturing process of that time. Now, a firm’s cost management systems must be more dynamic to deal with the more rapidly changing environment and the increasing diversity of products and manufacturing processes. The cost management systems must be able to assist management in this dynamic environment by facilitating strategic management.
The changes in the business environment, which are explained above, have consequences for cost accounting and management as well as for all other functions of an organization. In the following section we will evaluate ability and flexibility of traditional cost management to help in achieving the management functions, particularly, strategic management, and to support requirements of business environment changes and long-term firm’s success.
4. Traditional Cost Management and Long-Term Firm's Success

4.1. Literature Review

Traditional cost management originates from a time when the focus of attention was not the whole value chain, production was relatively aimed at one product or a homogeneous range of products but was not flexibly automated, and when the indirect functions played a subordinate role unlike today (Horvath 1991:72). Traditional cost management was developed in a moderate business environment, in which production was the crucial competition factor and cost structures were unequally more flexible and thus easy to influence (Fröhling and Weis 1992:135). The main task of cost systems was recording and reporting the past events regarding costs and profits (in the form of periodical reports); cost systems focused on determining the cost of goods produced and the cost of inventory (Berliner and Brimson 1988:86). Costs were classified into functional categories, and the determination of manufacturing costs consumed much effort (Hansen and Mowen 2000:2). The preparation of past-oriented data takes a great amount of time as well as personal and financial resources.

Many studies argued that traditional cost management systems are inadequate for the contemporary business environment requirements. For example, Eiler et al. (1982:133ff.) stated that traditional cost management systems are slow to present information, and they are very expensive to operate. Johnson and Kaplan (1991:1) also argued that traditional cost management systems fail to produce timely and useful information, cannot identify properly the users of information, and most importantly, do not reflect the new competitive environment.

Turney (1996:1) emphasized that traditional cost management systems can weaken your competitive position by encouraging an organization to set the wrong priorities and focus on the wrong problems; they can lead an organization to: focus on the wrong markets, serve the wrong customers, increase the cost of production, incorrectly change the structure of an organization, institute cost cutting programs that fail, and obtain the wrong parts from outside suppliers (incorrect sourcing decisions).

Shank and Govindarajan (1989:5) asserted that the ideal goal in designing an accounting system (determination of exactly where customer value can be enhanced or cost lowered) is "a function radically different from traditional record keeping". We cannot expect those systems...
to cover today's information requirements originating from the changes explained above such as information concerning the customer profitability, sales channels, complexity, support new technology techniques, facilitating the development of a successful business strategy or support process or customer orientation.

In traditional cost management systems, in comparison to many other management instruments, certain developments, e.g. customer or process orientation, have not been considered urgent. This may be a consequence of the fact that between 1950 and 1980 in many places there was not enough mutual interest between theory and practice. Practitioners were not interested in the theoretical problems and innovations and they did not contribute to the transfer of their own problems into theory (Johnson and Kaplan 1991:177).

According to Johnson and Kaplan (1991:234) the traditional cost management systems mainly focus on short-term costs. Due to decrease share of this costs, cost management systems should more and more focus on long-term product costs; long-term product costs comprise costs of design, development, and engineering as well as costs which originate from areas out of the company (marketing, distribution, service costs) plus fixed costs, which can be linked with production output. Yet knowing these costs is critical for companies engaging in such tasks as continuous improvement, total quality management, environmental management, productivity enhancement, and strategic management. In recent years, the significance of overhead has increased extremely. Knowledge workers, particularly engineers and software specialists, have displaced much of the direct labor force in many plants. In some cases, overhead costs outside the plant - engineering, marketing, and distribution - has increased to where it exceeds direct labor costs. Figure 4.1 illustrates this trend - the importance of overhead costs.

The relative importance of direct labor and overhead has changed over 150 years. Kammlade et al. (1989:6) suggested not only that overhead is a growing proportion of total cost, but also that manufacturing overhead now represents about a third of total manufacturing costs in a typical company, with administrative overhead (selling, general, administrative expenses) accounting for an additional 30-50 percent of total manufacturing costs. Kaplan (1984:96) goes so far as to suggest that variable costs will disappear except for purchases of materials and the energy required to operate equipment, "Not only will labor costs be mostly fixed;
many of them will become sunk costs”. Thus, the focus of yesterday's cost management systems on direct cost must give way to new cost management systems that focus on overhead (Turney 1996:34).

![Figure 4.1 The relative importance of direct labor and overhead costs over 150 years (Turney 1996:34)](image)

Traditional cost management systems were developed at a time when direct labor was a large percentage of the total product costs. Changes in manufacturing technologies, such as the just-in-time philosophy, robotics, and flexible manufacturing systems decreased the direct labor component of production and increased overhead costs. As a result, product cost distortion occurs due to allocating overhead costs to the products arbitrarily on the basis of direct labor hours used by each product (Böer 1994:22). Cost distortion means that some products have costs that are too high and others have costs that are too low, and almost all products have costs that are WRONG. Cost distortion has many harmful side-effects. The fact that product costs are wrong leads managers to make wrong decisions about marketing, product design, capital equipment purchases, organization changes, sourcing and out-sourcing decisions. Most companies analyze their products to determine which ones are profitable and which are not. This analysis leads to the company focusing its attention on the profitable products and abandoning (or sidelining) the unprofitable ones. The problem is that these decisions can be disastrously wrong when the calculated costs are wrong.
Cooper (1988:49) reports several situations that can cause distortions to occur, such as production volume diversity, complexity diversity, material diversity, and setup diversity. In connection to the process of overhead costs allocation the concept of "hidden costs" emerged; hidden costs means those costs which originate from the complexity of the company and which cannot be explained with the output of the production; to make this hidden costs visible, we need to start understanding the primary cost drivers, a goal that all virtually traditional systems fail miserably to achieve (Johnson and Kaplan 1991:237).

Due to an increased automation, direct labor costs shift to overhead costs, whereas direct labor costs fall, procurement costs, for example, rise and in some cases 50% or more of the product costs are part of these two types of costs. Degraeve and Roodhooft (2001:22) assert that purchased products and services account for more than 60% of the average company's total costs. For steel companies, that number goes up to 75%; it's 90% in the petrochemical industry. Even at service companies, the figure is typically a hefty 35%. Bringing down procurement costs can have a dramatic effect on the bottom line - a 5% cut can translate into a 30% jump in profits. Traditional cost management systems do not illustrate the costs of obtaining raw materials and individual parts detailed enough (only within the overhead costs), in order to realize the necessity of optimizing the procurement processes. Also, in traditional cost management systems, procurement costs are allocated to products arbitrarily (Cooper and Slagmulder 1998b:16). Procurement has long been considered a business area in which more efficient arrangements were not necessary. However, the increasing importance of procurement processes makes it essential to manage the procurement costs.

Such traditional cost management systems lead to wrong decisions and thus resources are not well distributed. This may affect the performance of the company. Also, in traditional cost management systems, certain data is not analyzed enough. For example, there is not enough detailed information about customer profitability, sales channels, complexity, support new technology techniques, support process or market orientation as well as competitors (e.g. cost structure of competitive products). The following further examples show that traditional cost management is no longer relevant according to requirements of the business environment changes and supporting long-term firm's success.
4.2. Evaluation of Traditional Cost Management - Some Examples

4.2.1. Non-Financial Controlling-Information

The demand for balanced (financial and non-financial) controlling-information for the control of company activities cannot be met satisfactorily with data that primarily originate from traditional cost management. The focus of traditional cost management is mainly on meeting the requirements of financial reporting (Ames and Hlavacek 1990:82). Hansen and Mowen (2000:5) asserted that over the past decades financial reporting was the driving force for design of traditional cost management systems (as shown in figure 4.2). It is obvious that the company information is often not detailed enough when the focus is on traditional cost management. Managers who try to use traditional cost management information for decision-making, they may be doomed to make mistakes. According to Böer (1994:26), traditional cost management "was never designed for decision making - conventional cost management was created to produce cost values for financial reporting".

![Figure 4.2 Old management information system (Johnson 1992:122)](image)

Financial and non-financial information management needs to effectively manage the company. Financial information alone can be misleading, for instance, because it trends to
have a short-term focus. For competitive success, a company needs to focus primarily on long-term factors, such as product and manufacturing advances, product quality, and customer loyalty. For example, an emphasis on financial information alone could lead managers to stress cost reduction (cost is a financial measure), while ignoring or even lowering quality standards (a non-financial measure). This decision could be a critical mistake, leading to the loss of customer and market share in the long term. Cost management systems must provide the managers with both financial and non-financial information and both short-term and long-term to lead their companies to competitive success.

In the competitive business environment, company's operations departments must link with customer and suppliers, and management must strive to get all processes in control, this requires new management information system (see figure 4.3) (Johnson 1992:122). Strategic planning and decision making require a much broader set of cost information than that provided by product costs. Cost information about customers, suppliers, and different product designs is also needed to support strategic management objectives. This broader set of information should satisfy two requirements. First, this set should include information about the firm's environment and the internal working of the firm. Second, the information set also must be prospective and thus should provide insights about future periods and activities.

![Figure 4.3 New management information system (Johnson 1992:123)](image-url)
Traditional cost systems have also been criticized because they fail to report on such issues as quality, reliability, lead times, flexibility and customer satisfaction, despite the fact that they represent the strategic goals of world-class manufacturing companies (Johnson and Kaplan 1991:209). Traditionally, cost management systems have tended to focus on costs. Consequently, there is a danger that if the non-financial measures that are necessary to compete successfully in today's worldwide competitive environment are not emphasized, managers and employees will be motivated to focus exclusively on cost and ignore other important marketing, managerial and strategic considerations.

4.2.2. Standard Cost Perspective and Cost Management

Organizations need to know what their costs are and be able to understand why they incur these costs in order to determine and manage their profitability. Yu-Lee (2001:14) argued that understanding cost behavior and cost dynamics from the standard cost perspective made cost management less manageable; costs from this perspective become less manageable for multiple reasons:

- In reality, a large portion of total costs are being allocated arbitrarily.
- Variance analysis adds to the complexity of cost management.
- Organizations begin to lose control and visibility of their cost drivers.
- Organizations are beginning to understand that cost dynamics exist but are learning the wrong aspects of cost dynamics.

Standard cost-techniques often allocate costs based on standards. Because the setting of standards is very difficult and an important step in a well-function standard cost system, this area highlighted a weakness of the system (Shank and Govindarajan 1993:142). The standards might not reflect reality if improperly determined, if not updated to reflect the current state of operations, or if they are not consistent with what creates costs being allocated. Standard might be improperly determined, for example, if improper assumptions were made regarding the capabilities of the operations. If standards were determined in a controlled setting where the assumptions leading to the control do not reflect the reality of the operation, the standards are likely to be incorrect. For example, in a controlled setting, all incoming materials might be perfectly to specification, whereas in a real situation, the materials might include defects, which can impact the number of good parts coming out of the operation.
In today's dynamic manufacturing environment, Shank and Govindarajan (1993:142) emphasized that the proper updating of standards is a difficult and costly process. Therefore, the standards are seen by the manufacturing floor as being constantly out of date. Cooper and Kaplan (1999:66) stressed that for operational control, companies need to shift away their traditional systems such as standard cost since these systems emphasize performance against historical standard, for example, one organization determined its standards a number of years in the past and measured performance increases by analyzing year-to-year variances and job-to-job variances. Improvements were determined based on the value of the variance vis-à-vis previous jobs. Improvements, therefore, were discussed in terms of whether an unfavorable variance was reduced or whether a favorable variance had increased using standards often many years old as the basis.

One of the biggest problems associated with standard costing is that the costs are being allocated using values that may have nothing to do with why the costs were incurred in the first place (Yu-Lee 2001:14). Assume, for example, that an organization makes two products X and Y. Although X and Y take the exact same amount of direct labor to produce, because Y is a custom product, 90 percent of the time of the indirect labor force is focused on supporting the needs of Y. If allocation is performed using direct labor hours, as is the case using standard-costing techniques, the indirect labor is spread evenly across the products. This hides the fact that much of the activities of the indirect labor is being driven by the needs associated with supporting Y. Standard costing would suggest, in this case, that the costs would be the same for both products; logic would suggest that Y should cost more because it creates the majority of the costs. This is not as much of a problem when only 10 percent or so of an organization today finds that a significant percentage and often a clear majority of its costs are being allocated, inferring that unit costs are very much out of alignment with real costs. Baker (1989:24) argued that cost drivers that have been important in the past may no longer be pertinent. Also, Kaplan (1988: 61) stressed that one fundamental weakness of traditional cost systems is the fact that the allocation of indirect costs is based on a few too cost drivers. Typically, direct wages, machine time, and materials cost are the major cost drivers in traditional cost systems. This limited number of cost drives tends to be over-focused so that product costs become distorted and inaccurate.
With the focus being on standards, the issue becomes how an organization determines why indirect costs exist in the first place. In the previous example where product Y requires 90 percent of the resources, the organization loses visibility to this fact when focusing on standards. Organizations need to be able to understand what are the true costs of production certain product? What is driving the costs that exist? Also, an organization needs to be able to understand the correct aspects of cost dynamics; how and why costs change.

For example, costs that are fixed in the short run have no cost driver in the short run but may have a cost driver in the long run (Horngren et al. 2000: 31). Fixed costs may not change with changes in production amounts, yet traditional systems often suggest that they do. From this perspective, organizations begin to focus on unit cost dynamics and bottom-line cost dynamics (Yu-Lee 2001:16). In the current competitive environment, companies often produce a very diversified range of products with shorter and shorter product life cycle. Under such a situation, the cost standards are generally difficult to be revised quickly to reflect the very rapid technological and market change. As a consequence, the relevance of standard costing and variance reports remain an open question (Baker 1989:22 and Cheatham 1990:57). In this competitive environment, it becomes more important to deliver products according to the specifications of customers than merely to produce a product, which is manufactured according to the best engineering practice.

Although standard costing offered improvements regarding, for example, efficiency and productivity and their implied impact on the bottom line, saving time and reducing waste in the operations and made the idea of cost improvement opportunities salient in the minds of those making decisions, a number of serious issues associated with its use remained. There are fundamental questions that organizations needed to be able to answer with their costing system. Among the questions are the following: What are the true costs of producing certain products? What are the true costs of serving customers? What is driving the costs that exist? Although these questions are very important to the decision-making process and operation of an organization, they are unanswerable, as best, by standard costing.
4.2.3. Diversity and Complexity in the Manufacturing

Manufacturing is becoming ever more complex, driven by increasingly demanding markets. Customers expect more product choice but at the same, or lower prices. Traditional trade-offs between greater variety at the cost of higher prices or longer lead-times, are no longer sustainable. A new paradigm for excellence in manufacturing and long-term success is mass customization that leads, inevitably, to more complexity (Ray 2000:59). Complexity is a function of an organization's product diversity, customer diversity, business process design, business system, and product design (O'Guin and Rebischke 1995:279). Each of these factors influences the set of activities required of the organization to develop, manufacture, and sell products. Cooper (1995b:136) argued that product diversity occurs when products consume activities and inputs in different proportions. As an example, product lines place different size, complexity, or material component demands on an organization's resources. Complex products may consume more non-unit-level resources (inputs), such as machine setups, but not necessarily more machine hours or other unit-level inputs than less complex products.

Volume diversity or batch-size diversity occurs when there is a difference in the number of units manufactured by product lines (i.e., companies manufacture products in different-size batches). Products having materials that take longer to machine may consume a disproportionate share of unit-level resources (inputs); this is called material diversity (Cooper 1995b:136).

Due to the rise of products variety and of activities in the area of general costs there is a demand for information that allow complexity controlling. Complexity costs mean such additional costs that occur as coordination costs due to the diversity of products, varieties, customers, orders, and materials etc. (Männel 1992:290). The task of evaluating the complexity of a heterogeneous range of products has never been connected with traditional cost management. Since traditional cost management may be unable to analyze product varieties and their effect on the cost structure of the company. Also, traditional cost management systems using unit- or volume-based measures or cost drivers may provide distorted costing information when products are diverse in size, complexity, material requirements, and/or setup procedures (Hansen and Mowen 2000:441).

Products that differ in volume, size, and complexity consume support resources in significantly different amount. As product diversity increase, the quantities of resources
required for handling transaction and support activities rise, thereby increasing the distortion of reported product costs from traditional costing systems. Cooper (1988:45) demonstrates how traditional costing systems overcost large-size, high-volume products and undercost small-size, low-volume products when product diversity exists within the same operation. This distorted costing information may cause undesirable strategic effects, such as wrong product-line decisions, unrealistic pricing, and ineffective resources allocation. Availability of detailed cost information for complexity can contribute to evaluate alternatives of products, functions, processes, or component forms as well as availability of detailed cost information about alternatives design of products and processes would be necessary in the phase of products development (Hansen and Mowen 2000:499). One could claim that traditional cost management which may be unable to determine the effects of complexity is responsible for today's incredibly high product diversity. In the past, wrong decisions were made because nobody was able to determine the complexity costs and because nobody was able to demonstrate costs of extra varieties.

4.2.4. Strategic Influence on the Costs

Cost management systems should have a strategic influence on the costs. Historically, most traditional cost systems have focused on the production stage of the product life cycle (Tatikonda and Tatikonda 1994:22). Standard cost and budgeting systems are prime examples of this type of cost systems, which focus on production processes. The chief concern at the product planning and design stages has been product specifications and scheduling, with little attention paid to product cost.

Unfortunately, most production capabilities and costs are set during production planning and design and are, for the most part, relatively fixed once production begins. Estimates vary, but approximately 70-80 percent of a product's life-cycle costs are designed into a product and committed once the first unit of product is manufactured (Bürgel and Zeller 1997:219). Thus, efforts of cost management to reduce a product's costs after production begins may be of limited effectiveness. Therefore, cost management should contribute to a strategic influence on the cost in all stages of the product life cycle. "Japanese companies also seem to understand better than U.S. counterparts that costs should be managed and avoided during the product planning and development stages rather than after products have entered full scale
production" (Howell and Sakurai 1992:31). An effective cost management should begin with participation during R&D and design stages of the product.

By ignoring costs during a product's planning and design stages, managers are effectively allowing designers - who typically have little motivation to care about the cost implications of their designs - to determine the most of a product's cost (Tatikonda and Tatikonda 1994:23). Indeed, it is necessary for engineers to include in their product designs favorite features that are actually needed by the firm's customers but not cost-effective features. The addition of such features unnecessarily increases the production cost of a product. Lack of concern about product cost during the product planning stages can reduce profitability. There may be far greater opportunity for cost reduction early in the product life cycle (during the planning and design stages) than there is later in the life cycle (during the production stage). Thus, effective effort to manage cost must focus on the design phase of the product life cycle. Ray (1995: 64) asserted "Cost managers must therefore be involved at the early stages of product development to facilitate the goals of reducing development times and costs. Cost managers must also provide cost information that allows development teams to make informed decisions about design attributes and product features that have an impact on manufacturing performance and cost". Cost management system must recognize the impact of product design not only on product cost, but also on capacity management, make/buy decisions, retention or abandonment analysis and the monitoring of strategic decisions (Berliner and Brimson 1988:11).

4.2.5. Adequate Support for Introducing of New Technologies

Manufacturing management approaches such as Just-in-time, total quality management, and the theory of constraints have allowed organizations to increase quality, reduce inventories, eliminate waste, and reduce costs (Maher and Deakin 1994:12). The impact of improved manufacturing technology and practices on cost management is significant. Product-costing system, control system, allocation, inventory management, cost structure, capital budgeting, variable costing, and many other accounting practices are being affected. Objectives such as quality improvement, throughput time reduction, shorter time-to market, reduced inventories are not obvious in the traditional cost management systems. An organization endangers its existence when cost information about activities, processes and products is misleading (Bear and Mills 1994:20).
Cost management systems have been the tools for factory managers to understand the performance of production systems and personnel on the shopfloor. If a costing approach which they rely on is no longer appropriate, then their estimation on factory performance can mislead them to reject automation investment projects necessary for implementing manufacturing strategies such as just-in-time (JIT) manufacturing and total quality management (TQM). The traditional cost management systems which were developed decades ago for costing labor-intensive products may be unable to justify the cost reduction/avoidance of process improvements that advanced manufacturing systems are truly accomplishing. This point is emphasized by Berliner and Brimson (1988:2) who stated that "current cost accounting and cost management practices do not support justification of new investments in advanced manufacturing technology: they fail to monitor the benefits obtained". Not only does the traditional cost management fail to support new technology, but it employs performance measures such as purchase price, machine utilization, labor reporting, and resource consumption that conflict with strategic manufacturing objectives, and it cannot adequately evaluate the importance of non-financial measures such as quality, throughput, lead time, and flexibility.

4.2.6. Market Orientation

Competitive strategy defines the goals that an organization must attain to satisfy market demands and remain profitable. Cost management must provide the means that helps the organization to achieve these goals. It does so by integrating the strategic variables of market trends, customer needs, technology advances, and quality requirements into product definition that meets a customer's expectations. Traditional cost management systems, which have a largely internal focus, lead to insufficient market-orientation (Buggert and Wielpütz 1995:25). Cost management must recognize that the customer comes first; customer focus is at the heart of the cost management systems (Hansen and Mowen 2000:8). Organizations that forget this truth do so at their own peril. For waiting around the corner is a competitor who understands the importance of meeting (and perhaps even exceeding) customer's expectations about high quality, high functionality, and low cost.

The list of inadequacies of traditional cost management is extensive where the modern business environment is concerned. Not only does it fail to reflect the realities of the manufacturing environment but it also ignores the environment and therefore does not orient
an organization towards changing markets, processes, and technologies. It also does not anticipate cost problems or move the organization down a continuous path of improvement and customer responsiveness.

4.2.7. Conclusions

According to characteristics of a contemporary business environment and evaluation of traditional cost management which are explained above, traditional cost management should move to strategic cost management. Hence, there are many demands for this change such as:

- Process-orientation leads in some companies to need for more detailed cost information about processes, activities, and resources. Activity-based costing is seen as a suitable instrument for these companies and contributes in the overhead field. So, the processes in the company can be optimized by known information about cost drivers and the real use of resources.

- Market-orientation - cost management must interact with external environment to respond to customer needs and competitive threats. Target costing and cost benchmarking are helpful instruments for this purpose.

- Cost management must extend beyond the factory walls; this means that costs are assigned to suppliers and customers as well as products. One of the primary techniques for meaningfully assigning non-manufacturing costs is activity-based cost management.

- Cost managers must provide cost information that allows development teams to make informed decisions about design attributes and product features that have an impact on manufacturing performance and cost.

- Cost managers must also provide cost information about logistics to optimize cycle time and efficiency.

- In sale/marketing, facts and information are needed about the competitors, suppliers, customer profitability analysis etc.

- Cost management should focus on all stages of the product life cycle by using its instruments such as target costing, activity based costing and management, and life cycle costing in order to help the organization to achieve its strategic objectives.

- In the 21st century cost management focus will not only cost but also increase revenues, improve productivity and customer satisfaction, and at the same time improve the strategic position of the company.
• The integration of different cost management instruments, for example target costing, activity based costing and management, benchmarking, and life cycle costing would release capacities of cost analysis and create a framework for cost management.

The concept of strategic cost management resulted from the conviction that cost management has to go with the business environment and has to in accordance with strategies of the company. One purpose of cost management is to translate the strategy to parameters and to communicate the strategy, to measure achieving of strategic objectives and support this with appropriate foundations for decisions. In the following section, firstly, we explain the issue of terminology and the strategic importance of cost management. Secondly, we deeply review the concept of strategic cost management in the literature, and introduce the concept of strategic cost management that will be used in the suggested framework. Thirdly, we explain the concerns and objectives of strategic cost management. Finally, we introduce the suggested framework for strategic cost management.

5.1. The Issue of Terminology

During the past two decades, organizations have had to respond to the trends and changes in the business environment with newer and better approaches to managing their businesses (Manoochehri 1999:7). These new approaches are being implemented in organizations under names such as: total quality management, employee involvement and empowerment, business process reengineering, continuous improvement, and other approaches. These philosophies require organizations to be responsive, agile, and flexible in profitably providing value-added products and services to customers at competitive prices. Thus organizations are now discovering that they must be able to manage a complex and rapidly changing environment without the significant costs that traditionally have attended these characteristics. Within this changing environment, organizations have witnessed a significant rebirth of new accounting approach; strategic cost management. Accounting terminology is often misinterpreted, and the term "cost management" is no exception. This is perhaps inevitable, given that "cost management" combines two terms ("cost accounting" and "management accounting") that are themselves subject to frequent misinterpretation (Hansen and Mowen 2000:2). While these terms are sometimes considered synonymous, they are at other times used to mean quite different things (Maher 2000: 336).

In any case, cost management builds on the both cost accounting and management accounting and assumes a knowledge of both. Nonetheless, cost management is not cost accounting; cost management is much more than just cost accounting - cost accounting is the field of accounting that records, measures, and reports information about how much things cost (Maher and Deakin 1994:3), cost management is more comprehensive than cost accounting (Berliner and Brimson 1988:3). Similarly, cost management is not the same as management (or managerial) accounting, if by management accounting what we mainly have in mind is breakeven analysis, economic order quantities, and - above all - calculation of variances between actual and standard costs (Cooper 1997:46). Cost management is far more concerned with management's use of cost information for decision-making. Although, cost management is not cost accounting and management accounting, they at least help set cost management in context.
5.2. The Strategic Importance of Cost Management

In the contemporary business environment, cost management has become a critical survival skill for many organizations. But it is not sufficient to simply reduce costs; instead, costs must be managed strategically (Cooper and Slagmulder 1998a:14). Many authors stressed that the strategic importance of cost management has drastically increased in the recent years due to intense competition. According to Cooper and Slagmulder (1997a:108) customers in highly competitive markets expect that each generation of products presents improvements. These improvements may include: improved quality, improved functionality or reduced prices. Any of these improvements alone or any combination of them urge a firm to manage its costs to stay profitable.

Furthermore, Cooper and Slagmulder (1997a:168) pointed out that highly competitive markets are characterized by low profit margins, low customer loyalty and low first move-advantages. Not only customers ask for cost management, also the intense competition between well-matched competitors increases the strategic importance of cost management. Cooper (1995a:10) argued that in competitive markets where competitors are frequently technologically equivalent, it becomes increasingly difficult to maintain a sustainable competitive advantage. In Japanese competitive markets, he found that even before a differentiator can teach its customers about the distinctive advantage of a new product, other firms launch me-too products at even lower prices. In the same way, cost leaders, offering products that are low in price, are leapfrogged by competitors, offering products at the same price but with a higher level of quality and/or more features. This fact leads Cooper (1995a:7) to conclude that in a world of non sustainable competitive advantage, a firm that fails to reduce costs as rapidly as its competitors will find its profit margin squeezed and its existence threatened. So, all firms have to manage costs aggressively in order to survive in today's highly competitive markets.

Similarly, Kato (1993:37) argued that while successful Japanese companies are all cost conscious companies, they also pursue differentiation strategies. This means that successful Japanese companies are both cost leaders and product differentiators. Also, Monden and Hamada (1991:16) contend that in highly competitive markets - that are characterized by a shortening of product life cycles, diversification of demand and keen competition - cost management is indispensable to introduce new products that meet customers' demands at the
lowest cost, and to reduce costs of existing products by eliminating wastes. Finally, Cooper (1995a:7) compares the strategic importance of cost management with that of quality management a few years ago and concludes that cost management has to become a discipline practiced by virtually every person in the firm. Summarizing, in the contemporary business environment, all companies need to strive for cost management in order to survive.

5.3. The Concept of Strategic Cost Management

Strategic cost management is understood in different ways in literature. Cooper and Slagmulder (1998a:14) argued that strategic cost management is "the application of cost management techniques so that they simultaneously improve the strategic position of a firm and reduce costs". They suggest three sorts of cost management initiative, based on whether the impact on the organization's competitive position is positive, negative or neutral. An example of a cost management initiative that strengthens an organization's position is illustrated as follows. A hospital redesigns its patient admission procedure so it becomes more efficient and easier for patients. The hospital will become known for its easy admission procedure so more people will come to that hospital if the patient has a choice. The strategic position of the hospital has just been increased over its competitors. The second example of a cost management initiative that has no impact on the organization's competitive position is explained as follows. An insurance company decides to reevaluate its accounts payable system to make it more efficient. The evaluation has no positive benefits to the insurance company in the external market. The objective of the change is to make the organization more profitable. The third example of a cost management initiative that will weaken the organization's competitive position is illustrated as follows. A large airline company only has two desks for administering and selling tickets. This set-up induces long lines for the airline customer which can ultimately result in high dissatisfaction and a bad reputation for the airline. This may reduce the amount of ticket sales when compared with the airline's competitors. Even though having only two desks available for customers may initially be cost effective, in the long run, it harms the company. As a general rule, an organization should never undertake any practices that are predicted to weaken the position of the organization.

Furthermore, Cooper (1995a:89) argued that strategic cost management needs to include all aspects of production and delivering the product; the supply of purchased parts, the design of products and the manufacturing of these products. So, strategic cost management should be
inherent to each stage of a product's life cycle, i.e. during the development, manufacturing, distribution and during the service lifetime of a product. According to Welfie and Keltyka (2000:33) strategic cost management is an area that holds exciting possibilities for accountants. They also emphasized that strategic cost management attempts to improve the strategic position of an organization and reduces costs at the same time and it is important because global competition means that firms must be constantly aware of their strategic position. An organization must compete in the areas of cost, quality, customer service, and flexibility with any cost reduction efforts contributing to an improved strategic position (Seal 1989:117). A sophisticated understanding of an organization's cost structure can go a long way in the search for sustainable competitive advantage, this point is emphasized by Shank and Govindarajan (1993:6ff.) who define strategic cost management as "the managerial use of cost information explicitly directed at one or more of the four stages of strategic management: (1) formulating strategies, (2) communicating those strategies throughout the organization, (3) developing and carrying out tactics to implement the strategies, and (4) developing and implementing controls to monitor the success of objectives".

According to Horvath and Brokemper (1998:585), strategic cost management has emerged as a key element to attain and sustain a strategic competitive advantage through long-term anticipation and formation of costs level, costs structure, and costs behavior pattern for products, processes, and resources. For this purpose, strategic cost management must provide managers with different information. Strategic cost management sees products, processes, and resources themselves as creative objects for attaining a strategic competitive advantage. This goal may not be achieved based on traditional cost management. They also argue that strategic cost management must determine and analyze long-term cost determinants (economics of scale, experience, etc.) and their influence on costs level, costs structure, and costs behavior pattern. Finally, strategic cost management should begin with participation during R&D and design stages of the product in order to avoid the costs early in the product life cycle.

Another contribution to the development of strategic cost management was that of Porter (1998a). Porter suggested that a firm has a choice of three generic strategies in order to achieve sustainable competitive advantage. They are cost leadership, differentiation, and focus. Where cost leadership is selected Porter advocates the use of strategic cost analysis.
The initial step in undertaking strategic cost analysis is to identify the firm's value chain which can be defined as the linked set of activities all the way from basic raw material sources to the ultimate end-use products delivered into the final consumer's hands. The value chain comprises of five primary activities and a number of support activities. The primary activities are defined sequentially as inbound logistics, operations, outbound logistics, marketing and sales and services. They are supported by activities such as the firm's infrastructure, human resource management, technology and procurement. In the value chain, costs and assets are assigned to each activity.

The cost behavior pattern of each activity depends on a number of causal factors which Porter calls cost drivers. These cost drivers operate in an interactive way and it is management's success in coping with them that determines the cost structure. The strategic cost analysis also involves identifying the value chain and the operation of cost drivers of competitors in order to understand relative competitiveness. Porter advocates that organizations should use this information to identify opportunities for cost reduction, either by improving control of the cost drivers or by reconfiguring the value chain. The latter involves deciding on those areas of the value chain where the firm has a comparative advantage. It is essential that the cost reduction performance of both the organization and its principal competitors is continually monitored if competitive advantage is to be sustained.

In his study, Hinterhuber (1997:11-13) argued that cost management is "a necessary course of action which acquires strategic significance the more it increases the number of options for discovering new opportunities or inventing new markets. Strategic cost management tends to be an integrated, proactive part of strategic management aimed at satisfying all key stakeholders." Further, Hinterhuber has interviewed executive of European companies about strategic cost management and has come to the conclusion that strategic cost management should be a part of the strategy of businesses in order to achieve a radical and long-term increase in the value of the company. Strategic cost management needs the support of employees, top management as well as information technology because effective and timely communication is a prerequisite for implementing it. Finally, strategic cost management has to consider the value systems, beliefs, and projections of employees; changes in business processes and in the ways activities are carried out have to be supported by incentive and
other non monetary systems - strategic cost management has to create win/win situations and to communicate effectively the benefits for all involved.

According to McIlhattan (1992: M1-1), strategic cost management is the skillful handling or directing of costs. Horngren et al. (2000:3) pointed out that cost management is not practiced in isolation. It is often carried out as a key part of general management strategies and their implementation. Cost management has a broad focus. For example, it includes the continuous reduction of costs. They define strategic cost management as the set of actions that managers take to satisfy customers while continuously reducing and controlling costs. Howell and Sakurai (1992:29) speak of a cost down mentality as a synonym for cost management. Kato (1993:37) added that in today's ever-changing environment, pursuing every possible cost reduction opportunity is surely a good strategy, but warns that it is essential to avoid reducing costs without regard for the quality, functions and characteristics of the product, from the customers' point of view.

Hence, the term strategic cost management has a broad focus, it is not confined to the continuous reduction of costs and controlling of costs and it is far more concerned with management's use of cost information for decision-making. Strategic cost management is also not confined to use cost management techniques that reduce costs and improve the strategic position of a firm at the same time. When most authors talk about strategic cost management, they are really thinking about cost reduction. However, it is often difficult to demean the importance of cost factor for the success of company, but the challenge is to increase revenue, which can be facilitated by strategic cost management. Cost-management knowledge and information is critical to their organization's success. Strategic cost management is important to organizations because it is more than focusing on costs; in the successful companies of the 21st century costs will not be the only most important factor, but also value and revenue consider critical factors in the success of companies. At this point the researcher advocates that strategic cost management is a philosophy, an attitude, and a set of techniques to contribute in shaping the future of the company (Hilton et al. 2001:8) (see Figure 5.1).
Figure 5.1 Strategic cost management-Concept

**Philosophy.** First, strategic cost management is a philosophy of improving cost and revenue; strategic cost management is not only cost management but also revenue management, therefore, it is seeking to improve productivity, maximize profit, and improve customer satisfaction. This philosophy plays a vital role in determining the future of the company because it promotes the idea of continually finding ways to help organizations make the right decisions to create more customer value at lower cost. An organization's products and services are measures of customer value through quality products, superior customer service, fair pricing, etc. Customer value is measured by both the price that customers are willing to pay and their satisfaction with products and services (McNaughton et al. 2001:537). Efficient companies provide products and services that customers want by using the minimum of the organization's scarce resources, while continuously seeking to improve value, costs, and revenue.

**Attitude.** Second, strategic cost management represents a proactive attitude that all the costs of the products and services result from management decisions within the company and with customers and suppliers. Thus, this proactive attitude requires that strategic cost management must have the following attributes:

- Market orientation: strategic cost management considers customer needs and competitive behavior.
• Holistic overview: strategic cost management takes a broad focus including the entire value chain and product life cycle.

• Anticipatory approach: strategic cost management starts in the product design stage and aims to influence the future cost position.

• Continuous: strategic cost management is a permanent task. It ensures continuous improvements.

• Participation: strategic cost management requires involvement of every employee.

• Cross-functional: strategic cost management integrates business functions.

**Techniques.** Third, strategic cost management is a set of reliable techniques. These techniques or instruments may be used individually to support a specific goal or together to serve the overall needs of the organization. A set of strategic cost-management techniques that function together to support the organization's goals and activities is called a strategic cost-management system (Hilton et al. 2001:8). When designing a cost-management system, we must consider many tradeoffs such as costs and benefits of cost management system (Hansen and Mowen 2000:31). For example, the "ideal" cost-management system may provide any desired information, in any desired format, and on demand to any authorized person in the organization. However, the benefits of such an ideal system may not justify the cost of building and maintaining such a system. In general, an organization should seek to build the simplest, most economical cost-management system that serves the overall needs of management in the contemporary business environment.

**5.4. Concerns and Objectives of Strategic Cost Management**

Change is an imprint of contemporary business environment that cannot be avoided. In the 21st century, strategic cost management is facing just such a challenge. Strategic cost management has both the opportunity - and difficult task - of defining and shaping its own future as well as the future of companies. Trends and changes in the business environment such as: increase of global competition, increasingly demanding customers and shareholders, and rapid advances in information and manufacturing technology - traditional cost management may be not adaptable to these events (McNair 2000:28). In fact, there are many cost management systems, have been offered many solutions for companies, but their primary concern was cost reduction (see figure 5.2), as result, the late 20th century found organizations anxiously to, not deciding, their future.
Cost and revenue management is the present role of strategic cost management; In the 21st century, strategic cost management primary concern will not only be cost management but also increase revenues, improve productivity and customer satisfaction, and the same time improve the strategic position of the company (see figure 5.3).
The key is that costs must be viewed by looking simultaneously at the value they provide. Strategic cost management must recognize that cost/value and revenue are complementary, not competing terms - both must be understood if an organization is to intelligently choose its customers and markets (McNair 2000:28). Strategic cost management must bridge the gap between cost and value as well as between the language of the market and the language of the business. Traditional cost management during the 20th century faced many criticisms which are explained above, however, strategic cost management during 21st century faces a future that will be unique and rewarding compared to its current realities. The key features and shifts that define this transition are detailed in the table 5.1.

<table>
<thead>
<tr>
<th>Focus</th>
<th>Traditional Cost Management</th>
<th>Strategic Cost Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perspective</td>
<td>Value-added</td>
<td>External</td>
</tr>
<tr>
<td>Cost analysis-way</td>
<td>In term of: product, customer, and function With a strongly internal focus Value added is a key concept</td>
<td>In terms of the various stages of the overall value chain of which the firm is a part With a strongly external focus Value-added is seen as a dangerously narrow concept</td>
</tr>
<tr>
<td>Cost analysis-objective</td>
<td>Three objectives all apply, without regard to the strategic context: Score keeping, attention directing, and problem solving.</td>
<td>Although the three objectives are always present, the design of cost management system changes dramatically depending on the basic strategic positioning of the firm: either under a cost leadership strategy, or under a product differentiation strategy.</td>
</tr>
<tr>
<td>Cost driver concept</td>
<td>A single fundamental cost driver pervades literature - cost is a function of volume. Applied too often only at the overall firm level.</td>
<td>Multiple cost drivers such as: Structural drivers (e.g. scale, scope, experience, technology, complexity) Executational drivers (e.g. participative management, total quality management) Each value activity has a set of unique cost drivers.</td>
</tr>
<tr>
<td>Cost containment philosophy</td>
<td>Cost reduction approached via responsibility centers or product cost issues</td>
<td>Cost containment is a function of the cost driver(s) regulating each value activity.</td>
</tr>
<tr>
<td>Primary concern</td>
<td>Cost impact</td>
<td>Cost/Value/Revenue relationship</td>
</tr>
<tr>
<td>Key disciplines</td>
<td>Finance/Accounting</td>
<td>Marketing/Economies</td>
</tr>
<tr>
<td>Primary role</td>
<td>Scorekeeper</td>
<td>Analyst and consultant</td>
</tr>
<tr>
<td>Management responsibility</td>
<td>Follower/reactive Risk-averse</td>
<td>Leader/proactive Comfortable with ambiguity</td>
</tr>
</tbody>
</table>

Table 5.1 Comparison of traditional cost management and strategic cost management (Fischer 1993:129, Shank and Govindarajan 1993:217 and McNair 2000:31)
Focus. Traditional cost management has been concerned with internal issues, including: emphasizing the current cost of production, allocation the pool of shared resources to various products and services, and summarizing results (Cooper and Slagmulder 1998c and McNair 2000). These have been the dominant activities that defined traditional cost management practice. Traditional cost management efforts are restricted to firm's boundaries and not across the value chain (Ansari et al. 1997b:17). In the emerging world of 21st century strategic cost management, however, recognition is increasing that external events and relationships define and constitute the costs and potential profits of a firm. With the rapid increase in tools and techniques (such as target costing, activity based costing, benchmarking, etc.) that measure key external relationships, identify the relative costs and benefits of different products and customer segments, and support the search for competitive advantage - strategic cost management interacts with external environment to respond to customer needs and competitive threats. This point is emphasized by Cooper and Slagmulder (1998c/1998d) who emphasized that strategic cost management should not restrict its attention to the cost structure of the firm or its supply chain. Strategic cost management should monitor the firm's cost performance relative to that of other firms and, in particular, competitors.

Perspective. Traditional cost management has focused on the notion of value added (selling price less cost of purchased raw materials) under the mistake impression that this is the only area in which a firm can influence costs. Shank and Govindarajan (1993:89) explained that value added can be quite misleading, for at least three reasons. First, it arbitrarily distinguishes between raw materials and many other purchased inputs. Purchased services such as maintenance or professional consulting services are treated differently than raw materials purchased. Second, value added does not point out the potential to exploit the linkages between a firm and its suppliers or between a firm and its customers with a view to reducing costs or enhancing differentiation. Third, competitive advantage cannot be fully explored without considering the interaction between purchased raw materials and other cost elements (e.g. purchasing higher-quality, higher-priced raw material could reduce scrap significantly and thus lower total cost). But strategic cost management-perspective is based on value chain analysis - this is the more meaningful way to manage costs, improve profits, and explore competitive advantage. With value chain analysis, the strategic cost management efforts are focused on improving the strategic activities of the company. This approach differs from traditional cost analysis that relies on functional cost classifications such as marketing,
research and development, manufacturing, and administration (Shank and Govindarajan 1992:197). Value chain analysis also provides insights into complex internal and external linkages, for example, improving product design may lower production costs, treating suppliers as partners may reduce upstream costs or improve supply quality, and vertical integration may strengthen a company's strategic position in the industry.

**Cost analysis.** No doubt traditional cost management systems can help in many areas such as inventory valuation, short-term operation decisions, etc., but in the competitive business environment, cost analysis must explicitly consider strategic issues to be most effective. In traditional cost management, cost analysis is viewed as the process of assessing the financial impact of alternative managerial decisions (Shank and Govindarajan 1988:19). But in strategic cost management, cost analysis has a broader context, where the cost data is used to develop superior strategies en route to gaining sustainable competitive advantage.

**Cost driver concept.** In traditional cost management, cost is a function, primarily, of only one cost driver, output volume (Banker and Johnston 1993:576). Cost concepts related to output volume permeate the thinking and the writing about cost: fixed versus variable cost, average cost versus marginal cost, cost-volume-profit analysis, breakeven analysis, flexible budgets, and contribution margin, to name a few. In strategic cost management, it is acknowledged that cost is caused, or driven, by factors that are interrelated in complex ways. Understanding cost behavior means understanding the complex interplay of set of cost drivers at work in any given situation. Strategic cost management focuses on multiple cost drivers perspective. Wong (1996:31) explained that strategic cost management is based on an important concept - cost drivers - although many companies have applied activity based techniques in the search for competitive advantage in cost and performance, however, the role of cost driver analysis has not been fully exploited, primarily due to the difficulty involved in quantifying the influence that factors such as complexity, experience and innovation have on cost.

**Primary concern.** Traditional cost management has proven to be of little use to organizations in managing unit cost, because it does not provide timely and accurate information on what changes are necessary to reduce cost (Naughton 2001:48). It has always been obsessed with the cost estimate-defining, improving, and using it. Finding ever better ways to match
resources to their uses, the accountants have faced formidable task of providing reliable, timely cost estimates in a world of shared resources and change - never an easy task. But currently, the need to understand the costs of a specific course of action or potential opportunity remains, though the focus has shifted onto accurate and relevant cost information (Drury 2000:336). The primary concern of strategic cost management will not only be cost management but also increase revenues, improve productivity and customer satisfaction, and at the same time improve the strategic position of the company. Clearly, not every Euro of cost is equal. Some costs lead directly to customer value creation and profits, other do not. Knowing which costs, activities, and efforts yield the optimal return to the firm and its stakeholders is the new objective; the goal of strategic cost management is to more thoroughly understand, measure, and portray the cost/value/revenue relationships that define a firm's competitive position and long-term success.

**Key disciplines.** Traditional cost management has always been seen as a part of accounting and finance. Within the world of finance and accounting, the content of the cost and management accounting systems is driven by needs of the financial accounting system (Hansen and Mowen 2000:3). This demand for financial information is deeply entrenched in U.S. organizations but the German approach takes into consideration this demand, but formally recognizes the fallacy of this information for running a company. In Germany, there is close integration between the managerial and financial accounting modules as well as the managerial accounting module supplies information for external reporting purposes and has unique functionalities that provide for the different demands placed on managerial accounting (for more detailed information about German vs. U.S cost management, see, e.g., Keys and Van der Merwe 1999). Hence, strategic cost management should help companies to understand and respond to key tenets of marketing and economics such as know your customer and know your products or services; make sure you know what your customers want, and that you have the ability and resources to provide that. The question of the day in most companies is not, what does this cost? but rather, how much value is being created for customers with this costs? The goal is not to develop standards that support inventory valuation and balance the general ledger; instead, strategic cost management seeks to help companies understand and leverage their resources and competencies to create a competitive advantage. Strategic cost management will serve to bridge the gap between finance and marketing, between customer value and shareholder value.
**Primary role.** The literature offers significant proof that in many organizations the key role played by accountants in traditional cost management has been scorekeeper. For example Kaplan (1995:13) argued that management accountants should become part of their organization's value-added team, participate in the formulation and implementation of strategy, translate strategic intent and capabilities into operational and managerial measures, and move away from being score keepers of the past and to become the designers of the organization's critical management information systems. As the cost management makes the transition to the 21st century, evidence increasingly shows that it is abandoning such traditional roles and embracing those of consultant and analyst. Strategic cost management is emerging as the source of information and analysis, of insights and opportunities.

**Management responsibility.** Companies competing in the competitive business environment require new knowledge about suppliers, products and processes, and distributors and customers. No one in the organization is better positioned than the financial manager to collect these types of data, assemble them into useful information, determine the competitive implications, and communicate the findings to the organization (Freeman 1998a:23). However, finance managers have often been more of a follower than a leader, reacting to requests and events rather than anticipating them. In this reactive role, cost management has often needed to rely on accounting data and operation information for financial reporting. Strategic cost management does not exist in a vacuum but requires broad based management support and commitment to achieve meaningful results. Also, in this new business environment, accountants must be proactive, exhibiting leadership skills as they work on teams and with other organization to find new ways for their firms to compete (Cooper 1996a:32). Cost managers have capabilities that enable them to both identify opportunities and assess them. Strategic cost management is, by definition, multidisciplinary.

In the 21st century the primary concerns and objectives of strategic cost management will not only be cost management but also revenue management. Therefore, strategic cost management as a philosophy of improving cost and revenue, a proactive attitude, and a set of techniques can enable the company to improve costs, increase revenues, improve productivity and customer satisfaction, and at the same time improve the strategic position of the company (see figure 5.4).
The key is that costs must be viewed by looking simultaneously at the value they provide. Strategic cost management is the practice of understanding what causes costs to occur (Wong 1996:31), through cost driver analysis and value chain analysis. The knowledge derived from this process can lead to revenue enhancement, cost reduction and increased productivity; companies can also increase understanding of profitability, satisfy customer demand and meet profit targets. Strategic cost management is not the same thing as cost reduction; the main concerns and objectives of strategic cost management are not confined to cost but also include value and revenue. Traditional cost reduction is not always the answer, because it may fail to produce long-term results and harm the company, especially when it is short sighted, random, and not based on the company's business strategy (Fisher et al. 1994:1 and Shields and Young 1995:12). It is usually a reaction to immediate problems and not well planned. While traditional cost reduction will appease a short-term need, the process will have to be repeated in the near future because the real problems were not solved, only the symptoms were dealt with. What companies really need to be doing is strategic cost management.

Strategic cost management does not focus on traditional cost reduction, it entails unnecessary costs elimination. When companies cut costs randomly, they wind up hindering their development and growth; this process can create major internal conflict, damage relationships
with customers and increase the risk of non-achievement of strategic business goals (Osborne and Ringrose 1998:28). Strategic cost management focuses on eliminating unnecessary costs while focusing resources on the customers. The managing of a company's cost structure is consciously choosing to invest in selected expenditures that will achieve a specific revenue system. This is a proactive process, whereas traditional cost reduction is a reactive process. Strategic cost management is inherently more effective. This effectiveness involves doing the things that optimize the results of a company's overall activities (Miller 1992). Reactive cost reduction may add some efficiency, but it does not optimize the company's business process or its results. Cost management is a strategic process that focuses on the customer and on profitability (Freeman 1998b:10). When determining how to manage costs in your organization, the key is to remember that costs must be viewed by looking simultaneously at the value those costs provide. Cost reduction is not good or bad in and of itself. Cost reduction is beneficial if it focuses on reducing those costs that fail to provide adequate value in excess of that cost.

Strategic cost management provides the information necessary to understand costs in relation to value (McNair 2000:32). With this information, managers can make decisions that help their organization to achieve its strategic objectives. Yet, understanding this relationship is virtually difficult with the traditional systems of cost management. These systems are important for many purposes, for example, financial reporting for historical purposes. However, they are often inadequate in explaining the value of the expenditures. For example, these systems will report the Euro amount of "salaries" but will not record the activities behind those salaries and the value those activities brought to the business. In today's competitive environment, managing Euro isn't enough. You must manage the activities and results produced by those Euros. Traditional cost management systems have been subjected to a multitude of criticisms. Johnson and Kaplan (1991) argued that such systems fail to show the relationship between the cost of a product or service and the actual effort expended. Thus, without relevant cost information, efforts to improve the business are not directed at the causes of cost. Since traditional systems fail to provide insight. There are many questions that you will need ask yourself to avoid making wrong decisions, for example, does your company believe current product or service costs are correct? Do your traditional cost management systems show how different products and services have different customer and product
profitability? Does your company know where costs could or even should be eliminated, and if so, how to reduce those costs?

Advances in strategic cost management systems are beginning to address these issues, providing a foundation for modifying or enhancing existing systems so that management can make strategic and operational decisions with confidence (Blocher et al. 1999:12). These innovations are allowing companies to engage in cost and profit planning, an exercise that focuses attention on "design to cost" targets. With these systems you can design your company's costs to target levels, maximizing the potential for capacity and profit. Here, in a nutshell, are some of new instruments in strategic cost management such as activity based costing, target costing, benchmarking, and life cycle costing are being used to facilitate dramatic change. These instruments are being used to improve cost, increase revenue, improve customer profitability, support a shared services environment whereby a company consolidates operations, support TQM and continuous improvement initiatives, address operational and strategic questions.

Strategic cost management should be linked explicitly to business strategy and to competitive context in which value is created (Grundy 1995:36). By measuring the cost and performance of activities and resources, and by focusing on the management of those activities, companies can improve the value received by the customer and the profit achieved by providing this value. Strategic cost management identifies the true link between costs and revenues and can reveal hidden costs - as well as hidden profits - in providing products and servicing customers. Embracing strategic cost management will transform finance and accounting departments into business partners.

5.5. The Suggested Framework for Strategic Cost Management and its Objectives

Strategic cost management is not limited to cost but is inclusive to all resources used and deployed across the value chain (Cooper and Slagmulder 1998d:18). Therefore, strategic cost management should not confine its concerns and objectives only to cost, but should also consider revenue, productivity, customer value, and at the same time the strategic position of the company. The need to understand costs is a clear one. Organizations need to know what their costs are in order to decide and manage their profitability. To aid in determining their profitability, organizations need to understand what their total costs were, are, or are going to
be over a given period of time. The difference between the revenue for that period and the costs incurred during the same period determines the profitability for the period. Ultimately, decisions are made in for-profit organizations to drive profitability. While other salient factors help to determine the long-term viability of an organization, without profitable performance, long-term viability is not an option. In order to survive for the long run, an organization ultimately must be able to show that it can make more money from a product or service than it cost to make that product or service (Yu-Lee 2001:2). Successful strategic cost management should focus not only on cost improvement, but also on revenue enhancement. Cross (1997:4) argued that a company should sell the right product to the right customer at the right time for the right price (cost), thereby maximizing revenue from its products. The figure 5.5 shows the objects and means by which strategic cost management can contribute to the process of cost improvement and revenue enhancement.

Figure 5.5 Strategic cost management - cost improvement and revenue enhancement
Strategic cost management is understanding costs and the causes of costs as well as how to drive the greatest possible productivity through the firm. Many studies generally focus on the equation that productivity is defined as the quantity of output produced divided by the quantity of input. Improvement is measured in terms of change in the ratio from one period to another. For example, Horngren et al. (2000:485) argued that productivity measures the relationship between actual inputs (quantities and costs) and actual outputs produced. The lower the inputs for a given quantity of outputs or the higher the outputs for a given quantity of inputs, the higher the level of productivity. Other authors have a broader view of productivity and understand it as three (E’s): Effectiveness, Efficiency and Economy. This is more simply stated as, "Do the right job, do it right and do it cost-effectively" (Bryce 1992:70 and Sharman 1991:8). In strategic cost management, reducing costs alone is not productivity improvement. Many times, reducing cost in one activity can shift costs to another activity. But lead time decrease, product quality improve, revenue increase, overhead and operation expenses decrease, customer satisfaction, continuous improvement are examples for productivity improvement. Strategic cost management can play an important role here as shown in the figure 5.6.

![Figure 5.6 Strategic cost management and productivity improvement](image-url)

Furthermore, successful strategic cost management must help a company to develop and identify superior strategies that will produce a sustainable competitive advantage. Competitive advantage is creating better customer value for the same or lower cost than offered by competitors or creating equivalent value for lower cost than offered by competitors. Customer value is the difference between what a customer receives and what the customer gives up (Ansari et al. 1997b:67). What customer receives includes such things as product functionality...
(features), product quality, reliability of delivery, delivery response time, image, and reputation. What customer gives up or sacrifice includes product price, time required to learn to use the product, operation cost, maintenance cost, and disposal cost. The figure 5.7 shows the two dimensions of customer value and the potential role of strategic cost management.

Strategic cost management should influence the attributes associated with the dimensions of customer value (decrease the customer sacrifice and improve the customer receives) in order to help a company increase customer value and therefore improve the strategic positioning.

How can strategic cost management achieve these objectives? The figure 5.8 shows a suggested framework for strategic cost management that can achieve these objectives. The theme of strategic cost management is supported by many sub-theme which we called "pillars". The proposed pillars of the suggested framework for strategic cost management as shown in the figure 5.8 are: (1) The guiding principles of strategic cost management, (2) The key concepts of strategic cost management, (3) The objects of strategic cost management, (4) The analysis fields & activities of strategic cost management, (5) The instruments of strategic cost management, and (6) the key support factors of the suggested framework. Each of these pillars will be explained more fully in the remainder of this study.
Figure 5.8 Strategic cost management-framework

6.1. The Guiding Principles of Strategic Cost Management

The first critical pillar of strategic cost management-framework is the guiding principles that form the foundation to achieve effective cost management. There are several guiding principles have been identified to assist in improved and effective cost management (Berliner and Brimson 1988:13). These principles, in general, are compatible with the strategic cost management-framework. To reach the desired objectives of strategic cost management, the following principles should be considered when implementing strategic cost management:

*Understand what causes the cost and revenue structure of the business.* This is the most critical item in cost management. Understanding the causal relationship between an activity and its cost enables management to focus improvement efforts on the areas that will produce the best results (Miller 1992:35). Many companies do not have accurate information on what their true costs are. A company must first identify exactly what causes its cost to occur and where its revenue comes from - products, services, customers, and sales channels. Next, a company must identify the specific costs that produce its revenue stream. Finally, a company must identify overhead costs and costs not directly linked to revenue generation. For example, salesmen's commissions can easily be linked to revenue, but this link is not as direct for office supplies. Nevertheless, office supplies are needed somewhere during the sales process.

*Identify the firm's activities and select those that can be used to produce (or sustain) a competitive advantage.* This selection process requires knowledge of the cost and value of each activity. With value chain analysis, the strategic cost management efforts are focused on improving the strategic activities of the company, trace costs to value chain activities, and use the activity-cost information to manage the strategic value chain activities better than other companies in the industry (Donelan and Kaplan 1998:9).

*Understand and reduce inter-functional complexity.* A company's complexity increases as the breadth of its product line expands, as each product uses more unique components, and as more process options are available to manufacture the product (Swenson 1998:21). The costs associated with this complexity fall as manufacturing processes are simplified and standardized and as companies offer fewer product options. Excessive product and process complexity drives costs up, increases lead time, and makes quality more difficult to control.
Complexity factors are the biggest single driver of cost. They also are the single biggest inhibitors of throughput (Gonsalves and Eiler 1996:35). The complex cause-and-effect relationships must be sorted out. Reducing complexity means constantly questioning why work is done, and how it can be done more efficiently. A basic flow chart of the company's work flow can be very helpful in understanding how things actually get done. It will probably also show that there are a number of extra, unnecessary steps involved in the company's processes. Complexity makes the challenge of managing costs effectively even more difficult (Spitzer and Tobia 1993:25). Accountants should not only look at the results of complexity but at its root cause. Management should then set performance measures that constantly seek to monitor and drive complexity out of the organization.

*Increase effectiveness and continuously improve costs.* A company should redefine its cost structure to select the costs that generate profit. Therefore, strategic cost management must become standard operating procedure; effective cost management never stops, and it doesn't have to be painful (Spitzer and Tobia 1993:25). Management and employees must be constantly identifying opportunities for eliminating or reducing unprofitable work. When a company only incurs costs that are specifically linked (with reasonable overhead) to revenues, they will be maximizing their profitability. A company may need to eliminate activities, or it may need to consolidate or even expand activities based upon where their spending generates revenue; it must constantly identify opportunities for eliminating, reducing or better managing low-value work.

*Use strategy to manage costs.* In tough times, a company may rush to cut costs without thinking carefully about its long-term future. Hence, strategic cost management should use the organization's strategy as the initial screen for decisions on costs (Grundy 1995:36). The first question cost management asks is: "What does our strategy say about making the tough choices on products, markets and resources?" Companies with a vital strategy - those that know what businesses they are and are not in - will be more successful in managing their costs than companies that are confused strategically. For many reasons, for example, because they know what costs should be reduced and what costs should not. They allocate resources to business areas that contribute to stakeholders value and avoid the need for radical treatment. Furthermore, because they look to their strategy for guidance in managing costs with certainty and commitment and know what the product and market emphasis is and, therefore, how to
deploy human, financial, and capital resources. Every company needs to have a long-term business strategy. Strategic cost management should be part of the strategy and be influenced by the strategy. Cost decisions should be measured against the company's strategy, rather than a current short-term situation. Use the strategy for decisions on costs will enable the company to achieve its objectives such as long-term growth and profitability.

*Build skills.* In an organization that practices cost management, employees must know that they are responsible for managing costs, have the skills to do so, receive positive reinforcement for cost management and get timely feedback on the results (McMahon 2001:35). Investments in educating the work force about cost make the critical difference. Given the right skills, employees at every level of an organization will be able to ask and answer such questions as: Is there value added to the activity I'm engaged in? Are there low-value activities or unnecessary complexities in any aspect of the process I'm responsible for? What are the true cost implications of a particular decision? Are there strategic implications? In the best instances, provide the skills such as decision-making, problem-solving, team-building, and other thinking skills will enable employees to better understand how to manage costs, improve quality and productivity, and enhance performance.

*Involve employees in decisions.* Employees will need to understand the company's objectives and have accurate cost information. Soliciting input from the employees will not only give management a better understanding, but it will give employees more incentive to become involved (Lewis and Luecal 1998:15). Companies that actively solicit suggestions from their employees will undoubtedly find better and more cost effective ways to do things. When employees understand the organization's objectives and have accurate cost information, they will excel at cost management.

6.2. Strategic Cost Management - Key Concepts

The second important pillar of strategic cost management-framework is key concepts. The emergence of strategic cost management has resulted from a blending of key concepts: cost drivers and value chain, each taken from the area of strategic management (Shank and Govindarajan 1993:8). Value chain analysis is used to decompose the firm into strategically important activities and understand their impact on the cost and value (Hergert and Morris 1989:177). These activities include not only in-company activities but also activities outside
the company (e.g., at the supplier, distribution and disposal/recycling levels). The company is viewed as part of an overall chain of value-creating processes focused on the customer. Each activity that a firm performs will have an underlying cost structure and behavior. Porter (1998a:70) defined the determinates of activity cost as "cost drivers". It is accepted that costs is caused by many factors (cost drivers) that affect the costs of activities, and, therefore, identify and analysis the cost drives can contribute directly to the success of the firm. Cost drivers and value chain as strategic cost management-key concepts will be discussed in more depth in the section 6.2.1 and 6.2.2.

6.2.1. Strategic Cost Management - Cost Drivers

6.2.1.1. The Concept of Cost Drivers

Accountants usually define cost as a resource sacrificed (consumed) or foregone (give up opportunity) to achieve a specific objective. It is usually measured as the monetary amount that must be paid to acquire goods and services (Horngren et al. 2000:28). All costs incurred by an organization result from activities that are pursued by the organization. "Know your organization's costs" is an essential theme for any manager. Thus, cost concepts are relevant only if they influence a decision, and cost data are relevant only if they are useful to a cost concept (Harper 1995:174). It is well known in an industry that a company can manage what it can measure. Unfortunately, some companies may cannot identify their costs precisely; determining how costs behave and best cost structure. Managers need to understand how costs behave and what cost structure is to make informed decisions about products, processes, and resources, to plan, and to evaluate performance.

What does it mean to say an organization understands its costs? It means that the organization's managers can predict, with some clarity, how costs will respond to management actions. In other words, it means managers can predict how cost will change, if at all, when they direct the organization to do something differently than it is being done today. To say an organization understands its costs implies that the managers understand the underlying cause-and-effect relationship between the work of the organization and the costs of the organization (Harper 1995:174). Cost driver is a characteristic of an activity or event that causes that activity or event to incur costs and can be more or less under a firm's control (Blocher et al. 1999:57). In other words, factors that causally affect costs (over a given time
span) are called cost drivers. That is a cause-and-effect relationship exists between a change in the level of activity and a change in the level of the total costs of that cost object.

Some companies, especially those following the cost leadership strategy, use cost management to maintain or improve their competitive position (Blocher et al. 1999:60). Cost management requires a good understanding of how the total cost of an object changes as the cost drivers change. It is well-recognized now that costs are driven not only by output volume and its related measures such as direct labor hours or machine hours, but also by non-volume-related output variables that result from the diversity of company's product lines and complexity of its production process. That is why many companies have transformed their traditional cost management systems into for example, activity-based cost management systems. In addition, in today's competitive business environment, to achieve a major cost advantage, an organization must focus not only on traditional cost drivers but also on strategic cost drivers. Strategic cost drivers determine the long-run cost position of a company (Siau and Lindt 1997:40). They explain the differences that exist in unit costs across companies of the same industry. For example, economies of scale will give larger companies a major strategic cost advantage. Technology affects the way activities are performed and the mix of resources (materials, machinery, and human resources) that are used to carry out those activities. Technology determines the competitive advantage of a company if it has a significant role in determining the relative cost or differentiation position (Porter 1998a:179). Types of cost drivers, traditional and strategic views of cost drivers, the basic outline of cost drivers, ways of identifying cost drivers and benefits of cost drivers determination will be discussed in the following sections.

### 6.2.1.2. Cost Drivers - Traditional Views

From the late 1920's to the 1970's, identifying cost drivers was directly related to the production area. Thus, some authors at that time concentrated their systems of cost drivers predominantly on the sector of production, for example, Schmalenbach (1963:41) argued that the output volume is the most important cost driver because he considered other determining factors such as production procedures to be of minor importance. He differentiates between output volume-related costs and output volume-unrelated costs, the output volume being measured by the output quantity produced in one period (Schmalenbach 1963:42). Costs unrelated to the output quantities correspond to the fixed costs arising from a company's
productive potential (such as machines, human labor, etc.) during a period. This means that such costs arise even if the company does not produce anything during that period, for example, employees' wages, costs of maintaining and servicing, or taxes and fees for utilized real properties. Since such costs depend on the actual time period, they are also known as period costs (see Horngren et al. 2000:36). While output volume-related costs mean variable costs.

Generally, Schmalenbach (1963:47) established the categories of costs based on how they are influenced by the output volume or product quantities. He differentiated between five categories in his analysis of cost developments, they are:

- **Fixed costs**: their marginal costs are zero - these costs are not affected by fluctuations in the output volume,
- **Proportional costs**: here the marginal costs equal the average costs, thus, cost elasticity equal one - this means that, if the output volume varies by a certain percentage, costs will change by the same percentage,
- **Degressive costs**: in that case the marginal costs are lower than the average costs - cost elasticity is less than one so that one-percent change in the output volume brings about cost change of less than one percent,
- **Progressive costs**: the marginal costs are larger than the average costs, consequently, the cost elasticity is greater than one - the changes in the output volume lead to bigger relative changes in cost,
- **and Regressive costs**: they are characterized by negative marginal costs.

The study of Schmalenbach was very useful at that time especially for the practical application of theoretical studies in one-product companies, but it could be not be applied without encountering considerable difficulties to multi-product companies. These companies are generally much larger than a single product company and can have diverse product lines and complex production processes. Companies in this category operate in the domestic market as well as internationally, where increased competition. Thus, the output volume is not the only factor affects costs.

Some authors gave special attention to the question of which is the best way of describing the system of cost drivers in a company, and in what way the effect of cost drivers on the costs
could be measured in quantity. In contrast to Schmalenbach, who presented the output volume as the only central cost driver, authors such as Rummel (1949) and Gutenberg (1973) tried to create a comprehensive list of cost drivers to reflect the diverse influences on costs. The figure 6.1 illustrates the cost drivers system according to Rummel (1949).

In his study, Rummel (1949) used a functional approach to identify the relationship between cost drivers and the costs; he assumed that costs can be split up into partial costs for each cost driver, and this assumption can be depended on planning and carrying out the cost calculation. Thus, he focused on a cause-and-effect relationship as a fundamental principle of cost calculation. He called the linear dependence of costs on different cost drivers such as output volume, performance of workers and machines, and lot size the "straightness in cost accounting" and tried to substantiate its existence by doing practical research. Within this context, his main concerns are those cost drivers that help to determine a company's cost structure in an empirical way and express the cost structure in its linear form. Fixed costs are integrated into the concept by regarding them as fixed with regard to the product quantity, but as proportional to the length of time of the respective production period. The list of cost drivers according to Rummel (1949) is constrained also on the production area, and may depend on the extent to which those factors conform the hypothesis of linearity.

Cost studies that belong to the production sector focus on helping companies better evaluate the economic efficiency of a certain production. According to Gutenberg (1973:344), this objective requires models of cost to include all those production-related factors and decisions that have an influence on the costs in a company and during a manufacturing period. A
company may identify and analyze the cost drivers according to whether they are directly related to the production area or stem from other sectors of the company that are connected with the performance process. In addition, a company has to study the question of mutual dependencies between cost drivers; therefore, it can analyze the direction and the intensity of their influence on the costs. Finally, a company should try to find out to what extent cost drivers support the decisions-making over the short, medium, and long term. Within this context, Gutenberg introduced his system of cost drivers, which represents a clear further development in comparison with the first traditional attempts. However, his system focuses also on the production area. Unlike Schmalenbach, Gutenberg was more concerned with systematizing cost drivers by attributing cost dependence to five main cost drivers as shown in the figure 6.2.

![Cost drivers system diagram](image)

**Figure 6.2 Cost drivers system according to Gutenberg (1973:344)**

The main emphasis of his considerations about cost drivers is based on the definition of the cost by two factors - the quantity factor and the price factor (Gutenberg 1973:338). The first cost driver is the quality of production factors. It is an expression of characteristics of production factors, which refer to their usability in the production process or for the manufacturing of specific products. Moreover, it is a combination of the productiveness of the materials, the capacity of the machines, and the workers' physical and mental qualifications. Factor qualities have influence on the productive output and the level of costs in the company (Gutenberg 1973:344). Therefore, the company which has the best technical equipment, the highest performance rate of its staff, and the best materials for this purpose, will be able to fulfill a given production program in the most-efficient manner. This arises the problem of selecting such factor qualities that will help to minimize the unit cost of the product. The selection does not only apply to factors such as workers, machines, or materials but is also valid for the inputs of other factors which exert an influence on the amount of production costs through management and through the quality of planning, organization, controlling and
decision-making. Gutenberg (1973:344) argued that the changes in the factor qualities and their effects on the amount of costs can be carried out in the following three forms of change. The first form of change is an unsteady change, for example, the quality of workers performance can change or fluctuate dependence on certain factors such as wages, working conditions and others and therefore can affect on the amount of costs. Unlike this, a steady change which means a constant improvement in the productivity and reduction of the cost level e.g. by the regular renewal of old machines. The third form of change is an abrupt change; a sudden shift in costs may occur as the result of abruptly changed factor qualities, for example, when a completely new production method, new materials, or new organizational structure are used in a company

The second cost driver is the output volume and its changes. The output volume means the number of production units produced per period of time. This output in proportion to the capacity of the company determines the capacity utilization rate. Gutenberg (1973:345) argued that the output volume and its changes can generate a change of the factor proportions or of the relationships among the production factors. Since the different production factors can be adapted in different extent to changes or fluctuations of the output volume, it may cause an unfavorable deviation for the minimal cost combination of the production factors and therefore a higher cost level. At the same time, the outputs of potential factors (for example machines) which are measured in production units are determined by two elements; production rate and production time. The different kinds of adjustments in production rate or production time are accompanied by changes in the production volume and therefore cause a direct influence on the production costs. For example, higher production times result in higher depreciation and labor costs.

The third cost driver is the price of production factors. Factor prices as a cost driver arise from Gutenberg’s definition of the costs by multiplying the factor quantities by their prices. Therefore, the operational cost level is also a function of the prices of production factors, e.g. materials prices, operating supplies prices, etc. Gutenberg (1973:346) emphasized that prices of the production factors have a direct effect on the production costs in the case of change the prices of certain inputs factors while the quantities of all inputs factors remain constant over certain time periods. For example, rising electricity tariffs means higher costs for driving-power input. On the other hand, prices of production factors may lead to an indirect influence
on the production costs level through the quantitative frame of costs. In other words, changes of the quantities that may occur as a result of price changes, may lead to an indirect influence on the production costs level.

The fourth cost driver related to the production area is the plant size. Generally, it represents the total output capacity of the plant, classified according to the type, quantity, and power output of existing potential factors (machines, human labor, and tools belong to this group). Fandel (1991:222) emphasized that companies which differ with regard to type, number, and age of structure of the machinery or regarding the qualifications and age of their personnel, as well as the number of employees, have different sizes, which cause differences in costs. Gutenberg (1973:346) argued that the influence of change the plant size particularly through the upgrading of the plant size does not necessarily lead to a change of the cost level of a company. This may occur as long as the change of plant size does not cause a change of both factor qualities and factor proportions. On the contrary, completely changes; new production methods or procedures that are introduced without doubt affect the cost level of the enterprise.

The fifth cost driver is production program. The production program specifies kind, range, and quantity of the products that can be manufactured as well as the production depth (Wenz 1992:26). The depth of production is characterized by number of production stages in a multi-stage manufacturing process, and by the extent to which primary and intermediate products and parts are performed in-house or can are purchased from outside suppliers (Fandel 1991:223). The effect of production program on the company's costs results from the changes in factor consumption and factor proportions, which are directly related to the production process (Gutenberg 1973:347). If changes occur in the production program; output quantities are lowered or raised, other input quantities of machinery, workers, and materials are used, different procedures of production are employed - this may lead to changes of in the former proportions and consumption and therefore to changes of cost. In addition, more stages of production may require more facilities, more personnel, and more materials, and thus have an influence on the production costs.

Summarizing, Gutenberg (1973:347) has concluded that every change in the output volume, in the plant size, and in the production program leads to a change in the factor qualities and/or factor proportions, therefore, change in the cost level. This means that from the five cost
drivers, the output volume, the plant size, and the production program consider "great cost drivers". Nevertheless, the output volume remains the central cost driver in the production and cost theory. Gutenberg’s multi-cost drivers system represents a clearly improvement towards the first attempts to explain the cost development, which usually considered the output volume as the only cost driver.

Another traditional view about cost drivers was from Kilger (1961). As the previous attempts, the theoretical basis of his cost drivers system was also based on knowledge of the production and cost theory. The relation between the costs and cost drivers in his study was related to the evolution of the flexible standard costing and contribution margin accounting. Thus, Kilger (1993:133) stated that the principal purposes of the flexible standard costing are an effective control of the costs as well as the determination of correct cost data for the operational planning. These objectives can be reached only if there is clarity about which factors cause the costs of accounting period. Therefore, identifying and analyzing of cost drivers consider as a basis for the cost planning.

According to the value-related cost definition, which can be primarily attributed to Schmalenbach, costs are composed of value consumption of production factors that serve the production of products in a factory and their marketing during a production period. Therefore, Kilger (1993:133) argued that all cost categories can be understood as the result of factor consumption and factor prices. The price of production factors considers an important cost driver in his system. Factor prices are determined mainly by the interaction of supply and demand in their markets or rarely by government. Kilger (1993:113) and Gutenberg (1973:115) explained that determining the minimal cost combination of the production factors and therefore the cost level is not possible without consideration of the factor prices.

Kilger (1993:135) stated that there is an interrelation between the factor prices and the qualities of production factors. The production factors with the same qualities (and other procurement conditions), an enterprise will select the source of supply, whose factor prices are lowest. On the other hand, the production factors with different qualities can arise the problem of selecting such factor qualities that will help to minimize the unit cost. In this case, the interrelation between the factor prices, the qualities of production factors and factor
consumption becomes effective. Kilger described and showed the interrelation between these factors.

In his study, the considerations about cost drivers were connected with the evolution of the flexible standard costing and contribution margin accounting, thus, he emphasized that in standard costing, prices variances are eliminated by the planned-price system, thus, planning and control of costs can concentrate on the quantities consumed of the factors of production (Kilger 1993:135). The quantities consumed of the factor inputs result from a complicated network of operational decision-making processes, which can be illustrated only with difficulty. According to (Kilger 1993), there are four main factors that determine the factor consumption and therefore the costs in most industrial corporations. These main factors are shown in the figure 6.3.

![Cost drivers system diagram](image)

Figure 6.3 Cost drivers system according to Kilger (1993:134)

As shown in figure 6.3, the four decision areas can include all primary decisions regarding sales, production, and procurement. There are mutual relations between all decisions areas. In
the following, the four main determination factors of quantities consumed of production factors and therefore the costs will be briefly explained.

Decisions on the utilization of potential factors unrelated with a period are reflected, for example, in the research and development projects, in advertising campaigns, in training and further education of employees. They always concern the investments, whereby both potential factors and consumption factors are used. These decisions are useful for sustaining and improving the position of the company in the long-term at its market. According to Kilger (1993:137), the costs resulting from such decisions can not be regarded as fixed or variable costs. He termed it "pre-production costs". Over the years, in many industrial companies, these costs consider an important category of costs especially in today's competitive environment.

Another two main cost drivers are decisions on capacities and methods of the operational departments. Kilger (1993:137) stated that a large part of the costs of industrial companies results from decisions on the capacities of operational departments. He indicated that these capacities are not for the entire enterprise, but for the operational departments (cost centers), which consist of homogeneous or similar workplaces. The capacities result from operational departments, in the fact are combined operational facilities capacities with certain personnel capacities. Kilger (1993:139) argued that for long-term decisions on the capacities, cost accounting (standard costing) is not suitable and significant because it focuses on short-term operational decisions. In this case, investment accounting is the suitable method in the long-term decisions on capacities of the operational departments.

In addition to decisions on capacity, the cost structure of industrial enterprise is substantially affected by decisions on the methods (procedures) of operational departments. These decisions are connected with the decisions on the capacity. Changes of the methods or procedures in the company, for example, in the departments of production, inventory, marketing, and management can be released by technical and technological progress. As in the decisions on capacities, Kilger (1993:140) argued that the decisions on the methods choice are also long-term decisions, whose economic evaluation is only possible with the help of the investment accounting. Kilger does not consider the decisions on the methods as an
independent cost determination factor, since they always can influence only on the costs through decisions on capacity and output.

Furthermore, Kilger (1993:140) gave particularly attention to the decisions on the output volume of the operational departments as an important cost determination factor in the industrial companies. He argued that during the output measurement by its measures (base factors) such as direct labor hours, machine hours, etc. one can differentiate between homogeneous cost causing and heterogeneous cost causing according to the dependence of the output costs on one or more of these factors. Kilger (1993) emphasized the notion that cost is driven by output volume and its related measures.

Kilger (1993:142) explained that the decisions on the production program have a considerable influence on the costs through the decisions on the outputs of the operational departments. Additionally, the decisions on the short-term operations planning can influence on the cost level, where there are interdependent relations between the decisions on outputs of the operational departments and short-term operations planning. These decisions can effect on the costs by some cost determination factors such as manufacturing time, production rate, process conditions, operational relations, changes in the raw material mixtures, make-or-buy decisions, and lot sizes.

The system of Kilger contains further cost determination factors such as the internal inefficiency. It can be understood by those additional and avoidable quantities of production factors, which result from behaviors and skills of the workers. Some reasons for the internal inefficiency are, for example, inadvertence, awkwardness, indifference, labor hoarding and theft. Furthermore, Kilger (1993:148) pointed out that in his system of cost drivers, some cost determination factors may be exogenous factors such as prices of the production factors or endogenous factors such as repairing costs.

As the former works of Schmalenbach (1963), Rummel (1949), and Gutenberg (1973), the system of Kilger (1993) also focused on the cost determination factors that stem from the production area. He also emphasized that output volume is an important cost determination factor in the industrial companies. Moreover, his system focused on identifying and analyzing the cost drivers for cost planning and controlling. However, the system of Kilger (1993)
considers a network of cost determination factors, and he showed the complicated mutual relations between these factors.

Finally, the traditional views of cost drivers concentrate on production activities and manufacturing costs and overlook the impact of other activities such as upstream and downstream activities on the company's cost position. These activities actually have considerable effects on the company's cost position. Additionally, many cost drivers that determine the long-term cost position of a company are arising from the competitive business environment. Hence, in today's competitive business environment, to achieve a major cost advantage, an organization must focus not only on traditional cost drivers but also on strategic cost drivers. The strategic view of the cost drivers focuses on the whole value chain and on the cost drivers, which determine the long-term cost position of a company. Some authors become aware of the importance of such cost drivers. The following section includes two strategic views of cost drivers.

6.2.1.3. Cost Drivers - Strategic Views

Over the last third of the 20th century, there were considerable changes in the cost structures of companies caused by new conditions of the business environment. These changes have resulted in higher overhead rates; investment in machinery and services has reduced direct labor costs and simultaneously increased overhead costs. Thus, Miller and Vollman (1985:143) in their study "The hidden factory", argued that most production managers understand what drives direct labor and materials costs, but they are much less aware of what drives overhead costs. Miller and Vollman explained that the real driving force of overhead costs comes from different transactions, not physical products. These transactions involve exchanges of the materials and/or information necessary to move production along but not directly result in physical products. Rather, these transactions are responsible for aspects of the "bundle of goods" that customers purchase - such aspects as on-time delivery, quality, variety, and improved design (Miller and Vollman 1985:144). Therefore, there are different cost drivers, which stem not only from the production transactions but also from other transactions of the company.

In addition to cost structure change, there have been some significant changes in the life-cycle costs. Upstream costs (such as design and development) and downstream costs (such as
marketing, selling, distribution and servicing) have become important parts of the total life-cycle costs of the product. Thus, the firm's cost position is frequently affected by activities that are performed within its value chain and activities with the value chains of suppliers and customers. Therefore, it is important to identify and analyze cost drivers across the entire value chain.

Within this context, Porter (1998a) introduced his system of cost drivers to overcome the strong production orientation of the traditional views of cost drivers. In opposite to most of the former approaches, Porter concentrates on the strategic level. He used the value chain as a basic idea in his considerations about cost drivers. Porter (1998a:64) emphasized that the value activities the firm performs in competing in an industry result in the behavior of a firm's costs and its relative cost position. Therefore, cost advantage results if the firm achieves a lower cumulative cost of performing value activities than its competitors. The behavior of a firm's costs and its relative cost position depend on a number of structural factors that influence cost. Porter (1998a:70) has identified several major factors that affect costs. Cost drivers according to Porter are shown in the figure 6.4. Each cost driver is briefly reviewed below.

![Figure 6.4 Cost drivers according to Porter (1998a:70)](image)

**Economies of scale.** They are perhaps an effective cost driver in many industries. The costs of the activities are often affected by economies or diseconomies of scale. Porter (1998a:70) stated that scale economies arise from some principal sources, for example, if a company succeeds in performing activities more efficiently or differently at larger volume, or it is able to spread the costs of some items over larger volumes of output such as capital equipment,
research and development facilities, and advertising campaigns. In addition, economies of scale can stem from efficiencies in the actual operation of an activity at higher scale as well as from less than proportional increases in the overhead needed to support an activity as it grows. There are, however, limits to scale economies, for example, size can bring with it added complexity, which itself can lead to diseconomies. For most operations, there is an optimum size above or below which inefficiencies occur (Oster 1994:59). In some cases, a company may be reluctance to fully exploit economies of scale because of product differentiation; where customer preferences are differentiated, firms may find that the price premium of targeting a single segment with a differentiated product outweighs the higher cost of small volume production. In addition, economies of scale can lead to inflexibility; scale-efficient production is likely to involve highly specialized labor and equipment, which tends to be inflexible (Day 1990:155). In a dynamic environment, very large plants and firms may have greater difficulties than smaller units in adjusting to fluctuations in demand and changes in technology, input prices, and customer preferences. The scale sensitivity of activities is different, for example, R&D activities, national advertising activities, and infrastructure activities of the firm are typically more scale-sensitive that activities such as procurement and sales force operations because their costs are heavily fixed no matter what the firm's scale is (Porter 1998a:71). However, economies (and diseconomies) of scale can be found to some extent in every value activity of a company such as purchasing, R&D, and advertising.

**Experience and learning effects.** Further cost reductions may be achieved through learning and experience effects. Porter (1998a:73) used the term learning to compass all types of cost reduction that result from improving know-how and procedures independent of scale. However, learning refers to increase in efficiency that is possible at a given level of scale through having performed the necessary tasks many times before. In the 1960s the Boston Consulting Group extended the recognized production learning curve beyond manufacturing and looked at increased efficiency that was possible in all aspects of the business (e.g. in marketing, advertising and selling) through experience. Boston Consulting Group estimated empirically that, in many industries, costs are reduced by approximately 20-30 per cent each time cumulative production doubled. This finding suggests that companies with larger market share will, by definition, have a cost advantage through experience, assuming all companies are operating on the same experience curve. Experience can be brought into the company by hiring experienced staff and enhanced through training.
The experience curve as an explanation of costs has come under increasing scrutiny recently. However, the principal source of experience-based cost reduction is learning by personnel and activities (Ghemawat 1985:146). Learning can reduce cost over time by many systematic ways, for example, well-layout, improved scheduling, labor efficiency improvement, product design modifications that facilitate manufacturing, output improvements, procedures that increase the utilization of assets, and better tailoring of raw materials to the process (Porter 1998a:73). Learning occurs both at the individuals level and at the activities level, thus, the measures of learning are different. Porter (1998a:74) stated that a suitable measure of learning expresses the systematic ways of learning that explain the fall in costs over the time in a value activity. For example, in a value activity where learning can affect costs through improving personnel efficiency, in this case, the rate of learning may be connected with the cumulative volume in that activity. Learning can affect costs through the introduction of more efficient machinery, here the rate of learning may reflect the rate of technological change in machinery and have little to do with the firm's volume. In addition, the rate of learning can be a function of time in operation and the level investment expended in modifications to an activity. Finally, Porter indicated that the popular measure of the rate of learning is cumulative firm volume - it has many benefits, however, it hides other rates of learning in value activity and is not a suitable representative of the learning in many activities of the company. Thus, understanding the systematic ways of learning in each activity and identifying the best measure of learning rate may be necessary for a firm to achieve cost reductions through learning.

**Capacity utilization.** It has captured considerable attention in the literature. Determining the right level of capacity is one of the most challenging tasks facing managers (Horngren et al. 2000:303). Capacity utilization has been shown to have a major impact on unit cost. Over the short and medium term, plant capacity is more or less fixed, and variations in output are associated with variations in capacity utilization (Hax and Majluf 1991:316). During periods of low demand, plant capacity is underutilized. This raises unit costs because fixed costs must be spread over fewer units of production. On the other hand, during periods of peak demand, output may be pushed beyond the normal full-capacity operation. In this case, the unit costs may increase due to overtime pay, premiums for night and weekend shifts, increased defects, and higher maintenance costs. Therefore, Porter (1998a:75) argued that capacity utilization at a certain point in time is a function of seasonal, cyclical and other demand or supply
fluctuations, which have no influence on the competitive position of a company, and rather capacity utilization over the entire cycle is the correct cost driver. Finally, capacity utilization as cost driver is conditional on environmental conditions and competitor behavior especially competitor investment behavior and on the other hand on the company itself through principal decisions in areas such as marketing and product selection.

**Linkages.** A further set of cost drivers are linkages. No function or activity can be fully understood on its own; nor can costs be evaluated in such isolation. The cost incurred by most activities is significantly affected by those activities that link with it. Porter (1998a:75) described two types of linkages; internal linkages among the activities of value chain and external linkages with suppliers and channels. Internal linkages concern the activities of value chain that have an effect on the costs. These linkages exist between direct and indirect activities, for example, quality control and inspection activities can have a significant impact on servicing costs and costs attributable to faulty product returns. They occur also between alternative activities that achieve the target objectives such as advertising and direct sales. Porter explained that changing the way of performing one of the linked activities may not only has an impact on the cost of another activity but also has an impact on the total cost of the linked activities. This requires coordination and optimization of linked activities. Better coordination of linked activities, for example, procurement and assembly can reduce the need for inventory. On the other hand, for example, a more costly product design, more stringent materials specifications, or greater in-process inspection may reduce service costs. Thus, a company must optimize such linkages in order to achieve competitive advantage. Linkages exist not only among value chain activities but also between a firm's activities, suppliers, and channels. External linkages with suppliers of factors inputs or distributors of the firm's final products can affect the costs of a firm's activities. For example, frequent supplier shipments can reduce a firm's inventory needs, appropriate packaging of supplier products can lower handling cost, and supplier inspection can remove the need for incoming inspection. Similarly, linkages with the distributors may create the opportunity to lower the costs. For example, the location of a channel's warehouses and the channel's materials handling technology can influence a firm's outbound logistical and packaging cost. Also, sales or promotional activities of channels may reduce a firm's sales cost. As with internal linkages, Porter stated that external linkages with suppliers and channels can lower cost or enhance
differentiation by improving coordination and joint optimization between a firm's activities and the value chains of suppliers and channels.

**Interrelationships.** The relationships of mutual dependence between one business and other parts of a company's operations affect costs. Porter (1998a:323) stated that the most important type of possible interrelationships among business units is tangible interrelationships; arising from opportunities to share activities in the value chain among related business units due to the presence of common suppliers, customers, technologies, and other factors. Business units that can share a sales force, for example, may be able to lower selling cost or provide the salesperson with a unique package to offer the customer. Another type of interrelationship, he termed intangible interrelationships; involving the transference of generic skills or know-how to similar but separate value activities in many business (e.g. using cost reduction expertise gained in one division may lower cost in others). The third type of interrelationships, sharing know-how between separate activities. This form of interrelationships can affect the costs if the activities are similar and if the know-how is significant to improving the efficiency of the activity. In this case sharing the generic skill represents transferring the successful results of learning from one activity to another. In summary, interrelationships with other strategic business units in the overall corporate portfolio can help to share experience and gain economies of scale in functional activities, such as marketing, research and development, quality control, ordering and purchasing. Businesses can frequently reduce their costs if they share them with other business units. They can sometimes achieve the same effect by transferring knowledge within the group to other strategic business units who share similar technology or problems. Awareness of this potential means of reducing costs might influence a firm's decisions.

**Degree of integration.** Vertical integration involves ownership or control of inputs to the firm's processes or the channels of product distribution (Rue and Holland 1989:43). When a firm tries to gain ownership or control of its inputs called "backward integration" or its outputs called "forward integration". Degree of vertical integration in a value activity can influence its cost (Porter 1998a:79). Decisions on integration, e.g. contracting out delivery and/or service, also affect costs. Similarly, the decision to make or buy components can have major cost implications. Therefore, integration can affect costs through many ways (see Oster 1994:195), for example, forward integration gives a firm control over sales and distribution
channels, which can help in avoiding costs of using market, such as procurement and transportation costs. Backward integration gives a firm more control over cost, availability, and quality of the raw materials that go into its present products or services, thus, a firm can avoid suppliers with considerable bargaining power. In addition, some companies use integration in hopes of benefiting from the economies of scale - they result in lower overall costs and thus increased profits. However, companies should be cautious when adopt vertical integration because it can raise costs, for example, through creating inflexibility, bringing activities in-house that suppliers can perform more cheaply, and undermining incentives for efficiency because the relationship with the supplying unit becomes captive. Porter (1998a:79) argued that integration may lower cost, raise cost, or has no effect on cost - this depends on the activities and purchased inputs involved. A company should decide the potential benefits of integration and de-integration for each important activity. For example, companies may lower cost by integration into some additional services while continuing to buy the basic product.

**Timing.** During the last years, timing has gained more significance for the costs of value activity. Porter (1998a:79) argued that the cost of a value activity often reflects timing. Timing, though not always controllable, can lead to cost advantages. There are a number of occasions when the "first mover" in an industry can gain significant cost advantages (Lowe and Atkins 1994:406). For example, this could come from securing the right to the lowest costs of materials. In addition, it could come from attracting the best employees, technology, or finding the best location. If they move quickly into volume production, they may have influence on costs through learning, scale, etc. However, the advantage does not always rest with the first mover. Sometimes there are significant advances in the technology or product design that a later entrant can exploit. The first mover may either be unwilling to spend heavily again so soon, or simply not have money to do so. Thus, Porter emphasized that the role of timing in cost position of the company may depend on timing with respect to the business cycle or market conditions than on timing in absolute terms. Timing may lead to either sustainable cost advantage or a short-term cost advantage. For example, a company may have low cost assets because of a good timing - at a later time it may find that the eventual need to replace those assets dramatically, this may raise its relative cost position.
**Policy choices.** The cost of a value activity is always affected by policy choices a company makes - they may be influenced by other cost drivers (Porter 1998a:80). Many of the decisions taken within a company are based on discretionary policies. It is not easy to get these decisions right and it is often necessary to modify them in the light of their effects on cost and differentiation (David 1993:261). They also need to be modified as the circumstances within which the strategic business unit operates evolve. The extent to which a company should, or should not adopt/maintain any of these policies needs to be considered carefully.

Policy choices have implications for costs, for example, decisions on the product line, the product itself, quality levels, service, features, credit facilities, etc. all affect costs (Porter 1998a:81). They also affect the actual and perceived uniqueness of the product to the customer. The general rules are to reduce costs on factors which will not significantly affect valued uniqueness, avoid frills if they do not serve to differentiate significantly, and invest in technology to achieve low-cost process automation and low-cost product design (fewer parts can make for easier and cheaper assembly). Although policy choices play an independent role in determining the cost of value activities, they also may be affected by other cost drivers (Porter 1998a:81). For example, decision on process technology choices may be affected partly by scale, timing, or by what product characteristics are desired. Thus, accountants should not ignore the impact of policy choices on the cost in cost analysis. Also, a company should make a detailed examination of each activity to identify and recognize the extent to which the explicit and implicit policy choices determine the cost.

**Location and institutional factors.** The final two cost drivers identified by Porter are location and institutional factors. The geographic location of a value activity can affect its cost, as can its location relative to other value activities. It can stem from many factors and may be treated as a separate cost driver (Porter 1998a:82). Location has always been an important factor in costs. It can affect costs through many ways, for example, the cost of labor and tax rates vary obviously by country and also by location within a country or region. The move to internationalize manufacturing is now strongly underway. This is affecting manufactures in virtually all countries. For example, some German producers may move to another country to benefit from lower labor costs. Also, because climate, culture norms, and tastes differ from location to another, these factors can affect not only product needs but also the way in which a company can perform its activities and therefore can affect costs. In
addition, location has an important influence on logistical costs; location relative to suppliers is an important factor in inbound logistical cost, while location relative to buyers affects outbound logistical cost. It also affects the costs of transshipping, inventory, transportation, and coordination. Thus, it is necessary to identify the impact of location on the costs and recognize opportunities for reducing costs by establishing new patterns of location of facilities relative to each other.

Institutional factors such as the regulations imposed by government can have important effects on a firm's ability to produce economically. Many of these factors are outside the area of manufacturing, but some factors can have significant direct effects. Thus, the laws about unionization, health and safety at work, environment protection, etc. can make large impact on a plant's relative costs. Another example of the role of institutional factors as a cost driver is in power costs, the single largest determinant factors of cost position in aluminum smelting (Porter 1998a:83). Power costs are determined through the rates charged by power companies, a highly political issue in areas where governments own power companies. Thus, rapid change of power rates because of institutional factors in these countries may affect the relative cost position in aluminum smelting. Finally, institutional factors often remain outside a company's control and have a direct and an indirect impact on the costs in the company.

There are many ways in which a company can seek to reduce costs. In attempting to become a cost leader in an industry, a firm should be aware, first, that there can only be one cost leader, and second, that there are potentially many ways in which this position can be attacked (i.e. through using other cost drivers). Cost advantages can be among the most difficult to sustain and defend in the face of heavy and determined competition. However, it should be a constant objective of management to reduce costs that do not significantly add to ultimate customer satisfaction. Porter (1998a:124) argue that most of the factors listed above as cost drivers could also be used as "uniqueness drivers" if the firm is seeking to differentiate itself from its competitors.

Porter (1998a:84) draws attention to the fact that the cost behavior of a value activity may be influenced by many cost drivers. While one cost driver may have the great impact on the cost of a value activity, there are several drivers often interact to determine the cost. Thus, a company must try to quantify the relationship between cost drivers and the cost of a value
activity. For example, a company should estimate for each activity the slope of the scale or learning curve, the policy choices that have the greatest impact on cost, the cost advantage or disadvantage of timing, and so on for each driver. Although the process of quantification of cost drivers is difficult, it is necessary to determine the relative significance of each cost driver. In addition, it can help a company to estimate its relative cost position in comparison with competitors.

Porter (1998a:87) argued that there are interaction relationships between cost drivers. On the one hand, cost drivers may reinforce each other in influencing cost. For example, the extent of scale economies (as a cost driver) in an activity is somewhat determined by policies choices such as how the activity will be performed as well as product mix. Also, the advantages of early timing can be supported by scale economies or learning effects. On the other hand, cost drivers may counteract each other; this means that improving cost position through one cost driver may lead to worsen it through another. For example, a very high level of vertical integration and large scale may increase the penalty of underutilizing capacity. Therefore, in the case of cost drivers reinforce each other, a company must coordinate and harness the reinforcing effects of cost drivers to improve its relative cost position. For example, policy choices should enhance the ability of the company to obtain the benefits of scale economies or to achieve linkages. In addition, the benefits of timing can be received through using strong methods of learning. While cost drivers counteract each other, a company must optimize the tradeoff among them. For example, location must optimize the balance among scale economies, transportation costs, and wage costs. Also, the choice of plant scale must carefully consider the cost of underutilization. Finally, a company must recognize such interactions among cost drivers and translate them into its strategy.

The list of cost drivers by Porter has made an important contribution to the research of the cost drivers. He has presented one attempt to create a comprehensive list of cost drivers particularly long-term drivers through using the value chain as a basic idea. Despite that fact, some cost drivers in his list represent strongly aggregated drivers such as policy choices and another subdivision such as location. Furthermore, porter explained functional connections between cost drivers and the costs as well as the mutual interdependence among cost drivers as a general theme. Altogether, the list of cost drivers by Porter is a milestone and a useful for further works about cost drivers. Thus, Shank and Govindarajan (1993:20) evaluated the
attempt of Porter asserting that Porter attempted to create a comprehensive list of cost drivers but his attempt is more important than his list. They emphasized that in strategic management literature better lists exist such as Riley (1987). Thus, the list of cost drivers by Shank and Govindarajan (1993) is discussed below.

Shank and Govindarajan (1993:151) emphasized that the notion of cost is driven by volume has no strategic significance. If a company in some way can double its throughput, can it achieve cost advantage? There are too many instances of companies in which average cost goes up, not down, as volume grows (Kodak in film from 1950 to 1980, for example). Also, if the output volume is the necessary answer to cost leadership, some companies may encounter some difficulties in competing against other companies, for example, Apple against IBM, or Mercedes Benz against GM (Shank and Govindarajan 1993:152). In addition, bigger size may not mean lower cost, in some industries, for example, the processed pasta business, and milk-processing industry, some companies dominated the market through small regional plans. But if the volume is an uninteresting answer to the question of what drives costs and has no strategic significance, what cost drivers are more useful in a strategic sense to explain cost position of the firm.

Within this context, Shank and Govindarajan (1993) presented their list of cost drivers. In their work, they argued that the basic concept of strategic cost drivers is to get away from the notion that volume drives cost. In strategic cost management, cost is caused by a multitude of factors that are related to each other in complex ways. Identifying and analyzing these factors mean best explaining the changing relationship between these factors and costs over time and therefore understanding the cost behavior and cost structure of a company. Shank and Govindarajan (1993) focused on the concept of cost drivers after Riley (1987). They broke the list of cost drivers into two categories (see figure 6.5).

The first category is called "structural" cost drivers and deals with the following strategic choices:

- **Economies of Scale**: How big an investment to make in facilities for research and development, manufacturing and marketing?
- **Scope**: Degree of vertical integration. Horizontal integration is related to scale.
• Experience: How many times in the past, the firm has already done what it is doing now?
• Technology: What process technologies are used at each step of the firm value chain? (State of the Art).
• Complexity: How wide a line of products or services to offer to the customers.

Each structural driver involves choices by the firm that drive product cost. Over the years, economists and strategists focused their attention to some of these structural drivers such as economies of scale, and experience and learning effects. Shank and Govindarajan emphasized that only experience and learning effects on the cost have drawn much interest from management accountants. In addition, complexity, as a structural variable, has received the most attention among accountants recently. Some examples of the potential importance of complexity as a cost determinant are in the work on activity based costing by Cooper and Kaplan (1998), or Shank and Govindarajan (1988).

<table>
<thead>
<tr>
<th>Structural cost drivers</th>
<th>Executional cost drivers</th>
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<tr>
<td>Scale of investment in capacity</td>
<td>Workforce involvement</td>
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<td>Degree of vertical integration</td>
<td>Total quality management</td>
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<tr>
<td>Experience</td>
<td>Utilization of capacity</td>
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<tr>
<td>Technology: process technology employed</td>
<td>Product design</td>
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<tr>
<td>Complexity: breadth of product line</td>
<td>Exploitation of external linkages</td>
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<td></td>
<td>Plant layout efficiency</td>
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Figure 6.5 List of cost drivers according to Shank and Govindarajan (1993:20)

The second category of cost drivers is called "executional" cost drivers that constitute determinants of a successful cost position. The most important executional cost drivers include:
• Workforce involvement (participation) - work force commitment to continuous improvement.
• Total quality management (beliefs and achievement regarding product and process quality).
• Capacity utilization (given the scale choice on plant location).
• Plant layout efficiency (how efficient against current norms, is the plant layout?).
• Product configuration (is the design or formulation effective?).
• Exploiting linkages with suppliers and/or customers, in the firm’s value chain.

Executional cost drivers are determinants of a firm's cost position that hinge on its ability to execute successfully. They are linked to efficiency and the more cost drivers identified the more likely it is to improve satisfaction. In contrast, the structural cost drivers have no direct linkage with efficiency and the number of cost drivers identified does not demonstrate a link to improving satisfaction. For each of the structural drivers, more is not always better (Shank and Govindarajan 1993:21). For example, there are diseconomies of scale, or scope, as well as economies. A more complex product line is not necessarily better or worse than a less complex line. In addition, too much experience can be as bad as too little in a dynamic environment. For example, Texas Instruments emphasized the learning curve and became the world's lowest-cost producer of microchips that were no longer state of the art. Moreover, the insights from analysis based on structural drivers are too often old fashioned and while the consultant who performs a strategic cost analysis is gradually directing his attention on the executional cost drivers, the accountant from his side is still grasping the structural cost drivers (Shank and Govindarajan, 1993:22).

Shank and Govindarajan (1993:22) emphasized that there is no clear agreement on the list of fundamental cost drivers. There are many studies that discussed different lists of cost drivers. Whatever cost drivers on the list, the key ideas are as follows:

• For strategic cost management output volume is usually not the most useful factor or driver to understand the cause-and-effect relationship between cost and behavior or to explain the cost behavior.

• In a strategic sense, it is more useful to examine the structural and procedural activities and their cost drivers that may explain a cost position and shape the firm’s competitive position.

• A company should be fully aware that cost drivers are not equally important all the time, but some are very probably very important in many cases.

• For each cost driver, there is a particular cost analysis framework that is critical to the understanding the positioning of the firm. Being a well-trained cost analyst is not enough; he or she requires knowledge of each framework.
Summarizing, the consideration of Shank and Govindarajan was to create a list of cost drivers. Their list of cost drivers includes only two categories: structural cost drivers and executional cost drivers and gives not enough attention to operational cost drivers as also in the list of cost drivers by Porter. Also, they neglected, as well as Porter study of the interdependence between the individual drivers. The effect of the cost drivers on the costs is only described through structural activities in the work of Porter and through structural and executional activities in the work of Shank and Govindarajan. Moreover, the list of Shank and Govindarajan lacks the aspect of timing, which was included by Porter and becomes more significant in a rapidly changing market with short life cycles and highly volatile demand. Finally, the list of Shank and Govindarajan cannot be considered as a complete list of cost drivers or a basic outline of cost drivers that serves as a guide for companies to improve their cost position. So, the following section introduces the basic outline of cost drivers dependence on the work of Porter and Shank and Govindarajan.

6.2.1.4. The Basic Outline of Cost Drivers

Every organization is a collection of activities that are performed to design, produce, market, deliver and support its products and services. All these activities can be represented generically through the value chain (Porter 1998a:36). Many authors, for example, Donelan and Kaplan (1998:9) and Hansen and Mowen (2000:493) stated that organization activities are of three types: structural activities (such as the number of production facilities and selecting and using process technologies) which determine the underlying economic nature of the company, executional or procedural activities (such as total quality management and designing products) which pervade all aspects of company operation and reflect the company's ability to perform processes efficiently and effectively, and operational activities (such as product assembly, setting up equipment, and scheduling ), are the day-to-day activities of the company. What determines costs of these activities? Costs of performing such activities can be driven up or down by three types of factors, structural cost drivers, executional cost drivers and operational cost drivers as shown in figure 6.6.
It is necessary that a company focuses on activities which represent the sources of strategic advantage for it. Most traditional cost management efforts concentrate on operational activities and their traditional drivers costs (Blocher et al. 1999:93). These traditional cost management efforts can be relatively easy to initiate, but may be narrow in focus because they seek to manage short-term operational costs and therefore they may not be able to give the company an overall competitive advantage. If competition is intensive, then focusing on operational activities and their cost drivers is necessary but may be insufficient. Therefore, the company should try to focus on structural and executional cost drivers because they can determine the long-term cost structure of an organization. They are used to facilitate strategic and operational decision-making. Possible structural and executional activities with their drivers are showed in the figure 6.7.

As the figure 6.7 shows, the first and perhaps most common consideration is that a given structural activity may be driven by more than one driver. For example, the cost of building plant is affected by scale, number of plants, and degree of centralization. Companies that have a commitment to have a high degree of centralization may build larger plants so that there can be more geographic concentration and greater control. Similarly, complexity may be driven by number of different products, number of unique processes, and number of unique parts. For example, in 1986 GM made over 200 different models. Ford reduced the number of
models, and combined options into packages in order to reduce the complexity of product lines. The result was a significant cost savings for Ford and a significant change in the balance of power between GM and Ford (Donelan and Kaplan 1998:14). Also, as shown in the figure 6.7, institutional factors impact on the company's cost position, for example, debt level can have a significant impact on many costs, as well as interest. High debt may limit the company's flexibility, impacting product costs and operating expenses. Other institutional characteristics can impact the cost of government regulations and tax expense.

<table>
<thead>
<tr>
<th>Structural activities</th>
<th>Structural cost drivers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managing location</td>
<td>Favorable location, number of locations</td>
</tr>
<tr>
<td>Building plants</td>
<td>Number of plants, scale, degree of centralization</td>
</tr>
<tr>
<td>Management structuring</td>
<td>Management style and philosophy</td>
</tr>
<tr>
<td>Managing complexity</td>
<td>Number of product lines, number of unique processes, number of unique parts</td>
</tr>
<tr>
<td>Vertical integration</td>
<td>Scope, buying power, selling power</td>
</tr>
<tr>
<td>Integrate horizontally</td>
<td>Sales volume in units or Euros, number of different customers</td>
</tr>
<tr>
<td>Managing technology</td>
<td>Types of process technologies, experience</td>
</tr>
<tr>
<td>Managing institutional structure</td>
<td>Debt level, debt capacity, favorable tax status</td>
</tr>
<tr>
<td>Gain experience, learn, and manage skill sets</td>
<td>Cumulative volume in the activity, time in operation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Executional activities</th>
<th>Executional cost drivers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managing employees</td>
<td>Employee morale level, turnover rates, degree of involvement</td>
</tr>
<tr>
<td>Providing quality</td>
<td>Quality management approach, employee training level, return merchandise rates, customer satisfaction ratings</td>
</tr>
<tr>
<td>Managing plant layout</td>
<td>Plant layout efficiency; throughout time, ability to convert from one product/service to another</td>
</tr>
<tr>
<td>Designing and producing products</td>
<td>Product configuration</td>
</tr>
<tr>
<td>Managing capacity</td>
<td>Capacity utilization, number of production or service facilities</td>
</tr>
<tr>
<td>Managing efficiency</td>
<td>Lead-time from product concept to production, R&amp;D cost compared to competitor</td>
</tr>
</tbody>
</table>

Figure 6.7 Structural and executional activities and their cost drivers


Management structuring can influence cost. For example, in some organizations the method of managing their activities is based on pyramidal structures and the principles of linear thinking - that is the inability to understand the interdependences or web of relationships of the activities and processes (Daft 2001:27). Such organizations are typically viewed with straight lines, with roles, responsibilities and reporting relationships confined to a linear way of operating. This management style may lead to slow communications for example, which can reduce the quality of outputs and increase their time-to-market and cost (Shields and Young 1995:25). Structural drivers are factors that can affect a company's long-term cost structure. This is readily understood by simply considering the various drivers shown in the figure 6.7. Among the structural cost drivers are the familiar drivers of scale, scope,
experience, technology, and complexity. For example, economies and diseconomies of scale are well-known economic phenomena, and the learning curve effect (experience) is also well-documented - these cost drivers are explained above. An interesting property of structural cost drivers as Shank and Govindarajan mentioned, is that more is not always better. Structural cost drivers cannot be changed in the short or medium term and are thus less controllable than the executional drivers, which can be influenced in the medium term. Moreover, the efficient level of a structural driver can change. For example, changes in technology can influence the scale driver by changing the optimal size of a plant. In other words, cost drivers can be interrelated in complex ways that are not always well understood. For example, in the steel industry, minimill technology has eliminated scale economies (in the form of megamills) as a competitive advantage (Shank and Govindarajan 1993:163).

The recent emphasis in many companies is executional or procedural cost drivers. They are determined largely by managerial ability and performance (Siau and Lindt 1997:41). Considerable managerial effort is being expended to improve how things are done in an organization. Continuous improvement and its many faces (employee empowerment, total quality management, process value analysis, life-cycle assessment, etc.) is what executional efficiency is all about. As shown in the figure 6.7, there are many executional activities and their cost drivers, for example, providing quality - there is a close relationship between providing quality and managing employees. This activity comprises factors that might affect the company's cost position such as quality management training, quality standards, and employee empowerment. A company should highlight the fact that poor quality can be a significant cost driver (Giakatis et al. 2001:181). The absence of good materials, trained labor, well-maintained equipment, and well-conceived management processes can dramatically increase quality costs. These include scrap, rework, excess inventories, process and equipment breakdowns, field service and product warranty claims. Thus, many companies throughout the world, for example, Ford, Samsung, and Siemens become aware of the importance of quality (Shank and Govindarajan 1993:165 and Horngren et al. 1999:701).

Strategic cost management focuses on managing all long-term costs, thus, there is an emphasis on full absorption costs - are the sum of all the variable and fixed costs in all the business functions in the value chain (Horngren et al. 2000:382). Thus, if a company is operating at 70 percent capacity, its long-term absorption cost of sales will be higher than if it
is operating at 90 percent capacity. Thus, capacity utilization may be considered a significant
driver of production costs.

In addition, managing efficiency considers an important procedural activity in the company
and can influence the level of cost. There are many types of efficiency, but this activity
represents a broad perspective of efficiency, including product introduction efficiency,
product rollover efficiency (as product life cycles are shorter and shorter, managing product
rollovers is now a routine challenge faced by many high tech companies), and overall
manufacturing efficiency (Donelan and Kaplan 1998:14). For example, in looking at how to
improve manufacturing efficiencies, there are a number of factors that a company can take to
improve manufacturing efficiency and therefore cost position such as reducing lead time,
combining duties to even out work elements, keeping production lines close together to
minimize material handling, eliminating unnecessary or unproductive work, keeping work-in-
process inventory to a minimum, maintaining equipment to insure quality and efficiency, and
cross train employees for multiple jobs.

A company can also improve its cost position particularly manufacturing cost through
improved plant layout - the type and efficiency of pant layout is another executional cost
driver. Layout considerations affect many areas include operation, maintenance and licensing,
as well as capital cost (Hassan 1994:2559). Therefore, a company that wants to compete in
today's competitive environment can no longer ignore the ongoing "costs" of inefficient plant
layout or design (Kochhar and Heragu 1999:2429). For example, high cycle and lead times,
poor materials handling systems, unacceptable work - in-process inventories, low equipment
utilization, and wasted space are the needless penalties manufacturers pay because of poor
facility layout and design. Thus, managing plant layout can influence cost position but this
hinges on the company's ability to execute plant layout effectively and efficiently.

Product design. Design-for-manufacture - designing products for ease of production rather
than simply for functionality and aesthetics - can offer substantial cost savings, especially
when linked to the introduction of new process technology (Walleigh 1989:37). Thus, a
company should design its products carefully to achieve higher quality, lower cost, improved
application of automation and better maintainability (Desai et al. 2001:37). This requires
some considerations such as simplifying the design and reducing the number of parts,
standardizing and using common parts and materials, designing for ease of fabrication, designing within process capabilities and avoiding unneeded requirements, minimizing flexible parts and interconnections, and designing for ease of assembly. For example, the IBM "Proprinter", one of the most successful computer printers of the 1980s owed its low costs (and reliability) to an innovative design that: reduced the number of parts from 150, found in the typical PC printer, to 60 - designed the printer in layers so that robots could build it from the bottom up - eliminated all screws, springs, and other fasteners that required human insertion and adjustment and replaced them with molded plastic components that clipped together (Gomory 1989:103).

Operational activities are day-to-day activities performed as a result of the structure and processes selected by the company. Examples include receiving and inspecting parts, moving materials, shipping products, testing new products, servicing products, and setting up equipment. Operational cost drivers (activity drivers) are those factors that drive the cost of operational activities (Rayburn 1996:122). Possible operational activities and their cost drivers are listed in the figure 6.8. They include such factors as number of parts, number of moves, number of products, number of customer orders, and number of returned products. As should evident, operational activities and their cost drivers are the focus of activity based costing.

<table>
<thead>
<tr>
<th>Unit-level activities</th>
<th>Unit-level drivers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grinding parts</td>
<td>Grinding machine hours</td>
</tr>
<tr>
<td>Assembling parts</td>
<td>Assembly labor hours</td>
</tr>
<tr>
<td>Drilling holes</td>
<td>Drilling machine hours</td>
</tr>
<tr>
<td>Using materials</td>
<td>Pounds of material</td>
</tr>
<tr>
<td>Using power</td>
<td>Number of kilowatt-hours</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Batch-level activities</th>
<th>Batch-level drivers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting up equipment</td>
<td>Number of setups</td>
</tr>
<tr>
<td>Moving batches</td>
<td>Number of moves</td>
</tr>
<tr>
<td>Inspecting batches</td>
<td>Inspection hours</td>
</tr>
<tr>
<td>Reworking products</td>
<td>Number of defects units</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Product-level activities</th>
<th>Product-level drivers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Redesigning products</td>
<td>Number of change order</td>
</tr>
<tr>
<td>Expediting</td>
<td>Number of late orders</td>
</tr>
<tr>
<td>Scheduling</td>
<td>Number of different products</td>
</tr>
<tr>
<td>Testing products</td>
<td>Number of procedures</td>
</tr>
</tbody>
</table>

Figure 6.8 Operational activities and their cost drivers (Cooper and Kaplan 1999:212)
Activity-based costing can be helpful tool in identifying the determinants - also called cost drivers - of the operating costs of companies. It is generally accepted now that overhead costs are driven not only by output volume, but also by non-volume-related output variables. As shown in the figure 6.8, the operational activities and their cost drivers according to Cooper and Kaplan (1999) are: 

- **Unit-level activities** - performed each time a unit is produced (units of product, machine hours, labor hours),
- **Batch-level activities** - performed each time a batch of goods is processed or handled (number of orders processed, number of setups, number of material moves), and
- **Product-level activities** - performed as needed to support the production of each different type of product (number of tests, number of parts, number of engineering change notices, hours of design time, number of inspections).

Many authors, for example, Maher (1997:240) and Cooper and Kaplan (1999:215) argued that operational cost drivers should be selected based on the following three criteria:

- Cost drivers must accurately reflect the cost of the activities they measure.
- The cost of measurement (of cost drivers) relative to accuracy desired must be low. Wherever possible, cost drivers should be data that are currently tracked using existing systems.
- Cost drivers must encourage management-desired behavior. For example, if “excess investment” is a problem, then the cost driver chosen for materials planning activity should measure and aid in the reduction of excess due on orders, while minimizing shortages.

In some cases, the structural and executional activities define in a large part the number and nature of the day-to-day activities performed within the company. For example, if a company decide to produce more than one product at a facility, then this structural choice produces a need for scheduling - a product-level activity. Similarly, providing a plant layout defines the nature and extent of the material-handling activity - usually a batch-level activity. Furthermore, although structural and/or executional activities define operational activities, analysis of operational activities and their drivers can be used to suggest strategic choices of structural and executional activities and their drivers. For example, knowing that the number of moves is a measure of consumption of the material-handling activity by individual products may suggest that resource spending can be reduced if the plant layout is redesigned to reduce the number of moves needed (Kochhar and Heragu 1999:2430). Operational,
structural, and executional activities and their cost drivers are strongly interrelated. The figure 6.9 illustrates one example of these relationships.

![Figure 6.9 The interrelated relationships between cost drivers](image)

The figure 6.9 illustrates one example that shows the interrelated relationships between structural, executional, and operational cost drivers. For instance, selecting and using process technologies such as JIT manufacturing and purchasing systems may affect the number and nature of procedural and operational activities within the company and therefore their cost drivers (Hernandez 1989:5). JIT system is one of the most advanced production systems. It aims to supply necessary kinds of quality products, in necessary quantity, and at necessary time with lower production cost through elimination of every loss and waste from the company's operation including those in production lines (Monden 1992:51). Adopting a JIT manufacturing system has many significant effects on procedural and operational activities and their cost drivers. For example, plant layout is a cost driver that is managed differently under Just in Time manufacturing (Horngren et al. 2000:726). In traditional job and batch manufacturing, products are moved from one group of identical machines to another. Typically, machines with identical functions are located together in an area referred to as a department or process (Horngren et al. 1999:735). Workers who specialize in the operation of a specific machine are located in each department. JIT replaces this traditional plant layout with a pattern of manufacturing cells. In manufacturing cells, equipment and workstations are arranged in a sequence that supports a smooth flow of materials and components through the
process, with minimal transport or delay (Salum 2000:1053). In other words, a cell consists of the people and the machines or workstations required for performing the steps in a process or process segment, with the machines arranged in the processing sequence. Thus, managing plant layout (executional activity) through JIT can result in some efficiencies such as reduced lead times and lower manufacturing costs - are a direct of the cellular structure. Reducing lead-time enables a company to respond better to changes in customer demand, for example, a short manufacturing lead-time helps Siemens to rapidly restock those model of mobile telephones that, at any given time, are the most popular with consumers (Horngren et al 1999:736). In addition, manufacturing cells can reduce materials handling activity cost, work-in-process inventory and set-up time, and the cellular manufacturing design can also affect structural activities, such as plant size and number of plants, because it typically requires less space (Urban et al. 2000:2911 and Suer et al. 1999:3446).

Also, "Total Quality Management" is one of the fundamental goals in JIT manufacturing (Johnson and Manoochehri 1990:2). Total Quality Management (TQM) emphasizes the quality at every stage of manufacture including product design down to the purchase of raw materials. Quality management is carried out at every step of the manufacturing from the source to the final step rather than relying on a single processing stage, which implements quality management on the final product. Each individual and function involved in the manufacturing system must, therefore, accept the responsibility for the quality level of its products. This concept introduces the correction of the problem before many other defective units have been completed. Thus, selecting and using process technologies such as JIT system may affect other structural and procedural activities such as providing quality (see Hernandez 1989:123). One of the main underlining concepts of TQM is empowerment of the employees, according to the JIT view, increasing the degree of participation allowed workers in the management of the company (the executional cost driver) increases productivity and overall cost efficiency (Johnson and Manoochehri 1990:3). Workers are allowed a say in how the plant operates. For example, workers are allowed to shut down production to identify and correct problems. Managers seek workers' input and use their suggestions to improve production processes. Employee empowerment, a procedural activity, also affects other structural and procedural activities. For example, the management structure may change in response to greater employee involvement. Because workers assume greater responsibilities, fewer managers are needed and the organizational structure becomes flatter. Finally, there are
many interrelated relationships among other cost drivers within the company, but the company must recognize such interrelated relationships among cost drivers and must take this into consideration when determining and analyzing cost drivers.

6.2.1.5. Ways of Identifying Cost Drivers

One of the keys to strategic cost management is the determination of the appropriate cost drivers. By identifying the key cost drivers, or the cause of the cost, strategic cost management not only tells managers where to start, but also what to start on. By identifying cost drivers and quantifying their effect on costs, where possible, strategic cost management again provides relevant and meaningful information. This process may not be easy, however, there are a number of ways that can be used to identify the key cost drivers.

Porter (1998a:87) suggested some methods to identify the key cost drivers. First, examining the basic economics of activity; in some cases the cost drivers of activity may be clear from knowledge obtained from carefully and in detail examining its basic economics. For example, the product design and development activity determines product attributes such as functional capacities, appearance, reliability, and product life span. This activity affects ease of manufacture and product serviceability, and dictates the number and type of parts required and the manufacturing processes that are needed to make and assemble them. Therefore, the product design and development process affects or determines the overall product costs (see Barton et al. 2001:47). In this case, a company can review its product design and development process carefully and estimate the shape of the relationship between product design and development process and the costs. Simplifying product designs results in numerous benefits such as reduced costs, improved quality, and shorter product development lead times. For example, NCR reviewed carefully the design of its product (2760 Point-of-Sale register) in order to identify cost drivers and reduce costs, this process results in reduced assembly time by 75%, parts by 80%, the number of suppliers by 65%, and saved $1.1 million in direct labor alone (Welter 1989:81). Another example of this method is "examining the activities associated with sales forces". Sales forces costs (the group of employees involved in the selling process) are often driven by local share because high local share lowers travel time (Porter 1998a:87). Here, in order to acceptably accurate estimate of the shape of the relationship between sales force cost and share, a company can decide this relationship through estimating how rising share would cut or affect average travel time. In other
situations, when a company examines its activities, in order to understand and quantify cost behavior, it may be necessary to use alternative measures of the efficiency of an activity besides total cost such as yield, quality, time, and others. Theses measures can help a company to discover the sources of cost changes in an activity and their logic.

*Examining the internal experience of the company* is the second way to identify cost drivers. This way is more useful especially if the events within the company have changed over the time because of new method of production, new design of product, operate multiple units, change of product mix, etc. In this case, historical cost information may enable a company to accurately estimate the shape of the relationship between the costs and activities, for example, the relationship between the change in product or process design and costs, the relationship between the changes in product mix and costs. Also, cost levels at different scale of output in the past periods may throw some light on scale economies. If a company sells in several geographic regions or manufactures in several plants, differences among cost levels in these situations can help to explain cost drivers.

The third way to identify cost drivers is *interviews*. Cost drivers can be also determined from interviews with experts. Workers or managers who have extensive knowledge of a value activity can be asked "what if" questions about the effects of chaining various parameters on the cost (Porter 1998a:88). For example, interviews with production managers might determine the impact of doubling line speed on such factors as supplying levels, energy consumption, and output. Interviews with managers and design engineers may address the impact of product design changes on the cost of product life cycle. Here, managers and engineers should be asked questions such as: Does product design influence the costs? How much of advantage can be gained by designing a lighter weight product, a product with fewer parts, a product with more functions integrated into individual components, or a more rugged product that results in lower cost to produce a given quality? (Rowe et al 1989:211). In addition, interviews with experts may determine the effect of location on the costs; what would our costs be if our plant were in another location? In other words, how much do the basic factor costs (labor, capital, and energy) influence the costs of the company? How much of an advantage could be gained, for example, by moving production to a country with lower labor costs? Interviews are crucial to gain the information about the major activities
performed in the company, the cost of those activities, what drives those activities, and the qualities of each cost driver associated with every activity.

The final method for determining cost drivers is competitive cost analysis. By calculating competitors’ relative costs of value chain activities, and pinpointing their specific cost drivers, managers and accountants can understand why a company does or does not possess competitive advantage, and recommend to management opportunities to improve the firm’s competitive positioning (Jones 1988:282). Competitor may usually have different cost position through cost drivers, thus, comparing and analyzing competitor cost behavior can show which cost drivers are most important. The value chain is the basic tool for determining competitor costs; the company must identify competitor value chains and how activities are performed by them. In practice, the process of determining cost drivers through comparing and analyzing competitor costs is often extremely difficult because the company does not have direct information on the costs of the competitors' value activities (Porter 1998a:98). However, the cost of some of competitor's value activities can be estimated directly from public data or interviews with suppliers, distributions, and others. For example, it is usually possible to determine the size of a competition's sales force and its expense and compensation arrangements. The result is a partial picture based on accurate data that can be fleshed out with informed judgments.

In comparing and analyzing competitor's activities costs the first step is to establish how the competitor performs its activities, and to provide specific estimates of the costs of the competitor's activities (Jones 1988:282). Thus, in the case of the company cannot estimate directly the costs of some competitor's activities, it should employ comparisons between itself and competitor by reverse engineering and (cost) benchmarking. These comparisons include the relative position of competitor with respect to the cost drivers of the value activities. The company can use its knowledge of the behavior of competitor's costs and its relative cost position to estimate differences in the competitor's costs. For example, if the competitor probably possesses a cost advantage in the product design, the key question to ask in performing a competitive-cost analysis is, what are the production costs, given the weight, complexity of design, number and quality of parts, and performance of a competitor's product characteristics? This analysis enables managers to draw some immediate conclusions concerning the materials costs of competitive products and to make inferences concerning the
competitor's technology and production process. Differences in product design and the resulting cost differences can be significant and can also reveal differences in production philosophy among competitors. For example, Japanese electronics manufactures tend to integrate product components more than Western countries do (see Jacobs and Herbig 1998:142). While such a practice means higher initial costs for development and production, its long-term effects on quality overcome the short-term disadvantages by far. Another example, if local share drives logistical costs and competitor has a higher local share, in this case the competitor may have a cost advantage in that value activity. If the company can estimate the scale curve for logistical costs, the share difference provides a way of estimating the extent of the company's disadvantage.

The method of determining cost drivers through comparing and analyzing competitor cost behavior may involve estimates and deductions (Porter 1998a:99 and Jones 1988:284). It is sometimes only feasible to estimate the direction, and not the absolute magnitude, of the relative cost difference with a competitor in a value activity. However, this can still prove extremely useful, since the company can combine the direction of difference with knowledge of the proportional size of each activity to develop a greater picture of a competitor's relative cost position. Finally, a company can typically improve the accuracy of estimates of competitors' costs by comparing several competitors simultaneously. In the fact, analyzing a company's cost behavior and determining the relative costs of competitors is often a repetitive process.

When determining cost drivers, managers and accountants should give attention to some considerations (Collins and Werner 1990:134), for example, ask for and obtain top management support. In some cases, many changes and new policies may have influence on the company's activities costs, without support by top management, it is futile to determine cost drivers. Also managers and accountants should focus on activities (for example, structural and executional activities) that will be the source of a company's competitive advantage; it is important to identify and, then focus management attention on, the cost drivers of activities that represent the long-run - strategic cost drivers. It is likely that such activities will be the source of competitive advantage. In addition, using a team approach is necessary to determine cost drivers; create teams to investigate activities and determine cost drivers for each activity. Using a team approach makes it more likely operating and
accounting personnel will accept the new approach. Any major systems change requires widespread personnel commitment to make it work.

The chief benefit of the cost drivers determination is that it provides relevant and meaningful information about the activities that influence the firm's cost position (Blocher et al. 1999:57). These information may be used to improve the firm's cost position. A company that wants to manage its costs now looks to determine and analyze their causes - cost drivers. Using cost driver approach, accountants and managers look for the events and activities that cause costs. There are other benefits of identifying and analyzing cost drivers, for example, eliminating and reducing cost; after identifying cost drivers, the natural next step - to see if some of costs of activities can be eliminated or reduced - is greatly facilitated. Costs for an activity should be reduced only if it dose not adversely affect the strategic advantage. The benefits of identifying and analyzing cost drivers include also reexamining long-term costs; traditional cost management often is criticized for focusing on the short run. In strategic cost management, the cost driver approach, with its focus on cost causes and behavior, leads accountants and managers to examine not only short-term costs but also long-term costs that were considered committed or fixed. Indeed, many costs often considered fixed often do vary, however gradually, over the long term and are therefore subject to better management. In addition, cost driver approach may develop management awareness (Siau and Lindt 1997:43). Managers can be encouraged to develop awareness of the causes of costs. Their bonuses, promotions and performance evaluations can be based on the application of cost driver performance.

To manage costs and make recommendations for improving the company's cost position and creating value for customer, this requires not only identifying and analyzing cost drivers, but also value chain analysis. In other words, every company may be viewed as a chain of activities, each activity has a distinct cost structure determined by different cost drivers, therefore, strategic cost management requires disaggregating the company's value chain to identify important factors for improving cost position and value customer such as relative importance of each activity in compromising total cost, cost drivers for each activity and why the firm is relatively efficient or inefficient in individual activities, how costs in one activity influence costs in others, which activities should be internal and which should be outsourced,
etc. Thus, the following section discusses the value chain analysis as a key concept for strategic cost management.

6.2.2. Strategic Cost Management - Value Chain Analysis

6.2.2.1. The Value Chain Concept

The idea of the value chain is based on the process view of companies, the idea of seeing a manufacturing (or service) company as a system, made up of subsystems each with inputs, transformation processes and outputs (Stabell and Fjeldstad 1998:416 and Dess and Picken 1999a:102). Inputs, transformation processes, and outputs involve the acquisition and consumption of resources - money, labor, materials, equipment, buildings, land, management, etc. Many companies engage in hundreds, even thousands, of activities in the process of converting inputs to outputs. A company cannot reduce costs and/or create value for customer by looking at its activities as a whole. Creating competitive advantage originates from many separate activities a company performs in designing, production, marketing, delivering, and supporting its products (Porter 1998a:33). Each of these activities can contribute to improve a company's cost position and customer value. For example, a superior product design, a highly efficient assembly process, procurement of high quality inputs, a responsive order entry system, a low-cost products distribution system, etc., may enable a company to improve its cost position and also customer value.

Examining all activities a company performs and how they interact is necessary for improving cost position and customer value, the value chain is a systematic way for doing so. Porter (1998a:33) argued that the value chain approach, which involves disaggregating a company's operations into its strategically relevant activities, can be an important managerial tool to understand how value chain activities are performed, to identify what cost drivers of value chain activities are and the existing and potential opportunities for improving cost position and customer value.

The value chain describes the activities within and around a company, and relates them to an analysis of the competitive strength of the company (Dess and Picken 1999a:102). Therefore, it considers a systematic way to make a company able to evaluate which activity can add value to the products or services to its customers. Thus, this idea was built upon the insight that a company is more than a random compilation of machinery, equipment, people and
money (Evans and Wurster 1997:72). Only if these things are arranged into systems and systematic activities it will become possible to produce something for which customers are willing to pay a price. While one can define or group the activities a company performs at different levels of detail, the figure 6.10 represents a common approach (Porter's value chain) to categorize such activities.

Porter (1998a:39) distinguished between primary activities and support activities. Primary activities are directly involved in creating and bringing value to the customer. They deal with physical products. They can be grouped into five main areas: inbound logistics, operations, outbound logistics, marketing and sales, and service. Each of these primary activities is linked to support activities, which help to improve their effectiveness or efficiency. There are four main areas of support activities: procurement, technology development (including R&D), human resource management, and infrastructure (systems for planning, finance, quality, information management, etc.). As shown in the figure 6.10, the value chain contains the element of margin. The term "margin" implies that a company realizes a profit margin that depends on its ability to manage the linkages between all activities in the value chain (Hax and Majluf 1991:79). In other words, the company is able to deliver a product/service for which the customer is willing to pay more than the sum of the costs of all activities in the value chain.

In many industries, it is rather unusual that a single company performs all activities from product design, production of components, and final assembly to delivery to the final user by
itself. Most often, a company is an element of a value system. Hence, Porter (1998a:34) explained that a company's value chain is embedded in a broader value system that provides inputs into the company and helps transfer outputs to the ultimate consumer. The figure 6.11 illustrates the value system for an industry. Within the whole value system, there is only a creation value of profit margin available. This is the difference of the final price the customer pays and the sum of all costs incurred with the production and delivery of the product/service. It depends on the structure of the value system, how this margin spreads across the suppliers, producers, distributors, customers, and other elements of the value system (see Gadiesh and Gilbert 1998:149). Each member of the system will use its market position and negotiating power to get a higher proportion of this margin. Nevertheless, members of a value system can cooperate to improve their efficiency and to reduce their costs in order to achieve a higher total margin to the benefit of all of them.

As shown in the figure 6.11, suppliers have value chains that create and deliver the purchased inputs used in a company's chain. Suppliers not only deliver a product but also can influence the costs and performance within the company by many ways e.g. through quality control, meeting delivery dates and price. In addition, many products pass through distribution channels on their way to the customer. The value chains of these channels perform additional activities that affect the customer (e.g. a dealer network in the case of automobiles), as well as influence the company's own activities. The linkages between a company and its suppliers and customers should be managed so that all parties benefit. Gaining and sustaining competitive advantage depends not only on understanding a company's value chain activities and the linkages between these activities, but also on recognizing and managing the relationships between the company and the value chains of its suppliers and customers (Dess and Picken 1999a:110).

The value system and value chain are important tools for understanding how a company can position itself against its competitors. The value chain represents the interrelated value-
creating activities inside the company (Partridge and Perren 1994a:22). These activities affect each other and cannot be treated in isolation. To achieve competitive advantage, cost management of value chain activities requires them to be managed and optimized together instead of viewing them as separate and independent cost centers. The idea in the value chain was to capture the fact that a company does a series of functions (e.g. operations, technology development, etc.). Analyzing how these functions are done relatively to their competitors can provide useful insights. On the other hand, the value system is the set of interdependent value chains all the way from the suppliers of raw materials to the end-user. To gain competitive advantage a company has to realize that the costs and benefits, i.e. values associated with the product, must be examined from the final consumer’s point view. For a product to be competitive, it must pass through the whole value system efficiently. Thus, the following section discusses the fundamental methodology of value chain analysis for cost management.

6.2.2.2. The Fundamental Methodology of Value Chain Analysis for Cost Management

To manage costs and make recommendations for building cost advantage, the company or even the business unit is a level to work at it. As discussed in the section 6.2.2.1, every business may be viewed as a chain of activities. It is obvious that the behavior of a company's costs and its cost position develop as the result of the value activities the company performs in competing in an industry (Porter 1998a:70). Therefore, effective cost management requires considering or examining costs within value activities carefully and in detail and not the cost of the company as a whole (Partridge and Perren 1994a:23).

Shank and Govindarajan (1993), Donelan and Kaplan (1998) and Blocher et al. (1999) stated that using value chain analysis for strategic cost management could help a company to assess and improve its strategic position by:

- Improving quality by providing better understanding of customer requirements when products are assembled from multiple input sources (e.g. cars, computers...).
- Providing a way to evaluate competitive cost position and thereby improving strategic positioning.
- Reducing time when there is a great deal of interdependency between the participants in a value chain.
- Reducing cost by focusing attention on areas needing cost reduction and by reconfiguring the value chain.
Using value chain analysis for strategic cost management comprises some stages or is predicated upon the fundamental methodology identified in the literature. Shank and Govindarajan (1993), Donelan and Kaplan (1998) and Blocher et al. (1999) stated that the principal stages of value chain analysis for strategic cost management are:

- Identify the value chain activities and disaggregate the firm into separate activities
- Establish the relative importance of different activities in the total cost of the product
- Compare costs by activity
- Identify cost drivers
- Identify linkages and interrelationships in the value chain
- Identify opportunities for reducing costs and/or improving value

The following sections discuss each stage.

6.2.2.2.1. Identify the Value Chain Activities and Disaggregate the Firm into Separate Activities

The industry value chain begins with the basic raw material producer and ends with the delivery of the final product to the customer (Shank and Govindarajan 1993:48). A company should identify the specific value activities that it performs in the process of design, manufacturing, and customer service in the industry. Some companies may be involved in a single activity or a subset of the total activities in the industry. For example, in computer-manufacturing industry some companies may only manufacture components or complete systems, while others distribute and sell the product. Donelan and Kaplan (1998:11) explained that the key to identify and analyze value chain activities in the industry is to understand and take advantage of the company’s relative strength within the industry.

The industry value chain embraces upstream links and downstream links. For example, in the computer-manufacturing industry, upstream links include completed product design, mining, development, and refining raw materials (i.e., silicon, plastic, and various metals), converting raw materials into components and parts (i.e., chips, processors, boards). Downstream links include marketing, distribution, and service. The activities should be determined at a relatively detailed level of operations, that is, at the level of a business unit or process just large enough to be managed as a separate business activity (Kaplinsky and Morris 2001:4). In fact, each business activity or link in the industry value chain may stand an independent, economically viable segment of the industry. Donelan and Kaplan (1998:11) stated that links
or business activities in the industry value chain are separate when the output of the process has a market value (a market price can be determined objectively). In addition, when some companies produce and sell the output of this process within the industry value chain. For example, while the completion of a chip or computer board is likely to be an activity (the output has a market), it is unlikely that the operation of testing or packaging the chip or board would be an activity in a value chain analysis.

For the purpose of cost management, a company’s value chain activities should be isolated and separated. Porter (1998a:64) and Shank and Govindarajan (1993:48) argued that a company must give a lot of attention to the following considerations, when it isolates and separates value chain activities

- Activities represent a significant percentage of total costs; or
- The cost behavior of the activities (or cost drivers) is different; or
- Activities are performed by competitors in different way; or
- Activities have a high potential for creating differentiation.

In the value chain analysis for cost management, activities should be separated if they represent a significant or rapidly growing percentage of total costs (Porter 1998a and Shank and Govindarajan 1993). A company can identify the large components of their cost, however, the company should not ignore growing small activities because activities that represent a small and growing percentage of costs can effect on its cost structure. On the other hand, if activities are a small and stagnant percentage of costs, a company can group them together into broader categories.

A company can also separate value chain activities if they have different cost drivers (Porter 1998a and Shank and Govindarajan 1993). For each activity, there is factor(s) determines cost level or cost behavior of this activity. In the value chain analysis, activities with similar cost drivers can be grouped together. For example, advertising and promotion usually belong in separate value activities because advertising cost is sensitive to scale while promotional costs are largely variable. In addition, if a particular activity in a business unit shares with other business units, it should be treated as a separate activity because factors and conditions in other business units will affect its cost behavior. In a similar way, any activity that has important linkages with other activities should be also treated as a separate activity.
Practically, one cannot always know the cost drivers at the beginning of an analysis; hence, separating value chain activities through determining their cost drivers may require repeating the process of analysis several times. Further analysis of activities and their cost drivers can expose differences or similarities in cost drivers and therefore value chain activities can be aggregated or disaggregated.

A company can also aggregate or disaggregate a particular activity according to the behavior of competitors (Porter 1998a:65). This mean that significant activities should be treated separately when competitor performs them in a different way. For example, when a competitor shares a specific activity with related business units and the company dose not. Differences in the performing of activities among competitors may be the source of a relative cost advantage or disadvantage.

According to Porter (1998a) and Shank and Govindarajan (1993), a company may determine the appropriate chain activities through which activities have a high potential for creating differentiation. A company can differentiate itself when it is able to deliver benefits that exceed those of competing products. In fact, a company cannot create value for its customer by looking at its activities as a whole, but creating superior value for customer stems from specific activities a company performs and how they affect the customer (Hooley and Saunders 1993:39). Thus, a company should separate and focus on value activities that have a potential source of uniqueness. Value chain analysis for purpose of strategic cost management may not isolate all activities that are important for differentiation; however, a company should separate activities that have a high impact on the cost and value for customer while others may be aggregated if they have little impact.

6.2.2.2. Establish the Relative Importance of Different Activities in the Total Cost of the Product

To succeed in today's competitive business environment, many companies need to undertake value chain analysis and select an optimal mix of value chain activities (Hax and Majluf 1991:78). Determining the optimal mix of value chain activities requires sound knowledge of the costs of activities and how they are allocated to different cost objects. Management needs to consider the company's business strategy and operating environment and then determine how to effectively invest the company's resources in various value chain activities (Thompson
1993:429). For example, some companies may reduce cost or increase value to customer by investing proportionally in upstream activities such as research and development and product design, while others may gain a greater competitive edge by focusing on downstream activities such as customer service. To gain insight into this area, a company should identify value chain activities categories and the specific cost within them.

After identifying its value chain and which activities will be aggregated or disaggregated, a company must trace costs to activities (Donelan and Kaplan 1998:9). Identification of activities in the value chain and their costs allows management to decide on the most cost-beneficial manner in employing the activities (Turney 1996:53). Thus, the cost system should trace costs to separate value activities in order to enable the company to manage its activities better than its competitors. Operation costs should be assigned to activities in which they are incurred. To effectively management value chain costs, it is important for a firm to select a cost tracing approach and track costs by cost objects that can provide necessary information at the lowest possible cost. This is especially important for companies seeking continuous improvement opportunities. However, tracing costs to the activities will present some challenges. For example, Porter (1998a:65) stated that cost systems should be developed to match costs within value activities rather than with accounting classifications, especially, in areas such as overhead costs. In addition, Kajüter (2002:34) argued that assigning costs to the value chain activities is rather difficult because cost systems are not designed to provide data for value chain analysis. However, the emergence of activity based costing systems has helped some companies to analyze and collect costs around activity centers as well as the more usual organizational units such as cost or responsibility centers.

Thus, information on cost allocation, cost allocation bases, and relationships of value chain costs and degree of cost tracing are essential to manage value chain activities successfully. The adoption of activity-based costing has made such cost data more available. Doing an analysis of the cost important activities and factors that cause these costs to be incurred (cost drivers) reveals many opportunities for improving efficiency. Management can identify the critical activities, establish which activities are performed relatively efficiently or inefficiently, identify cost drivers, and offer recommendations.
6.2.2.2.3. Compare Costs by Activity

To establish which activities the company performs relatively efficiently and which it does not, benchmark unit costs for each activity against those of competitors. In reality, Cost disparities among rivals can stem from differences in prices paid for raw materials, component parts, energy, and other supplier resources, basic technology and age of plant and equipment, economies of scale & experience curve effects, wage rates & productivity levels, changes in inflation & foreign exchange rates, marketing & distribution costs, inbound & outbound shipping costs, etc. (Jones 1988:283 and Hoffjan 1997:352). Thus, a company should benchmark the costs of key activities to understand the best practices involved in performing an activity and to see if costs are in line with other companies. A company can use information from published reports, trade groups, industry analysts, customers, suppliers, etc. as the basis for analyses (Hooley and Saunders 1993:131). Compare a company’s costs activity by activity against those of rivals may result in identifying areas of cost advantage/disadvantage or learning which internal activities are a source of cost advantage or disadvantage. Benchmarking will be discussed in the section 9.1.4.

6.2.2.2.4. Identify Cost Drivers

For each activity, what factors determine the level of cost relative to other firms? The factors that influence the costs of the activities in the value chain - and are, therefore, major strategic choices - are cost drivers. As noted in section 6.2.1.4, costs of performing value chain activities can be driven up or down by three types of factors, structural cost drivers, executional cost drivers and operational cost drivers. Structural cost drivers determine the underlying cost base of organizations such as scale, scope, experience, technology used in the value chain, and supply cost. Executional cost drivers or management issues influence how well an organization manages the value chain in operation terms such as capacity utilization, product and process design, continued learning opportunities offered by TQM and continuous improvement programs, and internal and external linkages. Operational cost drivers (activity drivers) are those factors that drive the cost of operational activities. They include such factors as number of parts, number of moves, number of products, number of customer orders, and number of returned products. Activity-based costing can be helpful tool in identifying the determinants - also called cost drives - of the operating costs of companies. For some activities, cost drivers are evident simply from the nature of activity and composition of costs. For capital-intensive activities such as the operation of a body press in an auto plant, the
principal factors are likely to be capital equipment costs, weekly production volume, and
downtime between changes of dies. For labor-intensive assembly activities, critical issues are
wage rates, speed of work, and defect rates. Cost drivers can be also determined from
examining the internal experience of the company, interviews with experts within the
company or comparing and analyzing competitor's activities costs.

6.2.2.2.5. Identify Linkages and Interrelationships in the Value Chain

Although competitive advantage arises from one or more sub-activities within the primary
and support activities comprising the value chain, it is important not to think of the value
chain merely as a set of independent activities. Rather it is a system of interdependent
activities. Linkages in the value chain, which are relationships between the activities, are very
important (Porter 1998a:48). In the value chain, costs are associated with value-creating
activities. Thus, by reducing the costs in the various activities of the value chain, the company
may be able to reduce costs effectively. However, consideration must be given to linkages
between activities (Shank and Govindarajan 1993:50). The cost of performing one activity
will often be influenced by the way in which other activities are performed. In addition,
behavior in one part of the company can affect the costs and performance of other business
units and functions, and this quite frequently involves trade-off decisions.

Thus, the costs of activities should not be reduced independently, but they should be
optimized together. This way it is possible to achieve an overall cost reduction throughout the
whole value chain resulting in a competitive advantage. For example, more expensive
materials and more stringent inspection will increase costs in the inbound logistics and
operations activities, but the savings in service costs resulting from these strategies may be
greater. Similarly, a number of activities and sub-activities depend upon each other. The
extent to which operations, outbound logistics and installation are coordinated can be a source
of competitive advantage through lower costs (reduced stock holding) and/or differentiation
(high quality, customer-oriented service) (Porter 1998a:48). This last example uses linkages
between primary activities, but there are also clear linkages between primary and supports
activities. For example, product design affects manufacturing costs; purchasing policies affect
operations and production costs; and so on.
A company could benefit not only from establishing and managing linkages between activities in its value chain, but also from recognizing and managing linkages with its suppliers and customers. Hergert and Morris (1989:182) argued that the value chain concept emphasizes the following four areas for improving the company’s cost position and also customer value:

- Linkages within the value chain of a business unit
- Linkages across business units value chains within the company
- Linkages with suppliers
- Linkages with customers

Often, linkages within the value chain activities can mean that good planning in one stage can decrease costs in another and may create additional value for customers (Partridge and Perren 1994b:28). Internal linkages within the value chain are numerous - they arise from many reasons. Porter (1998a:49) introduced some of these reasons. One of the common reasons for occurring internal linkages is that the same activity may be performed in different ways. For example, the degree of conformance to product design or specifications can be attained by many ways, for instance, high quality inputs, specifying close tolerances in the manufacturing processes, or quality management (Edosomwan 1994:225 and Porter 1998a:49). Another reason is that the cost or performance of direct activity is improved by greater efforts in indirect activities. For example, better scheduling (an indirect activity) reduces sales force travel time or delivery vehicle time (direct activity); or better maintenance improves the tolerances achieved by machines. In addition to these reasons, activities that are performed inside a company may reduce the need to demonstrate, explain, or service in the field. For example, total quality management can substantially reduce service costs in the field.

Identifying and understanding linkages within the value chain is an important task to exploit the opportunities to reduce costs and/or create value to customers, however, this task may be complex and not easy (Hwang 1999:96). The linkages within the value chain activities may be not easily understood or known such as the linkages between procurement activities and manufacturing cost and quality and the linkages between order processing, manufacturing scheduling, and sales force utilization. Thus, recognizing the causes of linkages within the value chain can give managers a lot of support when they undertake this task (Porter 1998a:50). In addition, exploiting the opportunities to reduce costs and create value to
customers through internal linkages requires that linked activities must be coordinated and optimized.

Interrelationships between one business unit and another within the firm are highly relevant to the diversified firm (Hergert and Morris 1989:178). Some companies consist of many different business units as well as shared service or support units such as General Electric and Honda. Interrelationships or linkages across business unit value chains within the firm result from sharing activities of a value chain category across business units or entering new businesses in order to share activities (Porter 1998a:326 and Shank and Govindarajan 1993:21). For example, marketing and distribution activities across different divisions, procurement, logistics, product design, and selling are all good candidates for sharing. Thus, a business unit can potentially share one or more value activities with another business unite within the firm.

The value activities that are candidates for sharing should represent a substantial percentage of total cost and have the potential for economies of scale, learning or capacity utilization benefits from sharing (Fjeldstad and Haanaes 2001:3 and Porter 1998a:326). In this case, shared activities may lead to lower costs and/or enhance value for customer. For example, by producing the components for the assembly operations of two distinctive businesses, a component-manufacturing plant can operate at greater capacity and has the potential for capacity utilization benefits. On the other hand, if drivers such as scale, learning, and capacity utilization are not important for shared activities, sharing may lead to raise costs. Thus, to maximize sharing effects, sharing must involve value chain activities that have commonality and are crucial to competitive advantage.

Not all business units benefit equally from sharing because of differences in the scales of the business units, differences in the structure of the industries in which business units compete, and differences in their strategies (Lei et al. 1994:86 and Porter 1998a:330). For example, smaller business unit tends to benefit more than larger one in improving its cost position and market position through the benefits of the scale. In addition, differences in the structure of the industries are one important reason, for example, a small improvement in cost position may be very important in one industry, but less significant in another where product differentiation is high and the companies compete on the quality and service. Thus,
interrelationships through the sharing may lead to benefits that are valuable for one business unit involved but much less valuable to another.

The advantages of sharing must with adequately extent exceed all costs of sharing because activity sharing is not free (John and Harrison 1999:136). Sharing may raise complexity, require compromises or reduce each business unit’s freedom of action, perhaps even enough to nullify the benefits of sharing at least for some business units. However, information technology has helped to reduce some of these potential costs (Rayport and Sviokla 1995:78). Firms should assess the net benefit across all business units that share an activity to decide its contribution to cost reduction.

Intangible assets (know-how) also can be shared if there is enough similarity across business units for learning to transfer (Goold and Campbell 1998:133). Thus, transferring or sharing valuable skills or expertise can lead to competitive advantage only if the similarities among business units meet some conditions (Porter 1998a:352). For example, activities involved in the businesses are similar enough that sharing expertise is meaningful, transfer of skills involves activities that are important to competitive advantage, and the skills transferred represent significant sources of competitive advantage for the receiving unit. For example, Honda is a diversified firm operating in markets such as automobiles, lawn mowers and motor-cycles. An important strategic component in all these markets is engine technology. This technology is an important interrelationship between business units for Honda. Thus, focusing on interrelationships is very important where no single business unit is likely responsibility for the maintenance of Honda’s leadership in engine technology. Thus, Honda exploited its skills and expertises in engine technology to manufacture low-cost and high quality engines for variety products (Hergert and Morris 1989:178).

The transference of skills can occur anywhere in the value chain; from existing business units to a new business unit or from a new business unit to existing business units. In both cases, the transference of skill can affect performance and cost of the receiving business unit and may enhance its competitive advantage (Porter 1998a). This occurs when skills transferring can enable the receiving business unit to change some policies that lower cost or enhance the value or when skills transferring can give the receiving business unit the ability to have a clear understanding of its other cost drivers or uniqueness. The benefits of skills sharing or
transferring must exceed its costs. Know-how sharing or transferring also is not free because it may require some cost in developing and adapting it according to the conditions of the receiving business unit.

Linkages in the value chain concept exist also between a firm’s value chain and the value chains of suppliers and customers these linkages called vertical linkages (Hergert and Morris 1989:178, Porter 1998a:50). A company cannot ignore the interaction between its own value chain activities and those of its suppliers and customers. Performance of supplier/customer activities affects cost/performance of a firm’s activities (Cannon and Homburg 2001:29). Suppliers produce a product or service that a firm uses in its value chain. Thus, linkages with suppliers focus on many activities of suppliers such as suppliers’ product characteristics, service, quality assurance procedures, packaging, delivery procedures, and order processing (Hansen and Mowen 2000:498). The way in which a supplier performs such activities within its value chain can affect cost/performance of a firm’s activities. The linkage with supplier should be managed to be mutually beneficial and in which the relationship with the supplier is viewed not as a zero-sum game but as a mutually beneficial one. For example, an industrial chocolate firm (i.e., the supplier) began to deliver bulk chocolate to a confectionery producer in liquid form in tank cars instead of solid form. In this case, the supplier eliminated the cost of molding and packaging while the confectionery saved the cost of in-bound handling and melting (Porter 1998a:77). The linkages with the suppliers are important for creating competitive advantage as they provide opportunities for joint optimization and problems of coordination.

The firm’s value chain links not only to the value chains of suppliers, but also to customers. Linkages with customers can also have influence on cost and performance of a firm’s activities (Hansen and Mowen 2000:500). This effect depends on how the firm’s value chain activities relate to its customer’s value chain. There are many activities within the firm interact with some activities of the customer. In electronic components, for examples, a firm should work closely with the customer in designing these components, providing continual technical assistance, troubleshooting, order processing, and delivery (Porter 1998a:52). Such interaction may be a potential source of competitive advantage. The linkage between a company and its customer is designed and managed in order to both parties can benefit. For example, companies that produce canned beer consume large quantities of cans. These metal
empty cans are too big and taking up too much space to transport far or stock in large numbers. Thus, some producers of cans have constructed plants next to their major customers (beer breweries) and deliver cans by overhead conveyers directly onto the customers’ assembly line. This linkage between the company and its customer results in significant cost reductions for both producers of cans and its customers (Hergert and Morris 1989:178). In some industries, it is evident that the firm’s product costs represent a large percentage of the customer’s total costs. For example, paper constitutes over forty percent of the total costs of a magazine (Shank and Govindarajan 1993:56). In this case, it is very useful to both the printing plant (customer) and the paper mill (producer) to work together and exploit linkages between them to reduce costs. Finally, the development of external linkages is an increasing trend in many business sectors. It enables companies to concentrate on activities that contribute to the company’s competitive advantage.

6.2.2.2.6. Identify Opportunities for Reducing Costs and/or Improving Value

Opportunities to reduce costs are derived from many different sources within the value chain. Gaining and sustaining cost advantage may originate from one activity or many activities within the company, and controlling cost drivers and redefining the value chain can play a role in creating cost advantage. A company should exploit all the opportunities available for reducing costs in activities that do not influence the value to customer. Thus, for each value activity, a company should try to reduce costs in this activity and keep value constant or increase value (Shank and Govindarajan 1993:60). For example, Toyota, the Japanese car manufacturer, successfully operates a hybrid strategy combining low cost production with cars that are differentiated on the basis of their quality and reliability (Hamel and Prahalad 1994).

By identifying value chain activities, the relative importance of each activity in compromising total cost, cost drivers for each activity and why the firm is relatively efficient or inefficient in individual activities, how costs in one activity influence costs in others, which activities should be internal and which should be outsourced, etc., opportunities for cost reduction become evident. Thus, Porter (1998a:99) and Shank and Govindarajan (1993:60) argued that a company can develop a cost advantage by controlling cost drivers of value activities which represent a significant percentage of total costs, or by reconfiguring the value chain.
Reconfiguration the value chain means structural changes such as a new production process, new distribution channels, or a different sales approach.

A company can achieve superior position through controlling cost drivers of significant activities in the value chain. Activities that represent significant percentage of total cost will offer a greater potential for improving relative cost position. Thus, the appropriate cost drivers of activities in the value chain will vary, for example:

- If scale economies are a key cost driver, can volume be interested? For example, Caterpillar is the world's largest manufacturer of diesel engines. One feature of Caterpillar's cost reduction strategy was to broaden Caterpillar's model range and Original Equipment Manufacturer (OEM) sales of diesel engines to exploit scale economies, R&D, component manufacturing, and dealer support over a larger sale volume (Oster 1994:132).

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- If capacity utilization is the issue, can a company increase average capacity utilization by finding ways to level the fluctuations of volume through its value chain? A company can level throughput by many means, for example, by increasing promotion during slack periods and finding off-season uses for the products, line extensions into less cyclical products, selecting buyers with more stable demand, or by sharing activities with sister business unite with a different pattern of needs, etc.

- If a company recognizes and exploits linkages within and around the value chain, can a company improve its cost position? For example, in mechanical and electronic parts and components manufacturing, the additional costs of achieving precise parts or components may be offset by a reduction in inspection costs of finished products. In addition, linkages with suppliers and channels offer possibilities for all parties to benefit through the coordination and joint optimization of their value chains. For example, Xerox provides its suppliers with its manufacturing schedule through computer terminals, enabling suppliers to ship parts precisely when needed (Day 1990:189). Thus, a company must prepare itself to gain benefits from linkages with suppliers and channels. In addition, a diversified company may be able to reduce its relative costs significantly through sharing appropriate activities with sister business units or by transferring know-how.
• If a certain activity cannot be performed efficiently within the firm, can the activity be contracted out, or can the component or service be bought in? A firm may specialize in one or more value chain activities and outsource the rest. The extent to which a firm performs upstream and downstream activities is described by its degree of vertical integration. A thorough value chain analysis can illuminate the business system to facilitate outsourcing decisions. To decide which activities to outsource, managers must understand the firm's strengths and weaknesses in each activity, both in terms of cost and ability to differentiate. Managers may consider the following when selecting activities to outsource (Turney 1996:16 and Tayles and Drury 2001:606):

  • Whether the activity can be performed cheaper or better by suppliers.
  • Whether the activity is one of the firm's core competencies from which stems a cost advantage or product differentiation.
  • The risk of performing the activity in-house. If the activity relies on fast-changing technology or the product is sold in a rapidly-changing market, it may be advantageous to outsource the activity in order to maintain flexibility and avoid the risk of investing in specialized assets.
  • Whether the outsourcing of an activity can result in business process improvements such as reduced lead-time, higher flexibility, reduced inventory.

Opportunities to reduce costs and improve value can also arise from redefining or reconfiguring the value chain. A company can redefine its value chain to adopt different and more efficient activities to design, produce, distribute, or market the product. There are several ways in which a company can reconfigure its value chain in order to achieve superior position. Porter (1998a:107) stated some of these ways, for example:

  • a new production process
  • new process technologies
  • utilize new distribution channels
  • a different sales approach
  • a new raw material
  • major differences in forward or backward vertical integration
  • shifting the location of facilities relative to suppliers and customers
  • new advertising media
The value chain describes a series of value-adding activities connecting a company's supply side (raw materials, inbound logistics, and production processes) with its demand side (outbound logistics, marketing, and sales). By analyzing the stages of a value chain, managers may be able to redesign their internal and external processes to improve efficiency and effectiveness. Thus, a company must examine value chain activities as well as the value chain activities of its competitors in order to find creative options or ways to perform its activities differently and more efficiently. In this case, a company should ask questions such as the following for every value activity in connection with cost drivers and reconfiguring value chains (Porter 1998a:110):

- How can an activity be performed differently or even eliminated?
- How can a group of linked value activities be regrouped or reordered?
- How might coalitions with other firms lower or eliminate costs?

For example, Dell Computer, one of the fastest-growing computer companies in the United States, has successfully reconfigured its value chain through a different sales approach to become leader in the PC industry (Hamel and Prahalad 1994:173). Hitt et al. (2001:188) give a case example of Gallo Wineries that switched to selling wine through grocery stores rather than liquor stores because they found them to be more efficient distributors. Another example from different industry (beef packing) illustrates that significant cost advantage can be gained through redefining the value chain. Iowa Beef Processors redefined the traditional value chain in this industry by redesigning processing activities and distribution activities. This significantly reduced transportation cost, a major cost, as well as reduced costs in the operations activities in the value chain (Porter 1998a:109 and Shank and Govindarajan 1993:61).

Using value chain analysis and cost drivers as a basic pillar of strategic cost management-framework may encounter many difficulties. Thus, Porter (1998a:115) contended that there are several common pitfalls in managing costs for competitive advantage:

- Difficult to assign costs to activities properly.
- Misunderstanding of actual costs and misperceptions of the key cost drivers.
- Concentrating on manufacturing costs when cost savings are required. Quite frequently it is not the area to cut if quality is to be maintained, especially once a certain level of manufacturing efficiency has been achieved.
• Falling to take the advantage of the potential gains from linkages and interrelationships.
• Ignoring competitors behavior.
• Relying on small incremental cost savings when needs arise rather than introducing a long-term permanently installed cost management program.

Strategic cost management-framework has to be able to integrate all relevant aspects of cost management to get over such difficulties. Since strategic cost management considers a task, it comprises several objects, analysis fields & activities, and instruments that form other pillars of strategic cost management-framework. The next section will discuss the third pillar of the suggested framework - the objects of strategic cost management.
7. Strategic Cost Management - Objects

Cost management has shown remarkable progress over the past several years, and, where pursued skillfully, appears to have served management needs well. The determining and managing of the cost of a product, process, or resource for a company, or for one of its parts, generally is satisfactory for many management decisions (Kajüter 2004:39). Thus, in any cost management system, a central question concerns the object or objects of cost management being managed. In the frame of production systems, a production system uses operations resources to transform inputs into outputs. Thus, costs are influenced by certain actions that are related to specific objects within the value added process. There are a variety of opportunities to improve the cost position of the company on the basis of cost objects-management systematically (Arnaout et al. 1997:168). The main objects of cost management are shown in the figure 7.1

Arnaout et al. (1997:170) and Kajüter (2004:39) agreed that product or product program is one of the cost management-objects. This object may be product for the manufacturing companies or service for serving companies. They also agreed that processes may be object of the strategic cost management. These are necessary in order to provide the products. Process involves the activities, actions and tasks required to convert inputs to products or services. Processes are typically documented in the form of flowcharts, process maps, standard operating procedures or guidelines. Finally, resources are called as a cost management-object. Resources here generally concern the means or the inputs for undertaking processes and achieving outcomes. They could include equipment, facilities, materials, people, etc. and are obtained from external suppliers and/or the own organization. Thus, resources form a further object of cost management. With products, processes and resources the value-added process is
divided mental into several stages or levels, which show possible starting points for the strategic cost management (see figure 7.1).

A company has to find ways of enhancing cost position of its products and processes, in order to achieve this goal, all three starting points (resources, processes, and products) are included consistently in the framework of strategic cost management. Where, cost disparities among companies can stem from differences in prices paid for raw materials, component parts, energy, and other supplier resources, basic technology and age of plant and equipment, quality of the inputs, business processes improvements, products development and design, etc. (Jones 1988:283 and Hoffjan 1997:352). In generally, many studies (Corsten and Stuhlmann 1996, Arnaout et al. 1997 and Kajüter 2004) indicated that the cost advantages/disadvantages of many companies are attributed essentially to three complex causes or areas:

- Product design and development
- Process improvement
- Prices and quality of resources

These three causal factors for the cost differences correspond with the three compiled starting points or objects of strategic cost management. Thus, by focusing the strategic cost management on products, processes, and resources, a company can achieve long-term improvements in the cost position. After the strategic cost management-objects sufficiently specified and their meaning was justified, the following sections discusses the strategic considerations that are related with products, processes, and resources as strategic cost management-objects, in order to enhance the strategic position of the company.

7.1. Product as a Strategic Cost Management-Object

A company must be able to compete with other companies in the same industry if it intends to stay in business. Many factors such as cost, quality, etc., are key factors and are major opportunities for a company to gain a competitive advantage. Thus, a competitive product must address factors such as cost, performance, time-to-market, and quality (Cooper and Slagmulder 1997a:30). The importance of these factors will vary from product to product and market to market. In addition, customers or users of a product will demand more and more, e.g., more performance at less cost.
Cost is an important factor in all activities related to the design, production, and sale of a product in many situations (Maher 1997:489), for example, as the product technology stabilizes, matures, and becomes adopted by major companies (Fessler and Fisher 2000:32), as well as competition is increasingly based on cost or price. In addition, a customer’s internal economics or financial resource limitations may shift his decision toward affordability as a more dominant factor. In either case, a successful product producer must focus more attention on managing product cost.

The management of product cost begins with the conception of a product (Tanaka et al. 1993:35). A large percentage of the life cycle costs is determined by decisions made from conception through product development cycle (Bürgel and Zeller 1997:219). Once the design of the product has been established, relatively little latitude exists to reduce the cost of a product. Decisions made after the product moves into production and made about general and administrative, sales, marketing, and product distribution activities account for another percent of the product’s costs.

When a company faces a profitability problem and undertakes a cost reduction programme, it will typically focus on post-development activities such as production, sales, and general administrative costs (Tatikonda and Tatikonda 1994:22). While not suggesting that these are generally inappropriate steps to take, the problem is that it is often too late and too little. Most of the cost structure in a company has been locked into place with the design decisions made about the company’s products. Cost reduction or profitability programme has to start with the design of the company’s products at the very beginning of the development cycle. Thus, the next section discusses the product design approaches and product cost management.

7.1.1. Product Design and Development Approaches and Product Cost Management

Product definition is a critical starting point in the design and development of any product. For its importance, there are a number of common requirements to the process of product definition in a company, for example, defined product strategy, product design and development with true customer input, and a true understanding of customer requirements (see, e.g. Tseng and Jiao 1997 and Kärkkäinen et al. 2001). Products can be defined from two different views (see figure 7.2).
From customer’s view, a product can be defined as a bundle of characteristics, which can satisfy customer requirements or needs, by solving a customer’s problem (Gray 1996:5). From the internal or technical point of view, on the contrary, a product consists of different components and individual parts, and represents the result of the operational production process (Tseng and Jiao 1997:329). From these two views arise different dimensions that apply to the product design, in order to avoid product cost disadvantages or to improve product cost advantages.

The importance of customer requirements analysis has increased over time. An overall increased competition on the market is one factor but there are several other trends, which may explain the development. For instance, product life cycles are noted to have become shorter and markets more mature and saturated with product offerings (Urban and Hauser 1993). This means that in order to be competitive, manufacturers need to offer products that customers find superior to other products, of higher value, or as holding unique qualities (Cooper and Slagmulder 1997a). Thus, in the centre of the customer-oriented dimension, products must be adapted to meet customer requirements. In addition, the product functions must be aligned with the needs of the customer. However, it is no longer possible to develop perfect products with many qualities that the customer is not really interested in. It becomes
essential to avoid costly over-engineering and to systematically direct most of the resources to exactly those areas where the customers are willing to pay most of their money.

On the other hand, the internal view of product seeks to design the product components in a way that they can be completely achieved the product function as well as can go with the optimization of manufacturing costs. Thus, there are mutual relations between both views. The customer view provides the outline of product functions for the technical product design. On the contrary, the internal view seeks to determine the required or the possible product functions (Kärkkäinen et al. 2001:161f.). In this area of conflict between user (customer) and manufacture (technology), there are many approaches of product design and development are discussed in the literature, with which customer needs can be met, cost disadvantages can be avoided and potentials of cost reduction are available. To achieve better products, for example, Asiedu and Gu (1998:383) argued that many businesses have embraced approaches such as design product for manufacture and assembly, customer oriented product design and development, product design and complexity management and product design to cost objectives.

7.1.1.1. Design for Manufacture & Assembly

Product design is the critical first step in the manufacturing process that deals with the conceptualization and planning of the physical and functional characteristics of a product. This first step decides the method of assembly, component tolerances, number of adjustments and type of fabrication tooling (Tatikonda and Tatikonda 1994:23). Together, these decisions not only determine a great part of the manufacturing cost and total product cost but they also preserve the functional requirements of a product. One way to ensure that the product has been designed for economical production is to use the design for manufacture & assembly (DFMA) (Gauthier et al. 2000:1).

Design for manufacture and assembly is a process used for designing products and the related realization processes to optimize the relationship between design function, manufacturability and ease of assembly, and in turn will help to reduce the manufacturing cycle time and ultimately the cost of manufacture (Colucci 1994:21f. and Swift and Brown 2003:828). The figure 7.3 shows the fundamentals involved with design for manufacture and assembly for product cost management.
Design for assembly is a technique for reducing the cost of a product through simplification of its design (Boothroyd 2001:15). This cost reduction occurs by reducing the number of individual parts in the assembly and then ensuring that the remaining parts are easy to handle and assemble as shown in the figure 7.3. Design for assembly guides the designers towards a product with an optimum number of parts that requires simple, cost-effective assembly operations and the most appropriate manufacturing processes and materials for its components. On the other hand, the term design for manufacture means the design for ease of manufacture of the collection of parts that will form the product after assembly (Ashley 1995:74). In other words, product design is the process by which value is added to raw materials and/or processes and enables a product to be targeted to solve a particular business or market requirement. The term "product design" refers not only to the product meeting the needs of the customer - the functions expected - but also to its being manufactured efficiently.
Design for manufacture should ensure that products can be produced in an efficient and cost effective way.

The competitive nature of the market place has led to short product life cycles and reduced price margins. Therefore, many companies are constantly seeking methods to improve development and design of the product and reduce costs. Much of the cost is incurred during the manufacture and assembly of a product (see figure 7.4). A significant part of this cost can be attributed to the activities associated with assembly and manufacture, for example, labor-intensive activities associated with assembly, large numbers of components in the product and the complex manufacturing and assembly processes (Swift and Brown 2003:827).

Figure 7.4 Design change vs. cost (Fabrycky 1994)

There has been a trend towards automated assembly and manufacturing in order to reduce product costs (Galloway 1993:64). However, the potential benefits of assembly and manufacturing technology may be limited by the need for flexibility and the ability to respond to product changes and short production runs (Warnecke and Hueser 1994:24). Therefore, increased automation of the product assembly and manufacturing process may be not necessarily the solution for reduced product cost.
In fact, the design process holds the key to reduction of product costs. As the figure 7.4 shows, a large proportion of the overall product costs is determined during the design stage. The high costs associated with assembly and manufacturing are often due to an unnecessarily large number of components in the product and the complex manufacturing and assembly processes that are required due to the design of inappropriate component interfaces. Some Studies (Parker 1997, Boothroyd et al. 2002 and Swift and Brown 2003) have shown that often, products are still designed with at least 50% excess of parts and greater assembly content than is necessary.

Poor design, in terms of assembly, can be attributed, in part, to the component-centered approach to design still prevalent in many industries (Tatikonda and Tatikonda 1994:23). Traditionally, different engineering departments perform design, planning and manufacture of the product with no integration or feedback and so assembly problems are identified only at the later stages of production. In order to reduce lead times and product costs effectively, manufacturing and assembly issues must be detected and considered during design as shown in the figure 7.4. This requires the introduction of design for manufacture and assembly so that product design and assembly planning can be performed simultaneously rather than consecutively.

Finally, during the development and design stages of a product, cost and cost drivers are certainly one of the most important things to be given careful consideration (Schreve et al. 1999:731). However, they also tend to be the things that are most neglected, as teams really have no good tools to manage and understand them. Strategic cost management and its techniques can really help the design team to make good cost conscious decisions (see table 7.1). Strategic cost management considers the design of products and processes key to cost management (Sakurai 1996). It helps engineers to look at the cost impact of product and process designs on all costs, from research and development to the end stage of the product development cycle. This allows cost reduction over the entire life cycle of a product. In addition, strategic cost management encourages all participating functions of the company to examine designs, so product changes or engineering changes are made before the product goes into production. Finally, strategic cost management drives product design and development activities and spends more time at this stage in order to meet customer requirements and gain adequate profit by reducing or eliminating unnecessary parts and
components, expensive and time consuming changes, the complex manufacturing and assembly processes, etc.

<table>
<thead>
<tr>
<th>Design for assembly</th>
<th>Design for manufacture</th>
</tr>
</thead>
<tbody>
<tr>
<td>To minimize assembly costs:</td>
<td>To minimize manufacturing costs:</td>
</tr>
<tr>
<td>• Reduce the number of components to be joined</td>
<td>• Use the lowest priced material that will be satisfactory</td>
</tr>
<tr>
<td>• Reduce the number of complexity of fixings, or both</td>
<td>• Reduce the number of machining operations with castings, mouldings or other processes that produce a finished or near-net shape</td>
</tr>
<tr>
<td>• Continuously train assembly labor to the required skill levels</td>
<td>• Use low-cost machining processes if machining is still necessary</td>
</tr>
<tr>
<td>• Use materials and processes that reduce surface finishing operations. (This applies especially to assembly using automated special machinery.)</td>
<td>• Combine components to reduce costly interfaces. (Interfaces are also prime sources of unreliability.)</td>
</tr>
<tr>
<td>• Reduce skill levels needed where this improves reliability, but not where it leads to lack of job satisfaction and so reduces long-term productivity</td>
<td>• Use specialized tooling where volumes allow sensible amortization</td>
</tr>
<tr>
<td>• Automate where viable</td>
<td>• Use common parts to increase volume</td>
</tr>
<tr>
<td>• Design for manufacture and assembly using standard, reusable tooling.</td>
<td>• Continuously train your workforce; monitor and feed back their performance to maximize return on your assets and improve their skills, usefulness and job satisfaction.</td>
</tr>
</tbody>
</table>

Table 7.1 The design for manufacture and assembly and product cost management (based on information from Crow 2001)

There are many issues concerning contemporary business environment such as the shortened product life cycle, the heightened customer expectations, the squeezed profit margin, etc. Thus, a company should design and produce the products that have the qualities by which the really customer needs are met. By this way, a company can avoid over costs and direct its resources to the critical activities in order to create competitive advantage. Therefore, the next section discusses customer oriented product design and product cost management.

7.1.1.2. Customer Oriented Product Design and Development

Sustainable product design must take into account the economic reality and the technical feasibility of development and design the product and its system borders, making sure not to miss the most important of all factors - the benefit to the customer (Kärkkäinen et al. 2001:162). A prerequisite for product success is that a product is able to deliver the perceived benefits to the customer. Thus, products offer benefits when they satisfy needs (Ulrich and Eppinger 1995). In other words, customer requirements must be fulfilled.

When customers buy products, they do not base their decision to buy on a single criterion (the main function), but on several. As most of the products in the same product group fulfil the
main function, customers will choose products that satisfy their personal desires, which may be, for example, price, quality, etc. Therefore customer requirements also need to be taken into account and related to product design. There are various methods for trying to find out customer requirements and translate them into a technical description of what needs have to be addressed in the design (Kärkkäinen et al. 2001:170). One of the most significant of these procedures is Quality Function Deployment (QFD), bringing the voice of the customer into product development. Quality Function Deployment (QFD) and Kano Analysis (KA) (actually a part of QFD) are discussed further below.

Kano analysis is a tool that can be used to classify and prioritize customer needs (Tan and Shen 2000:1141). This is useful because customer needs are not all of the same kind, not all have the same importance, and are different for different populations (see Cohen 1995). The results can be used to prioritize the company effort in satisfying different customers. Kano analysis specifically brings the voice of the customer into the design of a product. Kano et al. (1984) recognized that an important requirement in a product is to maximize customer satisfaction while avoiding unnecessary extras that would add cost but with little added benefit.

In essence, Kano et al. (1984) postulate that design features can be classified into three broad groupings that relate to their impact on customer satisfaction (see figure 7.5). These relationships can be described as customer satisfaction curves. Kano et al. (1984) define a “basic feature” as one that the customer expects. Its absence or low level of performance will create dissatisfaction, while its presence or level of performance above the threshold will have little or no impact on satisfaction. A “performance feature” is defined as one where there is a more or less linear relationship between the level of the feature and satisfaction. Fuel consumption of a family car is an example. An “excitement” or “latent feature” is one where its absence has little if any negative effect, while introducing it generates excitement and satisfaction.

The Kano analysis is designed to clearly identify which of the above categories (basic, performance, excitement) any given requirement falls into, and also to yield other valuable insights into customer needs (Mazur 1997:4). It does this through a highly structured questioning technique that uses functional (positive) as well as dysfunctional (negative)
question pairs to explore each feature being considered. For example, a functional question like "If this requirement was met what would your reaction be?" is followed by its dysfunctional equivalent - "If this requirement was not met, what would your reaction be?"

The Kano process includes a very specific approach for plotting responses in an evaluation table and then offers various methods for doing further analysis. For more information on the design and analysis of Kano questionnaire, see, Kano et al. (1984)

![Kano Diagram](image)

**Figure 7.5 Kano diagram of customer requirements (Kano et al. 1984)**

The final result is an exceptionally clear set of statements about what customers want and the precise nature of those expectations. By helping make decisions on product function, this data can also guide the allocation of R&D resources and even the structure of production or service delivery processes (Tan and Shen 2000:1146). It yields a product or service with functional characteristics that will maximize customer satisfaction, but without unnecessary ‘extras’ that add cost but no further satisfaction gains. Therefore, the importance of Kano’s analysis is that it defines a good design as one that achieves basic features for least cost, while allocating design effort and product cost to optimise performance and excitement features to maximise customer satisfaction.

Apart from the importance of classifying and prioritizing customer requirements or needs, the systemic translating of customer requirements into system requirements throughout the entire production phase has a special meaning for the product development and design. By focusing
not only on the engineering capabilities but also on the customer requirements in the product development and design processes, a company can improve customer satisfaction, reduce development time, and ultimately reduce product cost (Vágási 2001:327). But how does a company incorporate the customer's spoken, unspoken, present, and future needs into its product development process? Many organizations have found the answer - Quality Function Deployment (Evans et al. 1999:405).

The goal of understanding a design problem is all about translating customer requirements into a technical description of what needs have to be addressed in the design. In this respect the key issues are determining who the customer is, identifying what the customer wants, and how to fulfil customer’s wants (Zairi and Youssef 1995:14). Quality Function Deployment (QFD), developed within Japanese industry in the 1970s, is one of the most significant methods for introducing customer requirements (often called the voice of the customer) into the stages of design process and also in the area of design of production systems (see Ullman 1997). By identifying and accurately translating customer requirements into system requirements for each stage of product development and production, the company can avoid unnecessary and costly redesigns and other rework (Clausing and Pugh 1991). This is possible because the design alternatives are realized much earlier in the design process thus reducing the number of corrections and design errors. At the heart of QFD is the House of Quality which links predetermined customer attributes to specific technical characteristics (see figure 7.6).

![Figure 7.6 The House of quality (Bossert 1991)]
The House of Quality is used to provide information on customer requirements (whats), design requirements (hows), priorities of the customer requirements, priorities of the design requirements, correlation between the (hows), and correlations between the (hows) and the (whats). As shown in figure 7.6, these six elements of the house of quality are:

- **The customer requirements:** Describing what the product must do, a structured list of needs and wants, determined by market research. Represents the voice of the customer.
- **The design requirements:** Describing how the product may achieve its required performance in general terms that are not solution specific. Represents the voice of the company.
- **Relationships:** Between the customer attributes and the engineering characteristics, indicating where there are strong, moderate or weak relationships.
- **Technical matrix:** Indicating the technical priorities based on the relationships between customer requirements and engineering characteristics. Also providing quantitative design targets for each of the engineering characteristics, based on the technical priorities and competitive benchmarking.
- **Technical Correlations:** Recording how the engineering characteristics may be wither mutually supporting or contradictory.
- **Planning Matrix:** Providing quantitative market data for each of the customer attributes. Values can be based on user research, competitive analysis or team assessment.

Quality Function Deployment (QFD) is a method for taking the voice of the customer and using that information to drive aspects of product design and production. Therefore, QFD is not just the House of Quality-matrix (Bouchereau and Rowlands 2000:10). The House of Quality is the first matrix in a four-phase QFD (Quality Function Deployment) process (see figure 7.7). The basic Quality Function Deployment (QFD) process involves four basic phases that occur over the course of the product design and production process.
During each phase one or more matrices are prepared to help plan and communicate critical product and process planning and design information (see Crow 2002). The Quality Function Deployment (QFD) process begins with product planning; continues with product design and process design; and finishes with process control, quality control, testing, equipment maintenance, and training. As a result, this process requires multiple functional disciplines to adequately address this range of activities.

Many authors provide evidence of the effectiveness of QFD in supporting product design and manufacturing. For example, in a study of 35 US projects ... QFD provided short-term benefits (reduced cost, reduced time, increased customer satisfaction) in 27% of the cases and long-term benefits (better process or better projects) in 83% of the cases (Griffin and Hauser 1993:6). At Toyota auto Body, using Quality Function Deployment (QFD) reduced startup and preproduction costs by 60% between 1971 and 1984 (Hauser and Clausing 1988:65). In some applications, it has reduced design time by 40% and design costs by 60% while maintaining and enhancing design quality (Hauser 1993:65).

Strategic cost management is customer driven. The voice of customer is an important and represented continuously during the whole process of strategic cost management. Customer needs or requirements for cost, quality, and time should be incorporated in product and process decisions and guide strategic cost management at the same time (see Hertenstein and Platt 1999). On the other hand, strategic cost management helps to assure that products are
better matched to their customer's needs, align the costs of features with customers’
willfulness to pay for them, reduce the development cycle of a product, and reduce the costs
of products significantly. In addition, strategic cost management enable a company to increase
the teamwork among all internal organizations associated with conceiving, marketing,
planning, developing, manufacturing, selling, distributing and installing a product, and engage
customers and suppliers to design the right product and to more effectively integrate the entire
supply chain.

7.1.1.3. Product Design and Complexity Management

Successful manufacturers are continually seeking methodologies and techniques to improve
costs, thereby improve profitability and, in turn, strengthen the enterprise position for the
future. Cost management can, of course, take a variety of paths, each with a different
emphasis. It can involve long-term or short-term initiatives. It can focus on strategic issues or
on less complex business tactics. It can precipitate major, long-term structural changes in the
business or simply modify operational factors on a short-term basis. Product complexity is a
strategic issue, where in a competitive business environment, revenue and cost management is
increasingly critical, each percentage point of increased customer satisfaction and operating
efficiency has a significant impact (Hagel and Roever 1988:4). When operating in the area of
manufactured goods, a company should provide more features and greater flexibility without
increasing the complexity of product selection.

It is critical that a company understands the peril of complexity, pinpoint its root cause, and
remove low-value activities on a permanent basis. Rapidly evolving technologies, global
competition, sophisticated customers, etc., have contributed to an increase in product
complexity in many industries (Ranta 1994:32). However, simply increasing product
complexity does not guarantee an increase in long run profits, and can in fact worsen a firm’s
competitiveness (Ramdas and Sawhney 2001:22). This makes product complexity
management a crucial dimension of successful business practice. In fact, there are four
sources of product complexity as shown in figure 7.8.
Customer requirements: the more that is required in the design by customer specifications, the higher the product complexity. The meeting of customer requirements is a fundamental aspect of successful product design and development. The consideration of requirements highlights two issues. The first is the process of managing the requirements. The second is the realisation of these requirements into a completed product or a variety of products. Marshall et al. (1998:144) argued that this process can be further broken down into:

- Identification and selection of customers to be served.
- Identification and selection of their requirements.
- Interpretation, deployment and use of requirements in a product design and development process.
- Increasing product variety without unnecessary variety of components, designs, and processes.
- Managing the complexity of products and the accommodation of new technologies.
- Maintaining a low product cost, by keeping design, production, service and disposal costs low.
- Minimising the time of development for new products and delivery time for ordered products.
Companies could only survive if they could meet customer needs and wants. Customer-driven requirements are often the major cause that drives complexity into products (Syan 1994 and Marshall et al. 1998). Customer preference changes over time. Companies have to adjust its products in order to fulfill customers’ expectation. Usually, only a few portions of customers, whom one company serves, bring most the profits. However, the company still spends many resources for the unprofitable customers. The company needs to identify those profitable customers in order to serve them better (see Cooper and Kaplan 1998 and Gurau and Ranchhod 2002). Companies could try to trace each customer with its profitability. By doing so, companies could have a better understanding on whom they could serve better than competitors, and gain competitive advantages over others. Thus, customer requirements management is an increasingly important aspect of product design and development.

**Change product design:** the more frequently a company changes its product design, the higher the product complexity. Product design changes may occur at every stage of the design process, from the stage at which the customer requirements are agreed to when the design is proven fit for delivery to the customer. Product design changes affect manufacturing processes, resource requirements and the factory design (Ansari et al. 1997b:48). There are many reasons for making product design changes, for example, market or customer driven, product improvement, safety considerations, cost reduction, and supplier driven change (Ansari et al. 1997b).

Every manufacturing organization makes product design changes. Modifications may range from a small change affecting a single item, to a design change involving a number of assemblies. Thus, understanding the implications of design changes is an important part of streamlining the design and development process. It is common knowledge that product design changes should be managed and made when they are inexpensive. The cost of changes associated with product design fluctuates with time (see Fabrycky 1994). Product design changes issued early in the development process will cost less than the same one issued late in the process. While changes that occur late in the product development cycle have significant economic impact on manufacturing, distribution, or packaging.

**Life cycle of the product:** the shorter the life cycle of the product, the higher the product complexity. Because of rapid technological development, the product life cycles have become
shorter. This is especially true, for example, in consumer electronics and the automobile industry. In general, the shorter product life cycles, the increase in the diversity to manufacture products as well as the obligation to provide for manufacturing processes with low costs compel the users. In addition, shorter product life cycles lead to an increase in design frequencies and shorter overall design cycles (Blocher et al. 1999:147). So the question arises: how do manufacturers meet the challenges of reducing design costs while increasing the productivity of engineers in order to produce additional products faster? Shorter product life cycles create an essential requirement which product design enables the product to enter the market at the required time. During product development, process design changes are unavoidable; however, the frequency of these can be a major source of product delay. To be able to compete on a reduced time to market basis, it is desirable to have a product with low levels of complexity, as it is easier to introduce changes within a simple design (Gray 1996:4). To compete on cost therefore requires companies to focus on design, and to compress the time from concept to market availability, both of which require an ability to introduce rapid changes during the design phase. In this environment - short product life cycles and therefore high rate of products complexity - companies need flexible design and planning systems and flexible production to introduce rapidly new products and designs into production and to markets without expensive technical changes in the production.

**Product variety:** the greater the product variety, the higher the product complexity. In fact, product variety has two main forms or dimensions (Prasad 1998:214 and Kajüter 2004:40). The first form is that a product has a large number of parts and components (internal variety) and the second is that a product range is wide (in terms of the range of colors and designs for example). Both dimensions of variety have steadily increased in many industries, so that the managerial challenge now is how to provide the right degree of variety that seems necessary for competitive success (Lancaster 1990:192). Determining how much product variety to offer is central to the strategy of most manufacturing firms (Macbeth 1989:74). Intuitively, the costs and benefits of product variety are well understood. Increased product variety allows a closer match between customer preferences and offered products, which then has the potential of increasing or maintaining market share and/or yielding higher prices. On the other hand, higher product variety could lead to operational inefficiencies incurred whenever the production system switches from making one item to another or in increased costs of raw material, component procurement, and storage and distribution of finished goods (Benjaafar et
al. 2002:1). Additional costs may also include higher costs in product development, marketing, and customer service. There's no doubt that offering more product variants on the market helps attracting new customers and increasing sales. However, companies in today's competitive markets tend to have a fairly complex product structure and struggle to offer variety cost effectively.

Product complexity brings benefits and challenges. A good product design can be a strategic weapon as well as a source of competitive advantage (Drew and West 2002:70). Choosing the appropriate level of product complexity is a strategic decision, competitive companies tackle by choosing a good product design. However, greater product complexity may bring greater revenue - greater sales from the products and better prices due to the added depth. On the other hand, product complexity brings costs in the form of overheads, duplication and quality. The challenge is to design and develop a product that positions a company for optimal trade-off between added value and cost (see figure 7.9)

![Figure 7.9 Product complexity and the trade-off between revenue and cost](image)

As shown in the figure 7.9, product complexity is likely to create some additional sales. Besides the positive effect of increased sales, increasing product complexity also has a number of negative effects, summarized by the complexity cost curve. The reasons for
growing complexity costs are manifold. Obviously, the optimal point to be is where the difference between complexity dependent revenues and costs is maximized. That is the point of operation where the total profit for the company is maximized. In this case, there are many possibilities to maximize total profit, for example, by changing the level of product complexity to an optimized working point; usually complexity reducing, by changing the shape of the revenue curve in order to generate more sales with less product complexity or by changing the complexity cost curve through reducing the costs of product complexity.

As product and process complexity may hurt profitability, management of the company needs hard financial and non-financial information. Strategic cost management provides the information managers need to make difficult decisions. Determining complexity related costs and total life cycle costs of products and variants is an important task in preparing product and variant-related decisions. When using normal costing systems with assignment of overhead costs based on volume, complexity related costs remain hidden. Strategic cost management by using activity based costing on the other side provides accurate information to uncover the cost of complexity (Swenson 1998:22). ABC process attempts to understand the activity consumption and resources needed to deliver products to customers. It assigns cost to activities pools and determines costing rates by dividing activity pools by some output measure, sometimes referred to as the cost driver. Activity based costing uses the costing rates to build meaningful product and it uses the activity-based cost information to manage cost.

7.1.1.4. Product Design to Cost Objectives

The design phase lies at the core of product life cycle. In many companies, the primary driver for improving the product development and design process is cost objectives (Williamson 1994). Because product development and design process is a major factor in the product cost or life cycle cost, managers must consider the cost as an independent design parameter that needs to be achieved during the development and design of a product.

In some companies, product cost or life cycle cost considerations may be an afterthought, where the product cost is determined and used as the basis for determining the price of the product. In such cases, the primary focus of the company is on product performance, technology, etc. By this approach, some companies can be able to live with difficulty in some markets with some products in the short term, but the product will no longer be competitive in
the competitive markets (Monden 1995:87). In today’s competitive business environment, it is critical to find new solutions that manage product cost and achieve competitive advantage.

In other companies, cost is considered a more important factor, but this emphasis does not perform as well as it should, where achieving cost goals is performed late in the development cycle of the product (Crow 2000). Planned costs of the product are estimated based on drawings and accumulated from quotes and manufacturing estimates. If these planned costs are too high relative to competitive conditions or customer’s requirements, design changes are made to varying degrees to reduce costs. This may occur before or after the product has been released to production. The result of this approach is extended the development cycle of the product and added development and design costs with these design changes.

Effective product cost management requires management of the product design process to meet predetermined or agreed cost goals because a large portion of the product’s cost is dictated by decisions regarding product design. According to (GAT 1998), product design to cost objectives means a concept that establishes cost elements as management goals to achieve the best balance between life-cycle cost, acceptable performance, and schedule. Under this concept, cost is a design constraint during the design and development phases to achieve agreed cost goals and an affordable product (Williamson 1994). Thus, product design to cost objectives embodies early establishment of realistic but difficult cost objectives, goals, and thresholds and then manages the design until it converges on these objectives. In this case, a company should focus its attention on many considerations (Crow 2000):

- An understanding of customer affordability or competitive pricing requirements by the key participants in the development process.
- Target costs must be established at the start and used to guide decision-making.
- Development team must operate as entrepreneurs in making hard decisions about the product and process design to achieve target costs.
- An understanding of the product’s cost drivers and consideration of cost drivers in establishing product specifications and in focusing attention on cost reduction.
- Using product cost models and life cycle cost models to plan costs early in the product life cycle to support decision-making.
- Active consideration of costs during product design as an important design parameter appropriately weighted with other decision parameters.
• Using cost techniques such as activity-based costing to provide improved cost information to support this process and empower development team.
• Continuous improvement through value engineering to improve value over the longer term.

Meeting customer affordability requirements is critical to a successful product. Since the majority of a product's costs are committed very early in the design and development process, product development team and executive management need to have understanding of customer affordability constraints or competitive pricing requirements (Crow 2000). They must have direct and indirect contacts with customers to know and understand their true requirements and recognize their reactions to costs directly. In addition, they must study and understand competitor products prices. Thus, product development team needs to be aware of customer requirements and competitive pricing to design product according to cost objectives.

In product design to cost objectives, target costs should be established based on analyzing market niches, assessing customer affordability requirements, understanding cost drivers, considering trade-offs in costs vs. other requirements, determining elasticity of demand, and analyzing volume-cost relationships (Williamson 1994). In a more complex product, the target cost is allocated down to lower level assemblies of subsystems in a manner consistent with the structure of teams or individual designer responsibilities. This will establish a measurable objective for a product development team where multiple teams are involved in this process (see Cooper and Slagmulder 1997a). In addition, the product development team should commit to these product cost targets to improve the opportunities of meeting these objectives. Thus, they should be empowered to develop these targets, in order to understand these cost objectives and the assumptions behind them.

In this approach, many tools and information are required to evaluate concept and design alternatives and support decision-making (Crow 2000). For example, a product cost model or life cycle cost model provides an objective basis for evaluating design alternatives from a very early stage in the development cycle. This tool is used to plan and estimate product costs in order to use these cost information as a factor in evaluating design alternatives and to improve the product design to meet cost targets. After this evaluation and in the case of the
product requirements or design cannot be achieved at the target costs, the requirements and targets will need to be re-evaluated and modified.

The product cost model which is used early in the development cycle, will be based primarily on characteristics of the product design such as size, weight, number of functions, etc. with relatively little consideration of the actual manufacturing process (Rush and Roy 2000:60). Later in the development cycle, a different type of product cost model will be used that will consider the specific manufacturing processes. This product cost model will be built around existing process; in this case, historical cost information can support this model development. Thus, over the course of the product development cycle, product cost models should be improved since more is known about the design of the product and its cost drivers (see Rush and Roy 2000).

Product design to cost objectives uses product cost models and estimating systems to evaluate design options and relies on tools such as design for manufacturability and assembly, value analysis and value engineering to achieve reduced product costs and improved product value over the longer term (Rush and Roy 2000:63 and Williamson 1994). In addition, cost information will need to be obtained for many purchased parts and sub-assemblies, thus supplier involvement in product design to cost objectives is critical since a significant portion of product costs are materials (Crow 2000). Also, indirect costs are most significant cost element and must be addressed. The company must examine these costs, re-engineer indirect business processes, and minimize non-value-added costs. In addition to these steps, development personnel generally lack an understanding of the relationship of these costs to the product and process design decisions that they make. Use of activity-based costing and an understanding of the organization's cost drivers can provide a basis for understanding how design decisions affect indirect costs and, as a result, allow their avoidance (Gupta and Galloway 2003:134).

Finally, product design to cost objectives is an important management tool. This process has to be managed to be successful. Thus, all management involvement and commitment are primary ingredients of successful design to cost objectives efforts. Product design to cost objectives is used by many companies, for example, this approach is adopted by the American Department of Defense in 1975, applied by Texas Instruments in 1985 and considers one
important origin of target cost management (Tanaka et al. 1993:37, Williamson 1994). In applying this approach, the American Department of Defense establishes not only product target costs but also target costs for many areas such as maintenance and supply expenses. Thus, this approach focuses on the internal capabilities of a company. Combining this approach with the complimentary external market-based target costs provides an excellent basis for cost management.

7.2. Process as a Strategic Cost Management-Object

7.2.1. Process Awareness Increasing and the Company’s Success

There is continual pressure on companies to not only operate, but also thrive in an environment that is increasingly more competitive. Improving competitive position involves raising the quality of the products and services provided to customers, designing and producing these products and services more quickly, and doing so in manner that minimizes costs and increases revenue (see, e.g. Hooley and Saunders 1993 and Porter 1998a). To accomplish these competitive objectives a company must look to improve its processes, the processes inputs (resources) and the processes outputs (products).

Improving business processes requires a model of the business. This model must represent the composition of the business and reflect the competitive issues of timeliness, cost and quality (Corsten 1997:19). Its components must be able to be adjusted and the model re-analyzed to examine the effects of change and determine potential success or failure before implementing change. Historically, business models have been a hierarchical representation of the organizational structure (see figure 7.10), which related little to timeliness, cost and quality issues (Maier and Laib 1997:99). In this business model, functional groups within a firm tend to complete their portion of a process and “throw it over the wall” to the next group in the value chain. This can lower effectiveness, because of the “inward-looking” focus of each functional group.
Improving the processes that a business performs drives true business improvement. A business process represents how work gets done in the company. Rather than looking at the company vertically (using a hierarchy), the correct view of the business is taken horizontally, by analyzing the business processes that flow across organizational boundaries (Harrington 1991:13). In other words, the company should perceive its activities as a set of processes that cut across the conventional, functional organization structure (see figure 7.11). The aim is to redesign the business so that it is process oriented and not function oriented. For example, in the product development cycle, this major process includes activities that draw on multiple functional skills. New product designs are generated by research and development, designed by designers, tested for market acceptance by marketing and evaluated for production by manufacturing (see figure 7.11).

By nature, a business process is initiated by an event, consumes resources, performs activities, and produces products or services (Tinnilä 1995:27 and Corsten 1997:23). The event component of the business process allows for the analysis of timeliness issues. The resources consumed allow for the analysis of associated costs. The activities performed lead to an analysis targeting process quality. Finally, the resulting products and services lead to the analysis of product quality and cost, and customer satisfaction.
Corsten and Stuhlmann (1996), Arnaout et al. (1997) and Kajüter (2004) indicated that the cost advantages/disadvantages of many companies are attributed essentially to some areas or causes; process considers as one substantially a cause for cost disadvantages/disadvantages of enterprises. Process represents accordingly an important objective of the strategic cost management. Process awareness has increased dramatically over the past decades. It has attained a large attention in theory and practice by emergence of the Business Process Reengineering (BPR) in the last years (Hammer and Champy 1993). Hammer and Champy (1993) presented the business process orientation-concept as an essential ingredient of a successful "reengineering" effort. They coined this term to describe the development of a customer-focused, strategic-business-process-based organization enabled by rethinking the assumptions in a process-oriented way and utilizing information technology as a key enabler. They offer reengineering as a strategy to overcome the problematic cross-functional activities that are presenting major performance issues to firms and cite many examples of successes and failures in their series of books and articles. For example, Hallmark and Wal-Mart are often put forward as success stories and IBM and GM as the failures.
Moreover, many other factors lead to focus the attention on the processes; some of these factors connect exactly with strategic cost management and have a direct importance and result. These factors include, for example:

- Over the last decades, there were important changes in the cost structures of companies, especially in the increased percentage of overhead. The high percentage of overhead in the internal value-added is due to the increased number of preparatory, planning, controlling, and monitoring activities in the research and development, procurement and logistics, production planning, quality assurance, order processing, distribution, and service areas (Cooper and Kaplan 1998:85). Manufacturing wages, on the other hand, have decreased and are therefore often no longer an appropriate basis for calculating overhead, because the result can be costing rates of several hundred percent for the direct labor costs. Thus, Miller and Vollman (1985:143) explained that the real driving force of overhead costs comes from different activities and processes, not physical products. Therefore, particular interest has centered on the cost impact of activities and processes not driven by volume (Miller and Vollman 1985 and Cooper and Kaplan 1998). This connected with the development of the activity based costing and activity based management whose implementation causes the importance of analysis the activities and processes.

- There is a great focus on processes in the theory and practice, in order to attain and sustain competitive advantage. True competitive advantage and customer value are derived from (Porter 1998a:33, Cooper and Kaplan 1998:14 and Tinnilä 1995:25):
  - Effective, integrated internal and external business processes;
  - Competent skills among the people executing the processes and assessing the information; and
  - Effective cost management that provides accurate and timely information in support of these processes.

The concept of integration within the processes of a firm can be represented by Porter’s value chain. Porter looked at the firm as a collection of key functional activities that could be separated and identified as primary activities or support activities. He arranged these activities in the value chain. In his model, for example, the activities and their cost drivers consider important elements (Porter 1998a). A company may create a cost advantage either by reducing the cost of individual value chain activities (using cost drivers information) or by
reconfiguring the value chain through structural changes in the processes of the company such 
as a new production process, new distribution channels, or a different sales approach (see 
section 6.2.2). The process view has recently become popular in industrial management and in 
the research of technology and industrial organizations. One source of process thinking is the 
concept of organizational value chain, introduced by Porter (1998a).

The business process perspective is popular when business development is performed. In 
literature, the perspective is used in different development strategies such as value chain, 
business process reengineering, total quality management, activity based cost analysis / 
activity based management, etc. (e.g. Porter 1998a, Imai 1986, Harrington 1991, Davenport 
perspective, the horizontal process in the company is in focus. This process consists of 
different vertical levels, which are performed in order to produce value for the customer. The 
following sections discuss some significant aspects of the process as a strategic cost 
management-object. These aspects are the concept of the business process, identification and 
selection of the business processes for improving, the different levels of the business process 
 improvement and strategic cost management and the dimensions of process improvement.

7.2.2. The Business Process Concept

In spite of large interest in business processes, there is a great deal of variety concerning the 
definition of process/business process (Pall 1987, Davenport and Short 1990, Harrington 
Terminology from information systems, manufacturing, logistics, as well as organization and 
strategy studies are often used and mixed. In fact, there are many different classifications and 
explanations of “the process” can be proven, for example: operational processes, and 
management processes, goods -, finance -, and information processes, primary and secondary 
processes, repetitive and innovative processes, sub-processes and main processes, core 
processes and support processes. In the table 7.2, one can see that business processes are used 
in many shapes and forms.
<table>
<thead>
<tr>
<th>Author(s) /Year</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pall 1987</td>
<td>Business process is the logical organization of people, materials, energy, equipment, and procedures into work activities designed to produce a specified end result (work product).</td>
</tr>
<tr>
<td>Davenport and Short 1990</td>
<td>Business process is a set of logically related tasks performed to achieve a defined business outcome.</td>
</tr>
<tr>
<td>Harrington 1991</td>
<td>A Process is any activity or group of activities that takes an input, adds value to it, and provides an output to an internal or external customer.</td>
</tr>
<tr>
<td>Johansson el al. 1993</td>
<td>A process is a set of linked activities that takes an input and transforms it to create an output that is more useful and effective to the recipient.</td>
</tr>
<tr>
<td>Scherr 1993</td>
<td>Business process is a series of customer-supplier relationships that produces specific results at specific points in time.</td>
</tr>
</tbody>
</table>
| Davenport 1993 | 1) Business process is a specific ordering of work activities across time and space, it has a beginning, an end, and clearly identified inputs and outputs.  
2) Business process is a structured, measured set of activities designed to produce a specific output for a particular customer or market: a structure for action. |
| Hammer and Champy 1993 | Business process is a set of activities that take one or more kinds of input and create an output that is of value to the customer. |

**Table 7.2 Definitions of business processes**

In spite of different definitions of business processes, they follow similar lines of underlining the nature of a structured set of activities designed to produce a specified output. This output added during the process should be of value to the customer. While there are differences in scopes of definitions, the common features are those that are the most important. Thus, there is a large consent about the following common features of the business process:

- Business process is triggered by an **external event** involving a **stakeholder**.
- Business process comprises all the actions necessary to provide the appropriate **business outcomes** in response to the triggering business events.
- Business process transforms inputs of all types into outputs, according to guidance (policies, standards, procedures, rules etc.), employing reusable resources of all types.
- Business process contains logical steps that usually cross functions and often organizational units.
- Business process has **performance indictors** for which measurable objectives can be set an actual performance evaluated.
- Business process delivers a **product** or **service** to an external stakeholder or another internal process.
- Only a few of the authors argue about the **range** of a business. Where does a business process start and end?
• Adopting a business process view of a corporation implies a strong emphasis on **what** is done and **how** it is done within a corporation, in contrast to **who** is done the work. Some authors mean that a business process needs a process owner.

• A corporation consists of **several** business processes

The defined process represents the link between the two other objects of the strategic cost management. Products are the processes outputs (output) for a customer, resources the process inputs (input) from a supplier. This process model is shown in the figure 7.12.

The figure 7.12 shows that business processes transform requirements and consumable resources into business outcomes in response to business events or triggers. Their performance can be measured in exactly the same way as the business overall (Corsten 1997:17). Consequently, business performance is directly attributable to process performance and a business may be viewed as the collection of all of its cross-functional processes.

![Figure 7.12 Process model (slightly modified from Gaitanides et al. 1994:23)](image)

In contrast to functional definition, process perspective is clearly focusing on the tasks and activities done in an organization. The emphasis is on how work is done, rather than the functional emphasis on what is done in an organizational unit as Davenport (1993:5) has observed. Attention is also paid to meeting the customer needs (Harrington 1991:72). Therefore, all companies can be described as a collection of business process such as fulfilling orders, developing products, maintaining brands, solving customer problems, acquiring new customer, developing manufacturing capabilities, etc.
A business process can be looked at from various perspectives depending on the kind of information required; usually this of the type, what work is going to be done, who and how is it going to be done, when will it be done, who will take the decision, etc. Hence, many classification schemes describe the business processes in literature and focus on many dimensions such as operational dimension, organizational dimension, informational dimension, or behavioral dimension (see Feurer et al. 2000). Managing and improving business processes needs identifying and selecting a business process that considers a critical process and a company should focus on. Thus, the following section discusses some views or perspectives of the business process classification and criteria for the business process selection.

### 7.2.3. Identification and Selection of Business Processes

Today’s businesses should view to improve their processes from a business process perspective; rather than focusing on the underlying technology or applications involved. By viewing processes from a business process perspective companies can identify what their processes are, both internally and externally, and gain greater control over them and predictability in managing them (Lind 1996:462). However, some authors are vague about how the perspective should be used when corporations are looked upon from a business process point of view. In literature many different ways can be identified of how the business process perspective can be used (some examples are below).

A corporation consists of several processes that start with raw material and end with a finished product to the customer (production process). Davenport (1993:7) regards a corporation as consisting of a number of processes, where the performance of each process is a part of creating a result which is of high value for the external customer. Davenport and Short (1990:12) argued that processes have two important characteristics: (1) They have customers (internal or external), (2) They cross-organizational boundaries, i.e., they occur across or between organizational subunits. Davenport (1993:8) provides a list of typical processes within a manufacturing firm (see table 7.3).
Companies may consist of more or even fewer processes. It is an elementary view characterizing only management and operational dimensions. In order to be effective, process definition needs more explanation. According to Davenport and Short (1990:18), processes may be defined based on three dimensions:

- **Entities**: processes take place between organizational entities. They could be inter-organizational (the processes take place between various organizations e.g., ordering from suppliers), inter-functional (the processes take place between various departments within a single organization e.g., new product development) or interpersonal (the processes take place within one department e.g., approving a bank loan).

- **Objects**: processes result in manipulation of objects. These objects could be physical (e.g. manufacturing) or informational (e.g. creating a proposal).

- **Activities**: processes could involve two types of activities: managerial (e.g. budget preparation) and operational (e.g. order processing).

One technique for identifying business processes in an organization is the value chain method proposed by Porter (1998a:33). He regards business processes in a similar way. He uses his generic value chain to explain how activities are performed in order to create a value for the customer. The value chain is divided into two parts: primary and support activities. The primary activities that are performed within a corporation are supposed to be value-added activities for the result that the external customer is receiving.
Both definitions of a business process by Davenport (1993) and Porter (1998a) start from an unrefined product instead of starting from the customer needs. The end of their business process is a refined product, which is of high value for the external customer. This means that the business process is regarded as a production process.

On the other hand, Porter (1998a) is very explicit about the fact that all the activities that are performed within a corporation are not value-added activities for the external customer. Within a corporation there are some activities that are performed that are of primary interest for the external customer and some that are of secondary interest (Porter 1998a:39). The primary activities can be questioned to ensure that these are value-added activities. The supporting activities can be difficult to relate to a certain business process. From Porter’s point of view the delivery process consists of supporting activities that could be a prerequisite for different primary activities. Porter means that the supporting activities indirectly contribute to a higher value for the customer, but are necessary for the performance of primary activities (Porter 1998a:44). In both of the viewpoints (Porter 1998a and Davenport 1993), the primary process consists of several sub-processes that are performed in sequence.

In their study, Earl and Khan (1994:21) describe four types of business processes. These four categories of business processes are:

- **Core processes**: are the processes central to business functioning. They are typically primary value-chain activities and relate directly to external customers. The generic example is the order fulfillment process in which several organizations have shortened lead-times, reduced material and information flows, administrative steps and staff head-count.

- **Support processes**: are the back-office processes that underpin the core processes. They are typically secondary value-chain activities and relate more to internal customers.

- **Business network processes**: are those that exist beyond the boundaries of the enterprise and include suppliers, customers, and business partners.

- **Management processes**: are the processes through which firms plan, organize and control resources. This involves redesigning the organization and its roles along business process lines.
The figure 7.13 illustrates the analytical framework for the topology of processes by Earl and Khan (1994). In this framework, (Earl and Khan 1994: 25) argued that it is more easily to identify, analyze and model processes and their redesign, if the business processes are relatively structured. The figure 7.13 shows two dimensions of Earl’s analysis framework; the degree of the process structuredness and the value chain target. On the vertical axis of the figure 7.13, Earl and Khan (1994:25) stated that managers could easily analyze and improve business processes if they are relatively structured. High structured processes means managers understand them, they are easily described, managers can prescribe rules for them, and be reasonably certain of achieving the goals that redesign is seeking. Low structured processes in contrast imply more complexity and uncertainty and, therefore, risk.

![Figure 7.13 Earl’s Topology of processes (Earl and Khan 1994:25)](image)

On the opposite axis of the figure 7.13, Earl and Khan (1994:25) explained the difference between primary value chain activities and secondary value chain activities. Primary value chain activities relate to how we do business and have external customers to the enterprise; their impact is likely to be strategic in the sense of competitiveness and market positioning. They are means by which managers can turn around the business. Secondary value chain activities describe how managers manage the enterprise. They are internally focused and have an affect on the enterprise’s internal efficiency. As a consequence, they impact on business performance indirectly. They are more concerned with the capability than competitive advantage.
In Earl’s classification of processes, core processes are easily described and redesign of these processes will have a meaningful impact through competitiveness and the enterprise's competitive positioning. In addition, support processes, which back up core processes, are easily described but have an effect on internal efficiency. Just as systems have subsystems, core processes have subsystems, which in this case are known as support processes. An example of a support process may be human resource management. Earl and Khan (1994:21) argued that business network processes are harder to describe and highly complex. However, redesign will have a strategic impact in terms of competitiveness. An example of this, was identified by Short and Venkatraman (1992:7) at Baxter Healthcare: When redesigning external processes, the company had the potential to redefine the business scope and reposition the firm in its industry value chain. Finally, the redesign of management processes will impact on internal efficiency, but are complex in structure. An example lies with Texas Instruments where they used expert systems to enable speeding up of the capital budgeting process.

In their study, Edwards and Peppard (1994b: 411) introduced four critical types of the business process in companies, which derive from the product and market focused element and the competency element of the business strategy. The classification of the business processes includes competitive processes, infrastructure processes, core processes, and underpinning processes (see figure 7.14). They argued that competitive processes relate directly to the company’s current basis for competition. For example, if a company was focusing on how quickly new products could be brought to the market, the competitive processes would relate to this focus. In economic terms, these processes enable the company to enjoy good profits.

While core processes are those processes that are valued by the stakeholder. They must operate satisfactorily but are not currently the chosen basis of competition. They are necessary in the company to avoid disadvantage in the marketplace. They may also be the minimum entry requirements into the market or be required by government legislation. For example, a vehicle scheduling process is very necessary to a logistic business but may well not be a chosen basis of competition and hence it is a core process to that organization (Edwards and Peppard 1994b:411).This types of business processes (core processes) should not be confused with Earl and Khan (1994) core processes, as described earlier. Edwards and Peppard (1994b)
used the word stakeholder, rather than customer, to include customers, suppliers, employees, shareholders, i.e. all those who have a 'stake' in the company. Thus, all the business processes which are necessary to satisfy the stakeholders are termed core processes unless they are the chosen bases of competition with customers, in that case, business processes are called competitive processes.

Figure 7.14 Classifying business processes: The process triangle

(Edwards and Peppard 1994b:412)

Edwards and Peppard (1994b:411) also stated that infrastructure processes create the capability to operate effectively in the chosen industry in the future. These processes develop the capability (people, process and technology) that will define tomorrow’s competitive strategy. Finally, Edwards and Peppard (1994b) argued that the underpinning processes are processes that are undertaken, but are neither recognized nor valued, by stakeholders in the short term. These processes are found in all companies and are collections of closely related activities that are grouped together for efficiency and recognized as a process. In reality, they
are not real processes in the sense that they directly support customers, but rather, they contribute to other categories of process. The reason why managers consider these as processes lies in the benefits of functionalism, namely efficiency and specialization. For example, in the performance of competitive, infrastructure, and core processes, some administrative support is necessary. An example of which is the recruitment of staff, this may be an element in a number of processes. However for efficiency reasons, management may decide to combine these elements and manage them as a single process. Edwards and Peppard (1994b:412), in their study also stated that a combination of competitive and infrastructure business processes constitute a strategic diamond because theses business processes directly support business strategy. In other words, infrastructure business processes support the future competency elements of the business strategy and competitive business processes support the market and product-based elements of the business strategy.

The classification schemes described above, namely from Porter (1998a) Davenport (1993) Earl and Khan (1994) and Edwards and Peppard (1994b), represent only some schemes from a list of many. Other schemes have been proposed, such as: Rockhart and Short (1989) suggest that processes relate to developing new products, delivering products to customers, and managing customer relationships. Beside the above classifications, in literature, processes can be materialistic (e.g. warehousing and distribution) or informational (e.g. qualifying suppliers), structured (e.g. reorder of materials) or less structured (e.g. market research), regular (e.g. order fulfillment) or non-regular (e.g. complaint handling). Therefore, the scheme of business processes should focus on the role processes play in delivering business benefits rather than what the processes do. In other words, besides the classification schemes may be useful checklists in identifying processes, they should give some indications of the importance of the processes to the business or how they should be managed.

Improving business processes needs to take into account not only business processes identification but also their aggregate nature (Hammer and Champy 1993:117 and Harrington 1991:30). In fact, every company has a slightly different way of ordering the various levels of business processes. However, a business process is made up of a hierarchy of activity levels. These vertical levels are typically given labels such as sub-process, activity and task (see figure 7.15).
The idea of identification of a business process hierarchy is based on a systems concept in which systems are composed of sub-systems (and processes of sub-processes). Harrington (1991:30) has proposed a hierarchy of macro-processes, sub-processes, activities and tasks each of which represents further hierarchical detailing of the process. Techniques must facilitate the identification of sub-processes, activities and tasks within the whole process, so that each element of the system is seen in its proper context relative to the other elements, and the analyst can identify the impact of any change upon the whole business system (Edwards and Peppard (1994a:254). Theoretically business process breakdown structure can be approached on many levels up to elementary performing. However, since there are no generally accepted rules for the optimal degree of detail, the decision should have many aspects such as the criteria of economy and the appropriateness regarding transparency for the process design.

![Diagram of the business process hierarchy](image)

*Figure 7.15 The business process hierarchy (slightly modified from Harrington 1991:30)*

Once the business processes are identified and classified, the next step is to select one or more business processes for improvement. Because of the time and economic factors, all business processes cannot be selected, analyzed, and improved at the same time (Hammer and Champy 1993:122). In addition, a company should take into account that the more business processes it selects for improvement the more complex the later phases of the process improvement.
effort will be. Business process selection for improvement must be based on suitable criteria. Many different criteria are suggested in literature (see Harrington 1991:36, Hammer and Champy 1993:122 and Koch and Vogel 1997:65). For example, the criteria are used to select processes for improvement are timing, volume, cost, process flexibility, potential for improvement, etc. In addition, in order to realize the biggest gains, a company should select first the business process that is associated with the most critical problem or the highest number of the problems. Thus, managers must select the business process (es) to be improved by choosing from among several approaches, as follows (Ulis 1993:22):

- Customer-focused approach: Start by taking the process that your customers are most dissatisfied with.
- Hot button approach: Begin with the process that senior managers are most dissatisfies with.
- Analytical approach: Identify all the processes eligible for improving, determine the appropriate criteria for prioritizing them, weight these criteria if necessary, and then apply the weighted criteria to the eligible processes. Start with the highest priority process.

Finally, identification and selection of business processes will be the basis for the process improvement that has different levels of improvement. These levels of business process improvement will be discussed in the next section.

### 7.2.4. Levels of Business Process Improvement

The improvement and repair work of business processes - or those processes that allow a business to take raw material and transform it into goods or services of marketable value - has always been an issue of concern for organizations who want to maintain a competitive edge and increase their profit generation. Business process improvement (BPI) has been considered one of the important methodologies for facilitating the delivery of high quality products and services by corporations and started to gain popularity in the mid-late 1980's (see e.g. Porter 1998a, Imai 1986, Harrington 1991, Davenport 1993 and Hammer and Champy 1993)

Business process improvement can be done in all organization, and there exist numerous approaches to process improvement (Harrington 1991:26 and Corsten 1997:14). These approaches have different goals, and focus on different aspects of the process. The main goal
of BPI is to improve business processes, as the term business process improvement itself implies. BPI is done on operational and strategic levels and is usually seen as being carried out by temporary work groups with a beginning and an end, permanent teams, or mixed groups with permanent and non-permanent staff (Tinnilä 1995:25 and Harrington 1991:62).

Business process improvement has been considered one of the underlying change dynamic tools of some widely practiced and researched, and at a certain stage revolutionary, management movements. Some representative examples that have recently attracted worldwide attention are the total quality management movement, seen as one of the propellers of the intensely publicized in the 1980s "economic Japanese revolution" (Imai 1986 and Walton 1991), and the business process reengineering movement, with a number of radical improvements in quality, productivity and competitiveness reported as having accrued from its application to large US organizations in 1990s (Hammer and Champy 1993 and Davenport 1993).

BPI is used here as a general term to refer to improvement schemes based on the concept of business process, whether they are radical, incremental, or somewhere in between in terms of degree of improvement sought and realized. BPI is assumed to be carried out by small groups that analyze and propose improvement to business processes.

A number of studies have suggested that business process reengineering and continuous process improvement are two distinct levels of business process improvement drawn from a continuum of more or less radical improvement approaches (Davenport 1993:11, Gaitanides et al. 1994:118 and Davenport and Beers 1995:58). The main similarity between these two levels of improvement is the focus on business processes and their improvement (see, for example, Davenport 1993, Hewitt and Yeon 1996 and Maull et al. 1995).

Improving business processes is paramount for businesses to stay in today’s marketplace. Over the last decades, companies have been forced to improve their business processes because customers are demanding better and better products and services (Hammer and Champy 1993:20). And if customers do not receive what they want from one supplier, they have many others to choose from (hence the competitive issue for businesses). Many companies began business process improvement with Continuous process improvement
Continuous Process Improvement is about fine-tuning the existing process. Focus is on identifying problems of the process and finding solutions for them. Continuous process improvement is closely associated with the total quality management discipline (Pereira and Aspinwall 1997:33 and Williams et al. 2003:1). In addition, CPI integrates methods such as industrial engineering, systems analysis and design and socio-technical design (Davenport 1993:13 and Galliers 1998). Continuous improvement refers to programs and initiatives that emphasize incremental and sustained improvement in work processes and outputs over an open-ended period of time (Davenport and Beers 1995:58). CPI actions typically are wholly contained within one functional activity, although cross-functional teams can be organized to deal with chronic or pervasive situations (Ward 1994:74). To use an analogy, the objective of a CPI team is to tend to one or two trees in the forest.

Before the advent of BPR, companies used other approaches to improve performance and satisfy customer’s demands (Hammer and Champy 1993:49). However, these approaches only led to incremental, small achievements that were not as good as companies expected and needed. For instance, in the 1980s, one of these approaches was the implementation of continuous improvement (TQM) within both the service and industrial sectors (Davenport and Stoddard 1994:124). Despite the broad concept of continuous improvement (focus on customer satisfaction, continuous quality improving, extension of quality improvement techniques to all functions and levels in the organization, teamwork and participative decision-making), most of the BPR defendants understood continuous process improvement (CPI) as a management methodology that focuses on making continuous, incremental improvement and minimizing variation of existing processes (see Hammer and Champy 1993 and Davenport 1993).

**Business process reengineering** is one of the management buzzwords being presented to companies that need to be competitive. Hammer and Champy (1993:32) defined BPR, also known as business reengineering, process innovation, core process redesign or simply reengineering, as “the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as
cost, quality, service and speed”. This definition clearly sets improving the efficiency and effectiveness of the ways companies operate as the main focus of attention. Discussions of BPR often, very reasonable, point out that the functional divisions of work in typical organizations have not changed for many years and do not capitalize on recent technological and other innovation, particularly in information technology fields (Davenport and Short 1990:13 and Hammer and Champy 1993:85).

The ways that companies internally organize themselves to carry out work depends on the business environment, available technologies, and the skills of the available workforce, and should change as these controlling factors change (Olalla 2000:581). Also, the way that a company is organized internally is a major source of competitive advantage and must be well matched to the strategic needs of the organization. Thus, BPR is often undertaken in response to radical changes in the external environment that exert considerable pressure on the ability of the organization to fulfill its mission, to meet customer’s requirements, to improve its competitive positioning, or to even survive in the trade (Motwani et al. 1998:964). BPR actions are radical and transforming. The targets of BPR are those business processes that have many participants, are fragmented, can be characterized by long standing-times and numerous errors, and as a consequence, are also very costly (Guha et al. 1993:15). Virtually all operational aspects in the organization are affected by BPR actions. To complete the analogy, the objective of the BPR team is to create a new forest with sturdier and more valuable trees.

CPI and BPR share a few common feature such as both focus on the processes, both start with the customer’s needs and work backwards from there, and both recognize the importance of team work (Hammer and Champy 1993:49). Nevertheless, Davenport (1993:10) and Hammer and Champy (1993:49), among others highlighted the main differences between the two approaches. The table 7.4 shows the main differences between CPI and BPR. For example, usually continuous improvement programs and initiatives work within the framework of a company’s existing processes and aim at achieving their continuous incremental improvement. BPR, on the other hand, looks for radical breakthroughs (Davenport 1993:10 and Hammer and Champy 1993:32). While BPR is an intensive top-down effort that requires continuing top management leadership and support, on the other hand, continuous improvement programs and initiatives, once built into the organization culture, can go on
working without much daily support from management (Hammer and Champy 1993:219). Where a single process reengineering project sweeps broadly across many functions or the whole organization, continuous process improvement efforts are often within single teams or a few functions. BPR places considerable emphasis on exploiting IT opportunities, while in CPI programs the focus is on automated systems for collecting data and controlling process variation (Davenport 1993:13).

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Continuous Process Improvement</th>
<th>Business Process Reengineering</th>
</tr>
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<tbody>
<tr>
<td>Level of change</td>
<td>Incremental</td>
<td>Radical</td>
</tr>
<tr>
<td>Starting point</td>
<td>Existing process</td>
<td>Clean slate</td>
</tr>
<tr>
<td>Frequency of change</td>
<td>One-time/continuous</td>
<td>One-time</td>
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<tr>
<td>Time required</td>
<td>Short</td>
<td>Long</td>
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<tr>
<td>Participation</td>
<td>Bottom-up</td>
<td>Top-down</td>
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<tr>
<td>Typical scope</td>
<td>Narrow, within functions</td>
<td>Broad, cross-functional</td>
</tr>
<tr>
<td>Risk</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>Primary enabler</td>
<td>Statistical control</td>
<td>IT</td>
</tr>
<tr>
<td>Type of change</td>
<td>Cultural</td>
<td>Cultural/structural</td>
</tr>
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Table 7.4 Differing characteristics of CPI and BPR (Davenport 1993:11)

Both CPI and BPR require cultural change (Hammer and Champy 1993:219). The necessary focus on operational performance, measurement of results, and empowerment of employees are all aspects of the cultural shift. But whereas avoiding uncontrolled change is prerequisite to continuous improvement, process reengineering involves massive change, not only in process flows and the culture surrounding them, but also in organizational power and controls, skill requirements, reporting relationships, and management practices. If continuous process improvement involves relatively little reward, it also involves little risk. Because business process reengineering initiatives have (or should have) well-defined and ambitious change objectives, failure to achieve these objectives is usually highly apparent.

CPI and BPR focus on the process and process improvement, however, some authors such as Klein (1994:30) suggested that BPR is much more radical than CPI, while others, notably Davenport (1993:14) and Harrison and Pratt (1992) argued that CPI and BPR can and should form an integrated strategic managements systems within organizations. In contrast with the early times of BPR, when incremental changes were viewed rather negatively (probably to raise recognition of the new idea), nowadays it is commonly accepted that BPR is not a more
advanced from of CPI. The necessity of radical initiatives or programs does not generally hold, it changes with profile and technology of a company (see Harrington 1995). And even if industry characteristics and environmental challenges make it necessary, it is better if BPR is coupled with CPI. After a reengineering phase, CPI programs are suitable for stabilizing and fine-tuning the changes brought about by BPR. Similarly, sometimes the row of CPI effort should also be interrupted by BPR in order to maintain competitiveness (Harrington1995: 48). This symbiotic relationship of BPR and CPI is illustrated in Figure 7.16.

Figure 7.16 CPI and BPR as symbiotic actions
(slightly modified from Harrington 1995:32)

As the executive teams examine and debate the strengths and weaknesses along with the risks and opportunities of both approaches, they come to realize that both approaches need to be used together. Thus, effective horizontal management demands extensive deployment of both process reengineering and process continuous improvement skills throughout the organization. Clemmer (1994:38) argued that balancing and blending both approaches strategically require many keys such as choose strategic processes carefully (strategic processes are often chosen for their impact on customer satisfaction, competitiveness, costs, or role in meeting key organizational goals), every strategic process needs an executive owner (he or she is the champion of the strategic process within the organization and is accountable for improving it), carefully choose and develop team leaders (they must have strong project management skills and know how to use process management tools and techniques), appoint internal process management consultants/coordinators, provide extensive training for leaders
and improvement teams, keep process teams focused on customers, and set breakthrough objectives.

In reality, some continuous process improvement efforts have failed to produce significant results because they were poorly implemented (Clemmer 1994:39). Thus, impatient executives are now jumping on the business process reengineering bandwagon. But choosing between CPI and BPR is about as useful as deciding whether to use only addition or multiplication. Both are needed. How, when, and where each approach and combinations of both are used depends on the task to be performed.

7.2.5. Strategic Cost Management and the Dimensions of Process Improvement

Over the last decades, the focus of many companies has shifted from achieving low costs as the primary determinant of profitability to maximizing the value offered to customers at a competitive cost (Hansen and Mowen 2000:489 and Blocher et al. 1999:3). Maximizing the value offered to customers at competitive cost implies, for example, optimizing value-added activities and processes and eliminating non-value-added activities and processes in all functional areas of the value chain, eliminating duplication, reducing process cycle-time, etc. The objective is the achievement of a competitive advantage based on a deliberate strategic choice (Roslender 1997:227). The process of radical breakthroughs (business process reengineering) and/or systemic breakthroughs (continuous incremental improvement) toward the achievement and sustainment of a competitive advantage involves initiatives and programs in many areas in the value chain such as the research and development, production, and marketing areas (Harrington 1995:40). This is primarily management process in which management’s behavior is influenced in the strategic direction.

The corporate motivation for implementing process cost management and process improvement may be explained by the shortcomings of traditional cost management methods and changes in cost structures of the companies (Horváth et al. 1998a). This is particularly true in view of the rising proportion of overheads. In order to be able to generate and utilize competitive advantages, knowledge of the “correct” costs is essential. Strategic cost management has the appropriate techniques for carrying out process cost management and process improvement for example activity based costing and activity based management. The use of ABC information for the improvement of business process and achievement of
competitive advantage has been called activity-based management (Cooper and Kaplan 1998:137). As well as ABC/M, many other useful management techniques have become popular over the last years, including BPR and CPI. While on first inspection these techniques may seem to be largely unrelated, they have at least one thing in common - all are process-based and they focus on business process improvement (Senyshen 1997:27). The figure 7.17 illustrates the overlap between ABC/M, BPR and CPI.

![Diagram of ABC/M, BPR, and CPI](slightly modified from Senyshen 1997:27)

The figure 7.17 shows the relationship between activity based costing and management, business process reengineering and continuous process improvement. Activity/process analysis provides a common link between the three (Senyshen 1997:27). Activity/process analysis can be a milestone in process improvement and is a critical component of the approaches that focus on the processes such as ABC/M, BPR and CPI. The identification and analysis of activities that consume valuable resources has become widely recognized as a powerful cost management tool. Its value lies in the fact that not all activities add value to a company’s products and services. This presents managers with the opportunity to reduce costs and improve the processes by eliminating the inefficiencies and freeing up resources associated with wasteful or non-added activities. Process analysis and activity analysis are closely related because a process is a series of interrelated activities carried out to achieve an end result (MacArthur 2000:402). Process analysis helps managers improve the performance
of their business activities. The focus of process analysis is on eliminating waste within a company by continuously improving how work is performed.

Achieving cost reductions through improved efficiency is accomplished by understanding cost behavior at the process level where resources are consumed (MacArthur 2000:404). Analyzing and improving how efficiently the activities within a process are being performed requires the following major steps (see Ulis 1994:22): (1) develop a business process model: a business process model is a high-level documentation of the steps within the company’s business processes. It is used to demonstrate how business processes operate and affect each other. A process model is developed by “walking thought” the work facility and documenting the major stages required to complete a product or service before it gets to the end user (see Harrington 1991:115). The result is a picture of the company showing the product or service flow and an analysis of the cycle time of each stage. (2) Analyze activity within the process: the second part of process analysis defines the activities within each process. It determines which activities in each stage of the business process model add value to the product or service. It also determines which activities add no value but still exist because they are unavoidable or because the process is inefficient. This is accomplished by developing criteria for assessing the value of products or services through discussions with management, employees and customer, then by comparing the activity to these criteria.

CPI and BPR focus on the process and process improvement, and both start with the customer’s needs as a basis for business process improvement. Thus, the focus here is on the relationship between the strategic cost management (by using ABC/M) and process improvement (by using BPR and CPI). In literature, many studies have described demonstrating the use of ABC and ABM in the process improvement. Several authors (e.g. Turney 1989, Turney and Stratton 1992, Greenwood and Reeve 1992 and Greenwood and Reeve 1994) have argued that strategic cost management by using ABC/M plays an important role in the process cost management and process improvement. This strategic approach to process cost management and process improvement is through some actions such as exploring customer expectations and defining value from the customer’s perspective, reducing operational costs by optimizing value-added activities and processes and eliminating non-value-added activities and processes, identifying which activities and tasks add value for the process customer and which don’t, utilizing activity/process analysis to assign costs, using
activity costing to improve processes, and managing company costs in terms of what you do (processes), not resources consumed (Böer 1991, Cooper and Turney 1990 and Turney 1992).

In addition, strategic cost management (ABC/M) and business process reengineering develop the same point of view on organizations (Nyamekye 2000:36). Organizations are not as a set of functional department, instead, as a chain of activities that interact in a given process. From BPR and ABC/M point of view, companies are not seen as blocks of departments, but as chains of processes. Therefore, strategic cost management helps in process improvement (BPR) in the analytical stage of the company’s processes where activity costing indicates which processes present the most promising opportunities for cost reduction (Cooper and Kaplan 1998:143). In other words, in this stage, it is possible to better define which processes must be approached by reengineering. Also, activity cost analysis in the existing processes provides a good basis for understanding which directions should be taken for reengineering changes in a restructuring stage. In the process improvement environment, activity costing is also an essential tool, because it allows following the new reformulated processes costs (Cooper and Kaplan 1998:151).

Thus, there are many dimensions can be used to manage process cost and improve process in literature, from these dimensions; three major dimensions can be differentiated (see e.g. Cooper and Kaplan 1998, Harrington 1991, Davenport 1993 and Hammer and Champy 1993). These dimensions of process cost management and process improvement will be discussed below (see figure 7.18).

- **Business-processes adjustment**

  The key to process cost management and process improvement in a company is analysis of activities and processes with a view to optimize value-added activities and processes and eliminate non-value-added activities and processes in the value chain (Horngren et al 2000:149). Thus, strategic cost management instruments such as activity based costing and management can be used to achieve the basic targets of process improving because these techniques are based on identifying and analyzing value-added and non-value-added activities and processes, and analyzing the efficiency and effectiveness of business processes (Baker 2002:25). Based on activity/process analysis (or process value analysis) activities or sub-processes are classified as value-added or non-value-added.
Blocher et al. (1999:105) and Hansen and Mowen (2000:553) suggest that value-added activities provide essential value to the customer, or are essential to the functioning of the business. Thus, value-added activities include, for example, direct labor processing, addition of direct materials, machining and delivering product. Blocher et al. (1999:107) and Hansen and Mowen (2000:553) complement this by defining non-value added activities as activities that do not add value to a product or service from the customers’ perspective or for the business and, therefore, can be eliminated without detriment to either. In many businesses, major source of non-value-added activity include waiting, inspection, rework and the unnecessary movement and storage of inventories.

The analysis and elimination of non-value-added activities can require considerable resources. Thus, a company should determine the real causes of non-added-value costs. To eliminate non-value-added costs, a company should start by building activities into processes, and then analyze those processes to find the causes of the non-value-added activities (Convey 1991:21). **Building activities into processes**: eliminating non-value-added activities requires a clear understanding of the way work is done in a company. One way of developing this
understanding is to identify, for each activity, the preceding activities that supply its inputs (i.e. its suppliers) and the subsequent activities that consume its outputs (i.e. its customer) (Sharman 1994:15). This information can be used to link activities together into processes. A business process as mentioned previously is a series of activities that are linked together to achieve a specific objective. In addition, processes (i.e. product development, logistics, order handling) cut across conventional responsibility centers such as functional departments (see figure 7.11). Therefore, building activities into processes requires understanding the horizontal flow of activities across the business and the interdependence between activities.

The process perspective helps to identify the root causes of non-value-added costs, establish relevant performance measures, and also using processes can simplify activity management as, in many cases, it may be possible to manage fewer aggregated processes rather than many detailed activities (MacArthur 2000:404). Activities in a process may share common cost drivers and performance measures. **Cost drivers analysis:** once the processes had been identified, a company can identify the root cause cost drivers of the non-value-added activities in its value chain (Blocher et al.1999: 105). The root causes of non-value-added activities are the basic factors that cause activities to be performed and their costs to be incurred. For example, non-value added costs are generally the penalty for poor quality or poor decision-making actions in activities "upstream" of the activity that incurs the non-value added cost. Thus, a company should use cost driver analysis to identify root cause cost drivers for the major non-value-added activities. In addition, the search for the root causes of non-value-added activities inevitably involves continually asking why. Improving the efficiency of processes and activities requires also **eliminating the root causes of major non-value-added activities** (Blocher et al. 1999:105 and Hansen and Mowen 2000:554). This may be a complex task and will involve managers from across the organization. For example, when a company identifies that the raw material quality is a primary cause of defects in production and, therefore, as a major cause of the non-value-added-activities. Thus, a company should work with the purchasing managers in order to improve the quality of the raw materials used in production. In addition, if non-value-activities are caused, for example, by poor scheduling, a company should work with the production scheduling staff to improve scheduling methods, the IT staff to improve the IT support for production scheduling, and the sales staff to improve the notice from customers. However, eliminating the root causes of non-value-added activities may involve tackling individual activities. Alternatively, it may require a fundamental
restructure of processes. Finally, the process adjustment (improving the efficiency of processes and activities) is a central dimension of the process improvement. In addition, it can take place during a fundamental redesign of processes. Based on the efficiency of processes and activities, a company can decide reducing the number of processes or moving the process (insourcing vs. outsourcing).

- **Changing business processes by streamlining**

Companies engage in a number of business processes, depending on the line of business they are in, and the number of services or range of products offered. In general, a business process involves everything, from the customer’s order to the dispatch of the products and the customer service (Tinnilä 1995:27). The process-oriented approach to organizational design envisions an organization as comprising a number of business processes, each process having its own objectives. In order to have an efficient business process one needs to bind a number of interdependent sub-processes, activities, and resources in a coherent manner (Hammer and Champy 1993:51). In other words, a company should seek to trim and streamline its business processes. The overall goals of process trimming and streamlining (improvement of an overall process by improving the individual activities and tasks of the process) are reducing costs, time, complexity and bureaucracy, increasing adaptability and meeting customer needs (Harrington 1991:132).

Changing business processes to be more efficient and effective is not a new idea; it is a commonplace occurrence. In fact, even if a company doesn’t set out to intentionally change a process, it will evolve as circumstances and situations demand (Harrington 1991). This is the key reason why processes are monitored and measured. What tends to happen when a process evolves is that redundancies are added in, original steps are made obsolete, cycle time increases as new requirements add steps; in other words, waste gets built in (Hansen and Mowen 2000). One of the simplest, yet most effective means of reducing such waste and excess is to trim and streamline the business processes. Thus, organizations can by trimming and streamlining the business processes, make business processes more efficient and effective by getting rid of waste and excess in existing processes and optimizing process performance with minimum effort (Harrington 1991:131). The same approach can also be used for insuring that new processes are as compact as is possible.
A company can pursue many procedures in order to make its business processes more efficient and effective. In literature, there are many procedures to optimize the process performance by trimming and streamlining business processes, for example, by bureaucracy elimination, duplication elimination, simplification, standardization, process cycle-time reduction and automation (for more tools see Harrington 1991: 132). These tools work most effectively when used in conjunction with process flow charts. Flow charts lay out a visual representation of the process as it occurs, and in so doing are a key first step in the trimming and streamlining of the business process.

**Bureaucracy elimination** is just that, the elimination of unnecessary administrative tasks, approvals, and paperwork (Harrington 1991:134). Bureaucracy is any administrative action requiring the need to follow complex procedures that impedes effective action. The key to finding bureaucracy is to ask "why?" a process step is needed, "who?" receives the output of the step, and "how?" those results are used by the recipient - and more importantly - "how?" the results aid in meeting customer needs. The rule of thumb here is strict and somewhat unforgiving (Harrington 1991:135). For example, any process that involves the absolute rigid adherence to rules, forms, and routines is bureaucracy. Thus, eliminating bureaucracy removes a major roadblock to performance and high morale, and it reduces costs.

**Duplication elimination** is the search for redundancy. Any duplication of effort increases a process' cycle time, adds cost rather than value and is, by definition, unnecessary (Harrington 1991:138). Put plainly, duplication is wasteful. In addition, the business process **simplification** aims at reducing complexity. It is not unusual for similar activities to be spread throughout a process. The principle of simplification is to determine where advantage can be found in blending and consolidation (Harrington 1991:144). Simplifying the business process and sub-process facilitates the work; processing times are reduced, costs are reduced and customers are better served. On the other hand, **standardization** means selecting a single way of doing an activity and having all employees comply with that single method (Harrington 1991:154). This does imply that a company builds a bureaucracy around the process, but it does mean that a process should be repeatable regardless of the seniority of the worker or the shift they work on.
**Process cycle-time reduction** is one of the most publicized methods for improving processes. In their study, Stalk and Hout (1990) suggested that the measure of cycle time would become the primary measure of process effectiveness. Improvement of cycle time is accomplished by determining ways to compress the overall cycle time, increasing the ratio of touch time (time spent adding value), and by reducing (or eliminating) delays and unnecessary movement between process steps. Finally, **automation and/or mechanization** of the business process (makes extensive use of information technology), business processes can be completely automated, so no human intervention is required, or semi-automated, when some human intervention is required to make decisions or handle exceptions. Thus, automating business processes reduces or eliminates dependency on human memory or procedure guides to keep processes operational (Harrington 1991:157 and Hammer and Champy 1993:84). The benefits that are gained from business processes automation or information technology are numerous, for example, business process automation can improve communication with the company’s customers, employees and strategic partners, reduce operating expenses, improve the speed and accuracy of organization’s processes, improve response time, etc (for more details about the role of IT in BPI see Hammer and Champy 1993:83). Techniques used for business process automation, include, for example, workflow, Enterprise Resource Planning (ERP), and software development.

The last step must be made when changing a process is qualifying (or re-qualifying) the process. This means simply that a company must insure that the changed process is doing what managers expected it to do, (i.e., its faster, smoother, less costly) without jeopardizing quality (Harrington 1991:161). In other words, after the business processes have been analyzed, trimmed and streamlined, a company should reap the benefits, for example, meeting customer needs, reducing cycle time of the process, reducing non-critical output of the process, reducing cost of the process, etc.

Strategic cost management techniques such as activity based costing and management will be useful instruments in identifying potential activities and processes that may lend themselves to streamlining, process improvement, and better utilization of resources. Activity based costing and management establishes the real cost of performing each step in a process, and helps to assess the cost of running a process, and the savings possible in reducing the time taken or removing particular steps.
• **Moving the business processes (outsourcing vs. insourcing)**

Many companies have traditionally performed a large range of processes in-house, regardless of internal capability, or criticality to the business (Tayles and Drury 2001:605). This was driven by the absence of dependable service providers to outsource to and partially because of insecurity. Most companies pursued high vertical integration to control the value chain (see Greaver 1999 and Gay and Essinger 2000). However, the concept of core competence by Hamel and Prahalad (1990) represents challenge to this mindset. The concept of core competence urges businesses to stay focus only on business processes that are core to the organization. Many companies realize that they can safely outsource their non-core processes to external service providers who are specialists in that processes (Lacity and Willcocks 2001:5 and Ross and Westerman 2004:6). This will free up time to focus on core processes to organizations, while qualified service providers will focus on and add value to non-core processes. Business processes outsourcing (BPO) - the management of one of more specific business processes (e.g., procurement, accounting, human resources, assets or property management) by a third party, together with the information technology (IT) that supports the business processes and is being heralded as a means to revitalize companies and make them more competitive (Halvey and Melby 1999:1).

Business process outsourcing (BPO) takes place when an organization transfers the ownership of a business process to a supplier (Copacino 2003:70). The key to this relationship is the transfer of control. This differentiates outsourcing from other business relationships in which the buyer retains control of the process or, determines how to do the work (Derose 1999:3). Thus, outsourcing differs from traditional contracting in that when a company contracts out for a product or service, the buyer still controls the process. In outsourcing, the buyer transfers control of the process to the supplier. The buyer tells the supplier what results it wants the supplier to achieve, but the supplier decides how to accomplish those results. In outsourcing, the supplier has expertise in a certain process, for example, software development, accounting and finance, human resources and payroll as well as economies of scale (Halvey and Melby 1999:3). If the buyer were to dictate to the supplier how to do the job (as in contracting), the buyer would be destroying an important aspect that makes outsourcing work - the value that is created by using the supplier's expertise and economies of scale. Telling the supplier how to do the job also eliminates accountability on the part of the supplier, this accountability is important in an outsourcing relationship.
Outsourcing differs from insourcing in that the supplier replaces the need for the buyer, for example, to maintain an internal staff of software developers by providing a group of skilled and trained individuals to perform software development work on the buyer's site under the day-to-day supervision of the buyer's program managers (see King 1994 and Monczka and Morgan 2000). On the one hand, the buyer benefits from this relationship by maintaining a smaller workforce, and then quickly adding or subtracting software developers based on business needs. In the other hand, the supplier benefits from this relationship by gaining expertise in different business processes, and economies of scale to spread costs over larger contracts (Monczka and Morgan 2000).

There are a number of factors to consider before making the decision to outsource a part or all of a process (Halvey and Melby 1999:8). The managers must weigh the implications of each of the factors to determine the appropriate course of action that will result in the greatest benefit to the firm. Such factors as costs - both explicit and implicit costs, risks, expertise, and access to reliable information should be considered before making the decision to outsource an entire process or a part of a process (Tayles and Drury 2001:606). In addition, Laplante et al. (2003:5) argued that the decision to outsource or not is based on whether the process is within the core processes and whether there is a benefit to outsourcing (efficiency) (see figure 7.19).

The figure 7.19 shows that non-core process may be considered for outsourcing, however, just because the process is outside of the core does not necessarily mean that the process should be outsourced. For example, in the case where the benefit is low, there is no need to outsource. In the case where the benefit is high and the process is not within the core processes, there is a strong incentive to outsource (Laplante et al. 2003:5). However, when either the process is outside of core processes, but the potential outsourcing benefit is low, or when the potential outsourcing is high but the process is within the core processes, there is some judgment to be made. Furthermore, in some cases, non-core process may be not considered for outsourcing if there are some perceived benefits in performing that process in-house such as gaining domain expertise.
The literature has cited a number of different potential and actual benefits from business process outsourcing (e.g. Lacity and Willcocks 1998, Quinn 1999, Halvey and Melby 1999, Lacity and Willcocks 2001, Carmel and Agarwal 2002). Some of the more visible benefits of business process outsourcing can include reduced costs and improved service delivery (Ross and Westerman 2004:6). Beyond the cost savings and efficiencies, a central benefit of outsourcing is that it frees up corporate resources, including scarce personnel resources, to focus on the enterprise’s core business processes or competency (Copacino 2003:70 and Ross and Westerman 2004:7). As is well known, if business managers have to worry less about non-core processes, they can spend more time concentrating on core processes - that is, on processes that deliver real value to the customers.

Strategic cost management techniques play an important role in outsourcing decisions, where reliable and complete cost data on company activities and processes are needed to assess the performance of company activities and processes targeted for outsourcing. This information is crucial to making informed outsourcing decisions. Thus, a company can use strategic cost management techniques, for example, activity based costing and management to obtain more precise and complete data.
Besides products and processes, resources represent the third object of strategic cost management. Thus, the next section will discuss resources as a further cost object of strategic cost management.

7.3. Resources as a Strategic Cost Management-Object

7.3.1. The Resources of an Organization - the Concept and Dimensions

The outcome or output of the business processes can often be described more explicitly as the products or services, which are created by the processes (Reijers 2002:3). The product of a business process is delivered by the commitment of resources, also known as “means of production” (Kajüter 2004:39). A resource is a generic term for all means that are required to produce a product within the settings of a business process such as buildings, machines, materials, human resources, energy, information, capital, etc. (Hansen and Mowen 2000:71).

Because resources are not free and most of them are scarce, a company must use its resources to meet, as effectively and efficiently as possible, the unique needs of its customers.

Resources can be identified and classified according to different criteria. In literature, it is common for companies to identify and classify resources by many dimensions. For example, Hilton et al. (2001:108) introduced four dimensions of resources: (1) the type of resource acquired, (2) how resources are used in the value chain of the company, (3) how traceable a resource is to a particular activity, and (4) the level or type of cost driver to measure resource use more accurately. Thus, identification and classification of the resources of an organization for additional analysis may be carried out in a number of different ways by type, use, traceability and the level of cost driver. Accountants and managers have used these ways or resources dimensions to identify and classify the resources of an organization for many purposes because these ways or dimensions provide information about the resources that is useful for decisions making. This information is vital to know how the organization has converted its resources into products and services (Hilton et al. 2001:108).

The first dimension of resources is the type of resource acquired. Organizations are formed to manage productive business processes effectively and to reduce costs and generate customer value and profit (see Davenport 1993 and Hammer and Champy 1993). The business processes of an organization such as production processes, support processes and management processes need many types of resources. These resources include physical
resources such as money, materials, land, buildings, plant, equipment and machinery (Russo and Fouts 1997:537). In addition to physical resources, a company needs human resources or human capital resources which are generally understood to consist of the individual’s capabilities, knowledge, skills and experience of the company’s employees and managers (Dess and Picken 1999b:8).

Hilton et al. (2001:108) classify the resources of an organization by the type dimension to material, conversion, and operating resources (see figure 7.20). Material resources are those physical things an organization will need to produce its products or to maintain or enhance the organization’s productive and support facilities. In industrial companies, materials include raw materials and purchased parts, components, and assemblies, such as engines, transmissions, door panels in automobile industry. Materials also include the maintenance and office supplies that are used to support production processes and the general organization. In an organization, providing products and services usually requires labor, equipment, and productive facilities; these resources together are called conversion resources. They have the capability to convert other resources into products and services, conversion resources include, for example, manufacturing technical and supervisory labor and manufacturing equipments.

In addition, in an organization other types of physical and human resources are necessary to create and sustain the organization itself and to perform business processes efficiently and effectively with parties external to the organization. These type of resources are called operating resources. They include elements such as the marketing, sales, and the customer service elements, without these elements of the value chain, a company may not be able to function efficiently or effectively.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure7.20.png}
\caption{Types of resources in an organization (based on information from Hilton et al. 2001)}
\end{figure}
A second useful dimension of resources is **how resources are used in the value chain**. In some cases, industrial companies may differentiate between resources according to their using in the business processes. In this type of companies, most of their resources are used in manufacturing processes, while other resources are used to support manufacturing processes. In today’s competitive environment, most companies seek to make the best use of their resources and improve manufacturing efficiency (Schroeder et al. 2002:105). Thus, managers and accountants can distinguish between **manufacturing resources** that are used to produce products in manufacturing processes and **non-manufacturing resources** that are used to support manufacturing processes.

It is important to recognize that support and services resources such as supply, administration, marketing, distribution, and services resources become an important portion of the cost structure of the company (Hansen and Mowen 2000:41). Thus, support and services resources consider important other elements of the value chain and should receive much attention from managers and accountants (see figure 7.21).

![Figure 7.21 Value chain-manufacturing and non-manufacturing resources](image)

(Figure 7.21 Value chain-manufacturing and non-manufacturing resources (Hilton et al. 2001:110)

The figure 7.21 shows that physical and human resources are supplied to and used in all elements of the value chain of the company in order to deliver the most customer value at lowest cost. In addition, the figure 7.21 shows that the production processes use materials and conversion resources in order to produce the products, while other value chain processes use
non production resources to provides support services, research and development, design, supply, marketing, distribution, and customer service.

A third important dimension of resources identification and classification is the ability to trace the cost of a resource to activity or set of activities easily - **traceability of resources** (see figure 7.22). When a company performs a certain activity, what resources must it obtain or use, and what will these resources cost? Acquiring and using decisions that are related to all resources are driven by activities performance decisions, thus the ability to trace resource costs to specific activities easily and accurately is vital to analyze and plan the costs effects to those decisions and activities (Hilton et al. 2001:110). Thus, the company’s resources can be identified and classified by ease of tracing into direct resources and indirect resources. Resources that are easy to trace to a specific activity of set of activities are called **direct resources**. Sometimes, it is easy to see that performing of a specific activity or set of activities causes the acquisition and using of specific resources. For example, if a company decided to produce a complex product such as a laser instrument, the required activities to produce this product will cause the acquisition and using of the materials necessary to produce this product as well as producing more of this product obviously causes the acquisition and using more materials (Hilton et al. 2001:110). However, it is not easy to trace all resources to all activities. **Indirect resources**. For example, when a company performs and manages its activities and manufactures its products in the same large building (resource), using the same computer network (resource), how much of the resources (building and computer network) will obtain for administration? How much for manufacturing each product? It may not be easy to trace these resources directly to activities or administration or manufacturing. These resources will be considered indirect resources for both administration and manufacturing (Hilton et al. 2001:111).

**Figure 7.22 Traceability of resources (based on information from Hilton et al. 2001)**
In this dimension (traceability of resources), a company may acquire some resources to provide the capacity to produce a certain level of products or services. In addition, resources are fungible (changeable) with respect to activities and therefore capacity resides on the resources, not on activities (Hansen and Mowen 2000:71). The capacity the company makes available for use is the **resources supplied**. On the other hand, the capacity used for productive purposes is the **resources used**. The relationship between resources supplied and resources used is expressed by the following equation (Cooper and Kaplan 1998:118):

\[
\text{Resources available} = \text{Resources used} + \text{Unused capacity}
\]

Confusion the distinction between the supply and use of a resource is potentially misleading because of the different impacts of activities performing and products producing on acquiring and using the resources (see Cooper and Kaplan 1998:111).

A fourth important dimension of resources is what the **level or type of cost driver** to measure resource use more accurately. Identifying and analyzing the resources needed to produce and support the products may be made easier by recognizing that acquiring and using resources result from different levels or types of cost drivers, which are employed to measure the using of resources accurately. These levels which help managers and accountants to identify, measure, and analyze the resources needed to perform activities and produce products, can be classified into the following levels (Hilton et al. 2001:152):

**Unit-level resources** are acquired and used for specific individual units of product or services. For example, the raw materials used to make a product can be traced directly to that product.

**Batch-level resources** are acquired and used to make a group (or batch) of similar products. For instance the use of outsourced human resources to complete a batch of products to meet a deadline is a cost directly traceable to that batch. The costs are indirect to each individual unit of product but are directly related to the batch.

**Product-level resources** are acquired and used to make a specific product. For instance, equipment useful only for the production of a certain product fits this category. These resources may be indirectly related to batches or units. In addition, resources costs of product design belong to this group of resources.

**Customer-level resources** are acquired to meet the needs of specific customers. For example, if a customer orders custom designed product and a designer is hired to design it, the cost can be directly traced to one customer. The costs of these resources may be indirectly related to product, batch, or unit-level decisions.

**Facility-level resources** are acquired and used to produce any
products and services the organization may decide to offer for sale. Examples of this type of resources are buildings, land, employees, and production equipment. The acquisition decisions of these resources may be directly related to decisions about scale, scope, location, and technology.

In summary, every resource of the company’s resources belongs to the qualitative dimensions of type of resource, use in the value chain, traceability to activities and to supply and use resources, and the level or type of cost driver to measure and manage resource use more accurately. These qualitative dimensions of the resources are summarized in the figure 7.23.

![Figure 7.23 Dimensions of the resources (based on information from Hilton et al. 2001)](image)

The cost position of the company is closely related to the company’s ability to efficiently use resources to obtain its objectives (Maher 1997:489). The doing of things correctly and accurately, using lower resources and, therefore lower costs, means that the company is increasing efficiency. Thus, cost management may be called also resources management, because each form of the cost driver has either directly or indirectly influence on resources. For this reason, the next section will discuss the role of strategic cost management in the resources management through the resources dimensions.
7.3.2. Strategic Cost Management and the Resources Dimensions

7.3.2.1. Strategic Cost Management and the Type of Resource Acquired

Resources management is one of the most interesting and relevant fields of our time (see e.g., Barney 1991, Hooley et al. 2001, and Schroeder et al. 2002). It involves the study of the ways in which organization’s resources can be managed effectively and efficiently. It examines how the limited and critical resources available to the business processes can be utilized in the most productive way to profitably supply products and services to the marketplace and achieve competitive advantage.

In order to start a business, a company needs many types of resources required. For example, the type of resource required includes physical resources (e.g., capital, materials, buildings, equipments, etc.) as well as human resources (e.g., the talent, effort, and knowledge of employees). For the typical manufacturing companies, material resources and human resources represent an important portion of the cost structure (Dobler and Burt 2003:24). In other words, in some manufacturing companies, purchases of materials and services, and wages, salaries, and employee benefits are responsible for spending an important part of company receives as income from sales. Dobler and Burt (2003:24f.) argued that many companies may spend more money for purchases of materials and services, and wages, salaries, and employee benefits than for all other expense items combined, indulging expenses for depreciation, taxes and interest, dividends, etc. The figure 7.24 shows costs of a manufacturing company such as materials and other costs.

Figure 7.24 Costs of a manufacturing company (Dobler and Burt 2003:26)
A company acquires and uses many resources such as buildings, machines, materials, human resources, energy, information, capital, etc. Due to the multiplicity of the acquired resources, the company must focus on the substantial resources. The figure 7.24 shows that in this cost structure analysis, purchases of materials and services, and human resources consider the most important resources in the manufacturing companies. For this reason, the next subsections will discuss some aspects of purchasing and human resources and strategic cost management.

7.3.2.1.1. Purchasing and Strategic Cost Management

Most companies have recognized that the purchasing processes should be an integral part of their operation and contribute to their efficiency (Dubois 2003:365). All business processes must mesh into a unified whole if management is to fulfill its basic responsibility of improving customer value and company position. Each business process must shoulder its portion of this responsibility. For most manufacturing companies, the costs of purchased goods and services have come to account for the majority of total costs, thus, managing the total costs of purchased materials and services has a very important role for improving cost position and customer value (Fernandez 1995:8, Ellram and Siferd 1998:55 and Dubois 2003:367).

While purchasing process traditionally has been considered as an operational process of the company, during the present time, it is introduced as a strategic process that may enable a company to face the threat of the temporary business environment and achieve its objectives (Trent and Monczka 1998:2 and Gadde and Håkansson 2001:3). Thus, the belief that purchasing was a mainly operational process put heavy pressure on the cost of goods and services that were purchased. Nowadays, the situation has become much more complex, supplier relationships, quality and innovativeness are all becoming much more important, while cost aspects remained one of the key elements of purchasing (see Dubois 2003). Regardless of the fact that cost related issues have been important in the purchasing decisions, the literature on supply chain management and purchasing does not deal explicitly with cost management (Ellram and Siferd 1998:60). The literature on many such topics discusses how the interfaces between buyers and suppliers can be made more efficient. However, recently many questions have been raised in literature about the role of integration of strategic cost...
management techniques in supply chains and supply chain management (see e.g. Seuring 2002, Kajüter 2002, Rebitzer 2002 and Ellram 2002)

In fact, cost has always been an important issue in purchasing process as well as quality and timing issues, whereby approaches such as cost management are necessary and have a great influence on the total costs. Thus, it is necessary to recognize the activities that are related to the purchasing process, how costs are perceived throughout the purchasing process, and the factors that cause these costs. Purchasing-related costs are found in every stage of the purchasing process (Van Weele 2002:95). The purchasing process has discussed in the literature by many models, for example, Van Weele (2002:23) introduced a model that is frequently used in the purchasing literature (see figure 7.25). The purchasing process model by Van Weele (2002) defined purchasing as a six-staged process. To every stage or step in this model, specific costs can be defined that should be considered in the decision to source and supply local or global.

The figure 7.25 provides an overview of all components of the purchasing process. As shown in the figure 7.25, the purchasing process consists of a tactical and an operational purchasing phase. Tactical or initial purchasing involves specifying the needs, selecting and contracting suppliers, while operational purchasing involves ordering, monitoring and after care. On the other hand, strategic purchasing phase involves decisions about the purchasing process, for example, decisions about defining a general purchasing policy, the methods and procedures and information management, etc. (see Van Weele 2002:98). In addition, performance
measures are needed in the purchasing process in order to verify that the purchasing process has been carried out as planned.

Traditionally, the price of purchased materials and products is considered the most important element of the total costs of the materials and products purchased. However, when materials or products are purchased, additional costs should be taken into consideration. Based upon the purchasing process model by Van Weele (2002), there are many different elements of the costs that are related to each stage of the purchasing process (Peeters and Quintens 2003:6). These costs are interconnected and have different impacts on the total cost of purchasing (see table 7.5).

<table>
<thead>
<tr>
<th>Stage</th>
<th>Associated costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determining specification</td>
<td>R&amp;D costs, Internal coordination costs</td>
</tr>
<tr>
<td>Selecting supplier</td>
<td>Travel costs, Information gathering costs</td>
</tr>
<tr>
<td>Contracting</td>
<td>Legal costs, Negotiation costs, Communication costs</td>
</tr>
<tr>
<td>Ordering</td>
<td>-</td>
</tr>
<tr>
<td>Expediting and evaluation</td>
<td>Transportation costs, Communication costs, Import/Export duties, Insurance costs, Quality control costs</td>
</tr>
<tr>
<td>Follow-up and evaluation</td>
<td>Quality control costs, Inventory costs, External coordination costs</td>
</tr>
</tbody>
</table>

Table 7.5 Stages in purchasing and their associated costs (Peeters and Quintens 2003:6)

There are many types of costs that are associated with purchasing stages as shown in the table 7.5. However, it should be recognized that some costs do not always occur in some cases, and if so, the impact of these costs on the total costs is often not significant (Peeters and Quintens 2003:6). Examples of these costs are risk of obsolescence or damage during transport. In addition, travel costs will take place when selecting a new supplier will be necessary for an important product. While a less important product has to be bought from well-known suppliers in the supplier portfolio offer that type of product, thus, it is likely that no plant visit will be organized before selecting the supplier.
The different costs associated with purchasing stages are related to each other. For example, determining specifications of a certain purchase (e.g. quality, logistics and maintenance) may imply costs later in the purchasing process in the contracting and expediting stages (Van Weele 2002). Purchasing related costs include internal and external coordination costs (Peeters and Quintens 2003:7). Internal coordination costs are the costs associated with bringing together different departments such as production and marketing that need to be contacted to give their opinion. On the other hand, external coordination costs are the costs that make the buyer-supplier relationships work well. While in all stages of the purchasing process, the administration and organizational costs are present. These costs ensure the fluent transition from one stage to another. The costs mentioned in table 7.5 assume that the materials and products are actually purchased from an outside firm. However, to find the optimal solution, a make-or-buy decision has to be undertaken.

In fact, most of the costs for a certain purchase are determined by the earliest stages in the purchasing process (Heijboer 2003:26). The figure 7.26 shows that the majority of purchasing related costs is determined during the tactical or initial purchasing. For example, if a company decided to buy a number of computers, determining the specifications (e.g. the type of monitor, the processor, the amount of memory, the size of the hard disk, etc) will determine the price to a very large extent. In addition, the specifications of the monitor (e.g. the flat screen monitor) required will make a huge difference on the total costs.

After the specifications of materials or product (e.g. computers) have been determined, certainly, the stages of selecting a good supplier and making a good contract have a significant influence on the total costs (Heijboer 2003:26). In the operational phase of purchasing process, a company can avoid additional costs by having a good ordering policy (bundling orders) and streamlining the logistics, but compared to the total costs these operational cost savings are very small. Thus, managers should recognize that the largest influence on the total costs can be made in tactical purchasing. Furthermore, strategic purchasing decisions create the environment in which the purchasing process takes place. Thus, strategic purchasing phase will impact on the whole purchasing process, for example, wrong decisions, i.e. implementing faulty methods or procedures, will affect the effectiveness of both tactical and operational purchasing.
When so much of company’s costs depend on the quality and costs determined by an outside source, it is important to be able to properly track where these costs come from in order to minimize costs and maximize quality (see Carr and Ittner 1992 and Ellram and Siferd 1998). One of the problems with traditional cost accounting systems is that only purchase price from a supplier is traced to the cost of the purchase (Ellram and Siferd 1998:57). In many cases, there are many other costs than the invoice costs (see table 7.5). Accountants and operating managers need to decide: (1) who should pay for these costs and (2) how these costs should be built into the cost system. These costs are called total cost of ownership. For example, Carr and Ittner (1992), Ellram (1994:171) and Ellram and Siferd (1998:56) argued that the cost of ownership refers to the total cost of purchased materials and products and purchased materials and products related costs, e.g., the purchase price, costs of purchasing, costs of holding, costs of poor quality and the costs of delivery failure etc. Recently, some strategic cost management systems (e.g. target costing) have addressed the issue of cost of ownership (Zsidisin et al. 2003:131). These progressive systems are used in companies with Just-In-Time inventory techniques and total quality management. Such systems focus not only on the price of purchased materials and products, but also on the cost of purchasing, holding, poor quality, delivery failure, etc. (see Ansari et al. 1997b). Examples of these costs are freight, storage, insurance, scrap, warranties, rework, and lost sales due to late delivery. In some cases, these costs are so significant that they are greater than the purchase price. For example, Texas
Instruments did a study and found that in once case, the cost of ownership was over 180 times the invoiced purchase price of an item (Carr and Ittner 1992).

During the last decades, the total cost of ownership approach has become an important approach and received considerable attention (see e.g. Cavinato 1991, Carr and Ittner 1992, Ellarm and Siferd 1993, Ellarm and Siferd 1998, Degraeve et al. 2000, Ferrin and Plank 2002 and Roodhooft et al. 2003). The total cost of ownership concept attempts to quantify all of the costs related to purchase of a given quantity of products or services from given suppliers (Ellarm and Siferd 1998:56 and Roodhooft et al. 2003:28). Ferrin and Plank (2002) argued that the concept of inter-firm total cost (Cavinato 1991; 1992), life cycle costing in industrial purchasing (Jackson and Ostrom 1980), product life cycle costs (Shields and Young 1991) and total cost of ownership (Ellram and Siferd 1993, 1998, Ellram 1994, 1995a, 1995b) are all related. These concepts all suggest that managers adopt a long-term perspective, not a short-term, initial-price perspective, for the accurate valuation of buying situations. Ferrin and Plank (2002) defined three ideas support all of these procurement valuation constructs. First, cost must be examined from a long-term perspective and should include elements other than initial purchase price. Second, purchasing managers should consider the impact of other business processes on the valuation of a specific purchase. Finally, to value a purchase situation accurately, purchasing managers should understand and measure the impact of all the activities associated with the purchase.

According to (Ellram and Siferd 1993:181 and Roodhooft et al. 2003:29), the philosophy of total cost of ownership can be determined on the grounds of activity-based costing (see figure 7.27). This philosophy using activity based costing information can be summarized as follow: The first step is to determine all the activities related to the purchasing process. These are specific to every enterprise and should be expressed through activity analysis. This is a traditional step in every activity-based costing system. The second step is to define factors that raise the cost of a given activity (cost driver) and assign costs to the different activities. Thirdly, one must identify which activities are caused by each individual supplier. Finally, the managers should spearhead an effort to determine how known cost information has been computed and what information is available for the total cost of ownership approach.
A clear understanding of the total cost of ownership is beneficial in many purchasing situations (see, for example, Ellram and Siferd 1993:168ff. and Roodhooft et al. 2003:35). The information gained through the total cost of ownership approach provides decision makers with an objective and easily understood argument for supporting and motivating a variety of purchasing decisions. The total cost of ownership approach can be used to compare and evaluate different suppliers or supply contracts. In addition, the information derived from the total cost of ownership can provide the ability to quantify and communicate areas of non-performance to concentrate supplier performance improvement efforts. Furthermore, it is often stated that total cost of ownership information can be used when negotiation with suppliers to identify areas requiring contractual performance improvement. Suppliers can be made aware of the extra costs they generate and the ways to improve their competitive position by reducing these costs at the buyer side (Roodhooft et al. 2003:35). In addition, the cost and cost driver information resulting from the analysis can be used to optimize and better coordinate the performance of activities across the supply chain.

According to Ellram and Siferd (1998:58), the total cost of ownership analysis can impact on the costs of the business processes across the value chain. In the total cost of ownership analysis, the cost considerations may span the boundaries of the company to include costs both internal and external to the company. Ellram and Siferd (1998) argued that the total cost of ownership analysis can be useful to determine the effects of the supplier’s performance,
and the performance of purchased materials and goods, on the company’s total costs. Therefore, the total cost of ownership analysis is truly strategic cost management and supportive of strategic cost management, because the total cost of ownership analysis considers the broad effect of the purchasing process decisions on the company’s costs, as well as the implications of these decisions on the other cost factors or variables.

Traditional cost management focuses on a narrow view (internal), but strategic cost management focuses on a broader view (internal and external) and of component costs of purchasing (Cooper and Slagmulder 1998d:18). In other words, instead of just looking at the purchase price, strategic cost management includes the costs associated with low quality, reliability, and delivery performance. By this way, supplier selection is based on the supplier’s ability to help the company produce high-quality products to customer demand. This leads to a strengthening of the company’s strategic position (Slagmulder 2002:78). In addition, this broader view of component costs of purchasing can be used as basis for evaluating and rewarding purchasing managers.

Furthermore, strategic cost management focuses on assigning procurement costs or supplier costs to products in a causal manner using activity-based costing principles (see figure 7.27). By this way, specific materials or products costs are assigned to specific products, not the average for all products. For example, products (e.g. laser instruments) containing large numbers of unique components that rely upon specialty suppliers will be seen as more expensive than products that contain only standard components that can be bought in the open market (Slagmulder 2002:78). In this particular case, if unique purchased materials or products add value to the end product and this value is reflected in the selling price of the end product, the acquiring and using of such materials and products will be justified. Finally, the application of strategic cost management beyond the boundaries of the company enables the whole supply chain to become efficient, and is significant step in helping the company to create and maintain its competitive advantage.

7.3.2.1.2. Human Resources and Strategic Cost Management

It is commonly accepted that the human resources of an organization are one of its main resources and one of the factors in determining its progress. The knowledges, skills, abilities, attitudes and behavior inherent in the individuals or the members of the organization, together
with other factors, play an important part in the organization’s success in reaching its objectives (see e.g. Schuler and Jackson 1987 and Wright et al. 2001). According to the resource-based view, in order for a firm resource to qualify as a source of sustained competitive advantage, it must add value to the firm, it must be rare, it must be inimitable and there must be no adequate substitutes for the resource (see Barney 1991:105f.). Therefore, human resources can provide the firm with a source of competitive advantage with respect to its rivals. The ability of human resources to provide a firm with sustained competitive advantage is possible because human resources can fulfill the criteria that are stated by Barney (1991) (see Wright et al. 1994:305ff.). The first of these is the value added to the company’s business processes, the contribution made by each individual having its effect on the results obtained by the organization as a whole. Since the organizations have different jobs which require different skills. Also, individuals are not all the same; they differ in both the types and level of their skills and their characteristics are in limited supply in the market. Thus, there is variance in individuals’ contribution value to the organization (see Steffy and Maurer 1988:272). In addition, human resources are difficult to imitate, since it is not easy to identify the exact source of the competitive advantage and reproduce the basic conditions necessary for it to occur. Finally, Wright et al. (1994) argued that human resources are not easily replaced; it might be possible to substitute other resources in the short term, but it is highly unlikely that such substitution could result in sustained competitive advantage. Thus, the only resources that can substitute human resources are those resources that add value to the company, are rare, cannot be imitated and are non-substitutable.

Acquiring and managing human resources that can provide the firm with a source of competitive advantage may be not easy, it depends rather on the action the organization is prepared to undertake towards that objective. It is through human resources management practices that organizations try to obtain the human resources that will give them the advantage when it comes to holding their own against other companies (Cooke 1992:39). There is broad agreement that a strategic approach to human resources management includes designing and implementing a set of internally consistent policies and practices that ensure effective and efficient use of individual and group knowledge, skills and abilities to accomplish organization goals (Tokesky and Kornides 1994:115 and Huselid et al.1997:171). Thus, some studies argued that the human resources function is increasingly viewed as a potential contributor to creating competitive advantage for an organization as well as human
resources can and should play an integral role in the strategic management of an organization (see, for example, Lundy and Cowling 1996 and Lawler III and Mohrman 2003).

According to Devanna et al. (1984:41), the human resources management cycle consists of five key activities - selection, performance, appraisal, rewards, and development - that typically follows a cycle, the so-called “human resource cycle” (see figure 7.28). Traditionally, human resource activities have been introduced and created within an organization with very little focus on cost. While costs of purchased materials and products are less important in the service companies, human resources costs are a major cost item in both manufacturing and service companies.

In contrast to costs of purchased materials and products, which are variable, human resources costs are mainly fixed, and thus do not automatically decline with decreasing volume. However, downsizing became an international term of art in the 1980s. Many companies around the world have realized that workforce reduction and restructuring were implemented to cut costs and improve productivity (Stiles 999:161). In some cases, the downsizing was dramatic, however, organizations frequently learned that downsizing has some unfavourable consequences such as: downsizing did not always cut costs, had a negative effect on productivity, had a negative effect on mission accomplishment, resulted in long-term morale problems for remaining employees, resulted in loss of organizational intellectual capacity, and increased human resources costs such as training, overtime, contingent workers, average salary, and costs associated with reduction-in-force (Cavanaugh et al. 2000:2). These
experiences highlight the importance of human resources and human resource costs management for an organization in order to achieve its objectives. In addition, these experiences demonstrate that downsizing, when done in isolation form other management initiatives, does not help an organization meet its objectives for improved customer value, improved productivity, and more cost-effective mission accomplishment.

In reality, human resources like any other resource, bring with them several costs (Barcons-Vilardell et al. 1999:387). Thus, managing costs that are associated with human resources can give an organization the ability to analyze the cost/value of human resources activities, just like other parts of the organization. Significant costs can be associated with human resources activities, the human resource costs are the sacrifice actually incurred to acquire, employ, learn, and develop employees, to human resources management (Flamholtz 1999:56 and Barcons-Vilardell et al. 1999:390). Thus, human resource costs may be divided into two general categories as shown in the figure 7.29.

![Figure 7.29 The human resource costs](image)

Figure 7.29 The human resource costs
(based on information from Flamholtz 1999 and Barcons-Vilardell et al. 1999)

In the figure 7.29 the human resource costs are divided into:

- **Infrastructure costs**: the costs of operating human resource function, including technology, systems costs such as recruitment, on-boarding, development and training support activities, payroll, and the facilities to house these activities.

- **Employment costs**: this is the cost of key services to support people in their jobs including total direct compensation, wages, salaries and benefits, and related expenses for recognition programs.
According to the activity based costing and management, costs are managed by managing activities (Cooper and Kaplan 1998), thus, human resource costs management (e.g., recruiting, selection, hiring, placement, training, development, etc.) would represent a significant beginning of an effort to manage the costs associated with the activities to provide an organization with productive employees (see figure 7.30). An organization needs to manage costs related with human resources activities in order to demonstrate their contribution to its objective (Sugano 2002:4). Thus, the human resource costs management is aimed at cost reduction and the maximization of human resource added value for the organization through analysis of human resources activities, the value of the humane resources, and cost drivers and humane resources related costs (see figure 7.30).

![Figure 7.30 The cost management approach to human resource costs](image)

Companies need an accurate cost picture about their human resources more than ever, because human resources continue to shift its focus from managerial to strategic. Thus, human resources are under constant pressure in order to reduce cost and maximize value (Sugano 2002:4). Companies that don’t know their total human resource-related costs risk making decisions that decrease rather than create value (see Johanson 1999). Fortunately, new instruments such as activity based costing and management are used in many companies to assess human resource costs and provide companies with information (e.g., human resource activities, human resource costs, cost drivers, the value of human resource activities, etc.) to make decisions about human resources.
An organization should use all methods and procedures to attract and retain the right human resources in the right roles to manage human resource costs and maximize the added value of human resources for the organization (Sugano 2002:4). Thus, in order to manage human resource cost in an organization, the most fundamental question to be addressed is “What human resource adds value to the organization?” in other words, what are human resources required to accomplish or contribute to the success of an organization?” after this question has been adequately answered, it then allows organizations to design a strategy to attract, retain and engage the most critical human resources needed for organizational success even during economic downturns (Dahl Jr. 1988:69 and Heneman et al 2002:35). These human resource are critical human resources that perform work that adds value are developed and retained at all costs, while human resources that do not add value may be subject to alternative work force arrangements and cost management programs (see figure 7.31).

![Figure 7.31 Human resources valuation framework](Slightly modified from Heneman et al. 2002:34)

The figure 7.31 shows the human resources valuation framework that represents a tool for segmenting people and roles inside the organization. The quadrant number one indicates to the most highly valued works that are occupied by the most critical people. In other words, it shows the works that has strategic impact on an organization success and people who have the greatest potential. In such case, these works or roles should not be sourced and critical or key human resource should be retained in those roles and appropriately engaged at all costs (Heneman et al. 2002:34). When highly valued works require skills that are not available
within the organization, it will likely be necessary to recruit such skills externally. The second quadrant points to the most highly valued works or roles that are occupied by people who are not viewed as higher performing or they are not adding value. In this case, human resources should be subject to alternative work force arrangements and cost management programs (Heneman et al. 2002:34). For example, an organization may reassign such human resources or eliminate human resources costs if development and motivation programs fail to make a difference.

On the other hand, Heneman et al. (2002) argued that the last two quadrants (3 and 4) indicate to lower strategic impact works. The third quadrant points to the lower valued works or roles that are occupied by people who are not viewed as higher performing or they are not adding value. In this case, such work activities and human resource may be subject to alternative arrangements and cost management programs. From a retention point of view, critical human resources who have high potential and occupy lower impact works or roles (as in quadrant number four) represent turnover risks. In this case, the action required here is to reassign these human resources to higher impact works or roles.

Finally, the figure 7.31 shows that human resources that add value are siezed, developed, motivated, and retained at all costs, while human resources that do not add value may be subject to cost management programs. Thus, the human resources valuation framework is geared to attract and retain the right human resources in the right work in a way that manages human resource costs and maximizes value.

Thus, strategic human resource costs management implies assessing value of the human resources through their relations to the larger business strategy (Sugano 2002:4). Human resource value may be defined by many variables such as strategic impact, competencies, and human resource market value (Heneman et al. 2002:36 and Treen 2000:64). Strategic impact refers to the potential the human resource has for impact the key strategic needs of the organization (e.g., revenue creation, brand recognition, customer service, quality, cost) (see, for example, Treen 2000 and Lawler III and Mohrman 2003). Competencies refer to the knowledge, skills, abilities and other employee attributes related to effective employee performance (see Hamel and Prahalad 1990). Human resource market is defined as the value that other organizations place on the work. Although market value may seem somewhat
unusual as internal work value assessment variable, it is not as improbable as it may seem (Heneman et al. 2002:36). Therefore, human resources can be valued relative to such these variables. In order to do so, a system is needed that scores work on the basis of strategic impact, competencies, and human resource market value. Finally, a strategic perspective of human resource costs provides a methodology to identify critical human resources and link them with strategic goals and objectives in order to improve business performance. Thus, effective management of human resource costs is a critical goal for organizational success and for the success of the human resource function. Effectiveness will depend on attract and retain the right human resources in the right work in a way that reduce human resource costs and maximizes value.

7.3.2.2. How Resources Are Used in the Value Chain and Strategic Cost Management

In many organizations, especially in the manufacturing sector, the resources which are used in the processes of the value chain can be categorized into manufacturing resources and non-manufacturing resources. Manufacturing resources refer to the resources that immediately enter manufacturing processes, such as the parts that are assembled into a car or computer. On the other hand, non-manufacturing resources include the resources that are used in non-manufacturing processes such as research and development, design, purchasing, sales and marketing, customer services, etc. Non-manufacturing resources that are used across the value chain processes had long received far less attention in the manufacturing sector (Hilton et al. 2001 and Hansen and Mowen 2000). Compared to manufacturing resources, non-manufacturing resources cover a wider range of resources; they typically represent a significant portion of the cost structures of some organizations.

The relevant expected costs include all costs that can be identified across the value chain. The processes and activities that the organization employs across the value chain determine how it uses its resources. Cooper and Kaplan (1998:86) argued that the objectives of classifying resources and activities are to recognize how the organization performs its activities and the ability to trace and manage the use of resources through activities performed and to manage the costs of products and services. Managing costs (resources) across the value means managing the costs before the product is manufactured, while the product is manufactured, and after the product is manufactured (Hwang 1999:96).
Traditional cost management methods tend to focus on manufacturing activities costs only, and for firms that have high upstream costs (i.e. design and development) or downstream costs (i.e. distribution and service costs), this approach would ignore a significant portion of the total costs (Kato 1993:34). On the other hand, strategic cost management techniques such as life cycle costing and target costing are most appropriate for these firms. Firms with high upstream and downstream costs need manage the entire life cycle costs, including the upstream and downstream costs as well as manufacturing costs (see figure 7.32).

Figure 7.32 The cost management approach to the value chain resources

Strategic cost management focuses on the upstream activities; the activities preceding manufacturing (Ansari et al.1997b). During this stage, many important decisions are taken that influence the acquisition and using of the resources and the total costs of the product, such as the selection of materials, production methods, machines, type of assembling methods, the choice between new or existing parts, between making or buying a part, between unique or general purpose packaging, etc. Thus, strategic cost management during this stage requires that the cross-functional team actively searches for managing resources and cost reductions when taking these decisions. Many studies, for instance, Gietzmann and Inoue (1991:53), Howell and Sakurai (1992:31), Michaels and Wood (1989:19), Hiromoto (1988:23), Tanaka (1989:49), Emore and Ness (1991:42), Morgan (1993:21), Rosenthal (1992:6) and Cooper (1995a:91) showed that cost management during upstream activities involves far more opportunities for resources management and cost reduction than there are.
for cost management of manufacturing activities during the manufacturing stage. Furthermore, it is important to understand that cost management during upstream activities can affect the product life cycle costs in two ways, i.e. by making design and development decisions in such a way that the manufacturing and downstream costs of the product are reduced, but also by managing the upstream costs itself such as design and development costs (Shields and Young 1994:175ff.).

Many industries such as electronics, automobile, pharmaceutical, etc. are now looking both upstream and downstream activities to improve their cost positions. Downstream costs represent a significantly large component of the cost structure in many industries (Cooper and Kaplan 1998:182). However, downstream costs have received very little attention in the accounting literature. Traditional accounting procedures and the way that many organizations have been separated by department or function (e.g., design engineering, manufacturing, marketing, logistics, installation and postal service), often lead managers to focus myopically on their own department’s costs. In particular, for the manufacturing function, defining product costs as those solely related to the manufacturing process ignores many costs associated with the entire life cycle cost of a product (see, e.g., Slagmulder 2002 and Shields and Young 1991). Understanding the total life cycle costs of a product or service, or the product costs incurred before, during, and after the manufacturing cycle is critical, as decision makers can more completely analyze and understand what creates product costs. The total life cycle costs provide information for managers to understand and manage costs through a product’s design, development, manufacturing, marketing, distribution, maintenance, service, and disposal stages. This approach has many strategic implications such as (Shields and Young 1991, Artto 1994 and Clinton and Graves 1999):

- The company should calculate percentages of costs in upstream, manufacturing, and downstream activities, and compare them with its competitors.
- The company should consider ways of spending less resources in the manufacturing activity, and more on upstream and downstream activities in order to improve its competitive position by pursuing the differentiation strategy in both the new product design and the customer service.
- Managing of the total value chain cost provides a long-term perspective of the product cost, not just focuses on a short term manufacturing cost. Different industries have different cost structures; for example, the computer software industry has a high
upstream cost while the retailing industry has a high downstream cost. And the pharmaceutical industry has both high upstream and downstream costs.

7.3.2.3. Traceability of Resources and Strategic Cost Management

The relationship of cost of resources to cost objects can be exploited to determine accurately products costs and help making strategic decisions (Cooper and Kaplan 1998:161). Resources costs are directly or indirectly associated with cost objects. Direct resources costs can be traced easily and accurately to a cost object where indirect resources costs cannot be traced easily and accurately to a cost object (Dierks and Cokins 2001). Tracing resources costs to cost objects easily and accurately means that the resources costs can be assigned in an economically feasible way and by means of a causal relationship (Hansen and Mowen 2000:36). In fact, the more resources costs that can be traced to the objects, the greater the accuracy of the resources costs assignment. Thus, traceability is a key element in building accurate resources costs assignment and then cost management.

In literature, many methods are suggested to assign cost of resources to cost objects. For example, Keys (1994:30) and Hansen and Mowen (2000:38) discussed three methods to assign resources costs to cost objects (see figure 7.33). Cost management systems typically deal with many cost objects. Thus, a cost object may be an activity, a product, department, project, customer, or some other focus for which a decision maker would like to know the cost (Keys 1994 and Cooper and Kaplan 1998). The cost object chosen is dependent on the type of decision that management needs to make. Resources costs should only be assigned to a cost object if the benefit exceeds the cost of the assignment (see Cooper and Kaplan 1998:102).

Resources costs can be assigned to cost objects as shown in figure 7.33 by direct tracing, cause-and-effect cost assignment (driver tracing) or allocation. Direct tracing requires that, by physical observations, resource cost can easily and accurately be related to a cost object (Keys 1994 and Hansen and Mowen 2000). Thus, identifying resources costs that are specifically associated with a cost object is most often accomplished by physical observation, for example, the salary of the power supervisor and the fuel used to generate power are costs that can be specifically identified by physical observation with the cost object (power generating
activity). This method is less expensive than driver tracing or allocation and the result is usually more accurate.

Keys (1994) stated that one disadvantage of the direct tracing method is that physical observation may lead to the wrong decisions resulting in inaccurate tracing. For example, the labor cost (considered direct labor) of a machine operator who works on several machines may be traced equally to each machine. Tracing costs to each machine in this manner will be incorrect if one machine requires more of his time than the others. In addition, the physical observation may require too many resources to directly trace resources cost to the objects. Thus, if the resources costs cannot be easily traced then another method should be used. Finally, Keys (1994) argued that some resources costs may be traced directly but will not be because they are indirect costs. For example, a focused factory with one area that is dedicated to a certain product. Since this area is used for a single product, salaries of supervisors who are dedicated to the area and depreciation on this portion of the building and all machinery and equipment used in the area can be traced directly to the product. If these costs are considered overhead and it is assumed that costs cannot be directly traced, then allocation or assignment of these costs will lead to greater cost and less accuracy than direct tracing.

The direct tracing method does not identify the cost driver or the resource (Hansen and Mowen 2000 and Keys 1994). Therefore, resource and cost driver analysis cannot be performed. However, this does not limit the ability to manage costs since the relationship
between the cost object and the cost can usually be observed. Theoretically, all resources costs should be charged to objects using direct tracing. Unfortunately, it is often not possible to physically observe the exact amount of resources being consumed by a cost object (Hansen and Mowen 2000:37). Thus, the next approach is to use cause-and-effect reasoning to identify factors - called drivers - that can be observed and which measure a cost object’s resource consumption. Drivers are factors that cause changes in resource usage, activity usage, costs, and revenues (Cooper and Kaplan 1998:86).

Driver tracing uses two types of drivers for tracing resources costs to objects: resource drivers and activity drivers (Hansen and Mowen 2000:37). Resource drivers measure the demands placed on resources by activities and are used to assign the cost of resources to activities. Activity drivers measure the demands placed on activities by cost objects and are used to assign the cost of activities to cost objects. The driver-tracing model is described briefly in the figure 7.34. This model is the heart of activity-based costing. Activity-based costing assigns costs to cost objects by first tracing resources costs to activities and then tracing activities costs to cost objects (Cooper and Kaplan 1998).

Figure 7.34 The driver tracing model (Hansen and Mowen 2000:37)

The driver tracing or cause-and-effect method is based on the long-run cause of the cost (Keys 1994). Since the cause of the cost is determined by cause-and-effect assignment, the resources costs assigned to activities and then to objects are usually more accurate than if the costs had been allocated. Moreover, identifying the cost drivers will assist management in managing the costs. However, Keys (1994) and Hansen and Mowen (2000) indicted that this approach is not without disadvantage. The cause-and-effect method assumes that costs have only one cause. As a result, costs that are assigned using this method will be inaccurate if the cost has two or
more causes. Moreover, managers may ignore the additional causes and focus only on the cause identified for the assignment. This method may also yield inaccurate costs if the wrong cost driver is identified. Without the right cost driver, managers will find the cost harder to manage and to explain.

The cost allocation method should be used if the cost can neither be traced nor assigned to cost object. The cost allocation method is similar to cause-and-effect assignment, except that the allocation base is not the cause (Hansen and Mowen 2000:38). Since no causal relationship exists, cost allocation is based on convenience or some assumed linkage. In most cases, the allocation base is usually some quantity that is already being tracked, such as sales or direct labor. Since the allocation is not based on a causal relationship, the cost allocation method will usually yield a cost that is less accurate than the two methods described above. In fact, the accuracy of an allocation can usually not be determined. It is possible that the cost allocated to a cost object is correct. This will occur when there is a high positive correlation between the cost and the allocation base. Even if the costs allocated are accurate, this method provides little help to managers wishing to manage costs. According to Keys (1994:34), "if accuracy of the cost is so arbitrary that the cost allocation will not be useful for decision making and if no regulation requires the allocation, then the costs should not be allocated". However, it must be admitted that resources costs allocation to objects may serve other purposes besides accuracy. For example, allocation resources costs to objects may be required to satisfy external reporting conventions. Nonetheless, most managerial uses of resources costs assignments are better served by accuracy.

Finally, strategic cost management techniques such as activity based costing and activity-based management emphasize driver tracing more than allocation resources costs (Cooper and Kaplan 1998). The role of driver tracing is significant expanded by identifying drivers unrelated to the volume of product produced (called nonunit-based activity drivers). The use of both unit and nonunit-based activity drivers increases the accuracy of cost assignments and overall quality and relevance of cost information. Thus, strategic cost management has improved the quality, content, relevance, and timing of cost information (Wong 1996 and Trussel and Bitner 1998). These cost information help many companies to determine products costs accurately, improve decision-making, enhance strategic planning, and increase ability to manage activities.
In this dimension also the measurement of resources costs is the basic key to manage company’s resources because costs are important measures of resource availability and use (Cooper and Kaplan 1992:1). The cost is a measure of the supply or use of a scarce or constrained resource to achieve a specific outcome. Thus, companies sacrifice or give up its scarce resources in order to obtain the benefits. The value sacrificed is a measure of the purchase cost of the resources. These resources that a company acquired are supplied to the business processes of the company and used to produce and sell products and services or to support other business processes. The value of the resources made available is the cost of resources supplied while the value of resources consumed for productive purpose is the cost of resources used (Hilton et al. 2001:111).

In many cases, some companies may choose to make available more resources than they use at any time perhaps to take advantage of currently low resources prices or to meet unexpected needs or shortages. In such cases, cost of resources supplied may or may not be the same as cost of resources used. From this perspective, Cooper and Kaplan (1998:120) argued that resources can be categorized as either flexible or committed. Flexible resources are supplied as used and needed. They include, for example, direct materials, energy, telecommunications services, temporary workers hired on a daily basis, employees paid on a piece-work basis, and overtime that is authorized as needed. The supply of these types of resources can be continually adjusted to match exactly the usage of resources. For example, the supply of energy for running machinery can be continually adjusted to match the exact demand. Thus the cost of supplying these resources will generally equal the cost of resources used and the resources will have no unused capacity. Resources of this type are classified as variable cost.

In contrast, Cooper and Kaplan (1998) stated that committed resources are supplied in advance of usage. They are acquired by the use of either an explicit or an implicit contract to obtain a given quantity of resource, regardless of whether the amount of the resource available is fully used or not. Thus, unused capacity arises because the supply of these types of resources (e.g. Appointment of purchasing staff, buying or leasing a building or equipment) have to be acquired in discrete amounts in advance of usage such that the supply cannot be continually adjusted in the short-run to match exactly the usage of resources. The costs of supplying these resources are thus incurred independently of usage in the short run and this independence has led to them being categorized as fixed costs.
Managers make decisions that result in changes in activity resource usage (for example, changes in output volume and mix, process changes and improvements and changes in product and process design). Distinguishing between resources supplied and resources used enables management to predict whether shortages or excesses of capacity will occur and to find the optimum between resources supplied and resources used (Cooper and Kaplan 1992:2). Traditional cost management systems typically provide information only about the cost of the resources supplied. In contrast, Strategic cost management systems such as activity-based costing provide information about how much of the activity is used and the cost of its usage (see Cooper and Kaplan 1992 and Hansen and Mowen 2000).

Activity-based costing model focuses on the cost of the resources used within the company in the business processes. Thus, measuring and managing cost of resources used in the business processes represents the basic key within activity-based costing. According to Cooper and Kaplan (1992:1), “the measurement of unused capacity provides the critical link between the costs of resources used, as measured by an ABC model, and the costs of resources supplied or available, as reported by the organization’s periodic financial statements.” Cooper and Kaplan (1992) argued also that spending on many organizational resources will not vary in the short run, and as a result, they are frequently considered “fixed” in traditional cost systems. However, traditional cost systems do not provide key information regarding how much of the resource was used, for what purposes, and what excess capacity may exist for potential redeployment elsewhere in the firm. Activity-based costing model should determine the capacity of each resource and assign resource costs to activities based on actual consumption.

Measuring and managing resources capacity will provide greater management insight and more accurate costs (Cooper and Kaplan 1992:2f. and 1998:116). Managers and decision makers can decide how much capacity or resources are available to support their company’s objectives. They can also determine how changes in their decisions (e.g. process changes and improvements, introducing of new technology, and changes in product and process design) and activity performance will affect resource consumption. For example, activity reengineering through technology will free up resource capacity that can be redeployed to other productive requirements or reduced to lower total costs. In contrast, managers may make some decisions such as producing custom products that may require more supply capacities or resources. Thus, the identification of capacity usage, capacity supplied and
unused capacity will produce more accurate costs and provide information for managers to take actions. In activity-based costing model, unused capacity is not assigned to the activities. As a result, activity costs will appear consistent from period to period, even if activity volumes increase or decrease (Cooper and Kaplan 1992:8). Thus, cost of unused capacity can be identified and assigned to someone or some departments after analyzing the decision that led to creation of the unused capacity. In other words, the cost of unused capacity or resources should not be ignored. Identifying and assigning cost of unused capacity or resources led to trace the costs at the level in the company where the decisions are made that could affect the supply of capacity resources and the demand of those resources. In addition, this process provides feedback to managers on their supply and demand decisions.

The used approach for resources capacity can affect the measuring and managing the costs. Many research studies have focused on the measurement and management of resources capacity (see for example, Cooper and Kaplan 1992, Debruine and Sopariwala 1994, Maguire and Heath 1997, and Lawson 2002). In the literature, there are four common definitions of resources capacity: theoretical, practical, normal, and master budget (see for example, Debruine and Sopariwala 1994:26, Horngren et al. 2000:304, and Lawson 2002:25). Theoretical capacity approach reflects the perfect use of resources capacity. This approach considers that each resource will perform perfectly and will produce at its theoretical limit. Master budget capacity approach reflects the expected level of capacity utilization for the next budget period (typically one year). This approach essentially ignores any consideration of underutilized capacity. Thus, all costs are fully loaded as if all the resources were fully consumed during the reporting period. The overhead cost rate will include different amounts of underutilized capacity during each financial reporting period (Horngren et al. 2000:305). As a result, activity costs can artificially increase or decrease from period to period. Normal capacity is the approach that based on the level of capacity utilization that satisfies average customer demand over a span of time. This approach assumes the normal capacity reflects how resources are really consumed based on historical usage. The major disadvantage of this approach arises from using historical averages. It does not recognize process improvements, the existence of excess capacity over time, and assumes management had sufficient visibility over capacity utilization. Practical capacity reflects the maximum level at which the plant, department or organization can operate efficiently. It allows for unavoidable operating interruptions such as scheduled maintenance time, shutdowns for holidays, and so on.
Practical capacity represents the most reasonable approach for determining capacity within an activity-based costing model (see for example, Cooper and Kaplan 1998:127). The use of this approach ensures resource utilization is not overstated, and excess capacity is visible within the activity-based costing model. Incorporating practical capacity also ensures consistent product costs that do not artificially vary from period to period (Cooper and Kaplan 1998:129 and Horngren et al. 2000:306). The incorporation of excess capacity reporting also enables the activity-based costing model to reflect what resources are freed up or released when an organization pursues some improvement initiatives or programs such as process reengineering or continuous process improvement.

7.3.2.4. Level of Cost Driver and Resource Cost Management

A company needs many types of resources to perform its activities across the value chain in order to produce and support the products or services. Acquiring and using the resources will result from various levels or types of cost drivers, these levels or types of cost drivers help management to identify, measure, manage, and analyze the resources needed to perform activities and produce products (Hilton et al. 2001:152). Different drivers to acquire and use the resources which are described in the resource hierarchy - unit-level resources, batch-level resources, product-level resources, customer-level resources, and facility-level resources – will cause different resources and technology mixes to be available to the company.

Cost drivers can affect the acquiring and using the resources that an organization obtains, for example, structural cost drivers determine, or drive, the overall makeup and structure of costs (Shank and Govindarajan 1993). Structural cost drivers determine the set of resources available to the organization. For example, scale of investment in capacity, degree of vertical integration, experience, process technology employed, and complexity may increase or decrease the overall acquiring and using of the resources (see section 6.2.1.3). The processes and activities that the organization employs determine how it uses resources. The decisions that are related to the specific processes and activities and determine how the organization carries out its work and causes resources to be consumed by that work are called executional cost drivers (Donelan and Kaplan 1998 and Shank and Govindarajan 1993). As mentioned previously in the section 6.2.1.4, executional cost drivers are the policies, methods, and procedures (e.g., managing employees, providing quality, managing plant layout, designing and producing products, managing capacity, and managing efficiency) that the organization
uses to conduct its work. For example, the way in which a company arranges its work, choose tools, and set schedules will determine how it uses resources to produce the products. Producing a product effectively, as designed and managing resources, requires careful choice of both structural and executional cost drivers because they jointly determine the organization’s value chain - its resources, processes, and activities.

The value chain of an organization describes the major processes and linkages, each process includes a number of activities that may be in more or less detail depending on the objectives of the analysis (Porter 1998a). Activities like resources, may be classified as one of five types depending on the driver to use resources: unit-, batch-, product-, customer-, and facility-level activities (Cooper and Kaplan 1998:89). The objective of classifying resources and activities into these levels is to enable a company to understand how its activities are performed, to trace and manage the use of its resources through activities performed to costs of products and services produced. The resource consumption of an activity is the cost of that activity, usually expressed in monetary terms. Hilton et al. (2001:160) argued that the level of an activity affects its use of resources, and consequently, its costs. For example, if an activity is classified as a unit-level activity, it may be possible to identify whether the cost driver best describes how the activity consumes resources, or the cause of its cost. Assume for example that a company produces two different types of product - one simple and one complex. The complex product requires applying many more parts and amounts of resources (e.g., materials) than the simple product. When the company uses traditional cost drivers such as the number of the units produced, averaging of the material cost across both types of product will underestimate the costs of materials of the complex product and overestimate the material cost of the simple product. Therefore, it may be very easy to compute average costs of all types of resources over many activities, doing so may greatly distort the use of resources by activities and consequently, costs of individual products and services. This could lead to incorrect production, pricing, and sales decisions.

It is generally accepted now that the use of resources and then costs of activities are driven not only by the number of the units produced, but also by non-volume-related variables (Cooper and Kaplan 1998:90 and Edwards 2001:2). As mentioned previously in the section 6.2.1.4, using activity-based costing can be a helpful approach in determining such variables or determinants - also called operational cost drivers. In fact, there are many possible operational
cost drivers that may differ across and within companies (Edwards 2001:2 and Hilton et al. 2001:161). However, a company should choose the proper cost drives in order to manage its resources and activities costs correctly. An appropriate cost drivers should logically have a cause and effect relationship with the activity and the use of resources, be feasible to measure, predict or explain activities’ use of resources with reasonable accuracy, and be based on the practical capacity of the resource to support activities (Hilton et al. 2001:162). The use of practical capacity enables the cost driver to represent the underlying efficiency of activity, as measured by the cost of resources required to perform one unit of the activity. In addition, it enables activity-based costing to differentiate between the costs of resources used during the period versus the cost of unused resources (see Cooper and Kaplan 1998:127). This distinction provides a powerful indicator for making decisions about process improvement, products, customers, and investments in new capacity.

Selecting the proper operational cost drivers will make a company able to trace uses of resources to activities and allow a company to accurately measure and manage the costs of the resources used in the various activities performed by its employees and caused by its processes (Hilton et al. 2001:160). When managers have information about cost drivers and accurate information about the amount of resources an activity consumes allows them to accurately predict resource demands and, as a result, the costs or cost savings of changing activities. This information is very important to decisions to change processes, add products, drop customers, and so on. Since most traditional cost management systems are designed to collect costs by functional areas of the value chain, resource-level information may not be readily available in these systems (Cooper and Kaplan 1992). Using activity-based costing approach provides more accurate cost information about resources, activities, and products. It focuses on the organizational activities as the key element for analyzing cost behavior by linking organizational spending on resources to the activities and business processes performed by these resources (Cooper and Kaplan 1998:107). However, companies must consider whether the benefits from this additional information exceed the costs of obtaining and maintaining it.
8. Strategic Cost Management - Analysis Fields & Activities

8.1. Introduction

Strategic cost management has many measures and instruments such as capacity management, complexity management, experience effects, overhead management, fixed cost management, target costing, activity based costing, benchmarking and life cycle costing that help to influence cost behavior, cost structure and then cost level of the company purposefully; usually improving cost position. To achieve long-term improvements in the cost position will require a good understanding of a firm’s cost-structure, arranging and shaping the relationship or proportion of certain cost categories to each other to improve the firm's cost-structure, recognizing how costs behave under a variety of influences, and the cost level must be purposefully affected (Corsten and Stuhlmann 1996:14 and Burger 1999:10).

A firm’s cost structure is directly related to its resources, processes and products (Corsten and Stuhlmann 1996:14). Thus, a good understanding of the firm's cost structure is critical to search for a sustainable competitive advantage (Shank and Govindarajan 1993:6). In addition, it is important for managers and accountants to be fully aware of how cost behavior truly varies in relation to a variety of factors. Without a knowledge of underlying cost behavior patterns, it would be difficult if not impossible for a manager to properly analyze the firm’s cost structure (Buckingham and Loomba 2001:12). The reason is that all costs do not behave in the same way. One cost may move in one direction because of a particular action, and another cost may move in an opposite direction. Unless the behavior pattern of each cost is clearly understood, the impact of a firm’s activities on its costs will not be known until after the activity has occurred (Porter 1998a:64). Unless managers can make reasonably accurate predictions about costs and revenues, their decisions may yield undesirable or even disastrous results.

Basically, a firm that fails to reduce its cost level as rapidly as its competitors will find its existence threatened. It should be better able to deal with a high cost level to respond strongly to the challenges and opportunities of the competitive environment. The competitive environment demands the development of sophisticated cost management practices to keep costs down (Tanaka et al. 1993:4). Strategic cost management is holistic approach that takes a broad focus including the entire value chain and product life cycle. In general, such an approach has the purposeful influence on the cost behavior, cost structure and cost level
through its measures and instruments. In addition, strategic cost management can develop and reveal vast amounts of information about cost structure, cost behavior, and cost level that help management to make strategic and operational decisions. Consequently, strategic cost management contains three general fields of analysis and activities: cost behavior-, cost structure-, and cost level management (see figure 8.1).

![Figure 8.1 Analysis fields & activities of strategic cost management](image)

The next subsections will discuss the analysis fields & activities of strategic cost management - cost behavior-, cost structure-, and cost level management - and how these fields and activities are critical to the long-term success of many companies.

### 8.2. Cost Behavior Management

#### 8.2.1. The Concept of Cost Behavior

Cost behavior is the general term for describing whether a cost changes when the cost driver of activity changes (Maher and Deakin 1994:41 and Hansen and Mowen 2000:65). Thus, cost behavior is the way costs respond to changes in the cost drivers. In essence, some costs vary with cost driver (e.g. production volume) while others remain fixed (Tanaka et al. 1993:23, Götzte 2004:12). Some costs exhibit characteristics between these two extremes. In cost accounting and management literature, two basic of cost-behavior patterns are found: fixed cost and variable cost patterns (see figure 8.2). These patterns are based on the production volume as a cost driver.
The costs of company activities are dependent on, and change with, cost drivers - both the level and the nature of these cost drivers (Blocher et al. 1999:57). It is necessary to know cost drivers of the company activities but it is not in itself of very much help. More useful is knowing how the cost behaves in relation to cost drivers (Hansen and Mowen 2000:65 and Blocher et al. 1999:57). In addition, not only will the cost amount and behavior differ between different levels of cost driver, but if the difference between these levels is large then the behavior pattern may differ as well. To plan and manage costs in practice within a specific context it is necessary therefore to limit consideration solely to the range of cost driver (activity) anticipated. This range is called the relevant range and can be defined as the band of cost driver in which a specific relationship between the cost driver and total costs are valid (Horngren et al. 2000:32).

Some costs remain the same whatever the level of cost driver; depreciation, local government rates, debenture interest, audit fees and rent payments are examples (see figure 8.2). However, this particular class of costs is very dependent on the relevant range of cost driver (activity),
any large change in the level of this range almost certainly affecting these costs significantly (Belkaoui 1991:34). When management finds an expansion of production facilities (cost drivers) is necessary, it may either move to a larger plant or use the present facilities with additional shifts. In either case, this change in the production facilities or the number of work shifts (cost driver) can cause a change in the relevant range. This change in the relevant range can affect fixed costs. Although some fixed costs, such as depreciation, do not change unless a company acquires new equipment or a larger plant, other fixed costs may increase. For example, a company may hire more plant supervisors. Thus, the concept of the relevant range of cost driver is very important in the case of a fixed cost. Therefore, a fixed cost can be defined as a cost that remains unchanged regardless of the level of cost driver within the relevant range (Rayburn 1996:54, Horngren et al. 2000:31 and Hansen and Mowen 2000:66). However, this does not mean that a fixed cost within this range cannot alter. Fixed costs are time-related rather than activity related when compared to variable costs. Fixed costs are unaffected by changes in activity within the relevant range but other factors such as time can, and do, change a fixed cost (Harper 1995:175).

Fixed costs are affected by long-range, management-control planning decisions and by strategic planning decisions (Rayburn 1996 and Garrison and Noreen 2000). The strategic planning decisions that determine production and marketing capacity occur at relatively infrequent intervals, whereas the management-control decisions resulting in fixed costs occur frequently. The difference in decision level and frequency results in two kinds of fixed costs. In the cost accounting and management literature, fixed costs can be either committed fixed costs or discretionary fixed costs. Committed fixed costs usually arise from decisions to acquire the facilities, equipments, and a basic organization (Rayburn 1996:54 and Garrison and Noreen 2000:195). These are large, indivisible chunks of cost that the organization is obliged to incur or usually would not consider avoiding. For example, long-term lease commitments and depreciation costs tend to remain constant for long periods of time, and these costs change when a decision is made to change capacity. After acquiring an asset, committed costs are not changed unless economic circumstances indicate a change in the depreciation method or useful life, or the asset is sold.

Discretionary fixed costs are costs fixed at certain levels only because management decided that these levels of cost should be incurred to meet the organization’s goals (Garrison and
Noreen 2000:196). Costs such as factory supervision, employee training programs, advertising and promotion, research and development and public relations are discretionary costs because management uses its professional judgment each period in deciding the amount of such costs (Horngren et al. 2000:478). Thus, decisions affecting these costs are usually made annually, and the costs can be increased or decreased in the short run. Discretionary fixed costs have no obvious relationship to levels of output activity but are determined as part of the periodic planning process (Horngren et al. 2000:478). Each planning period, management will determine how much to spend on discretionary items. These costs then become fixed until the next planning period.

Discretionary fixed costs also are called programmed or managed costs (Belkaoui 1991:41 and Rayburn 1996:54). Many Changes such as economic condition, technology, plant layout, and facilities location can influence decisions related with the level of discretionary costs. For example, if a competitor’s product is more technologically advanced, management may find it urgent to change the product design. This design change may require an employee-training program for example. Such costs arise from periodic appropriation decisions reflecting top management decisions. If unfavorable conditions develop for the company, managers may drastically reduce these costs for a given year (Rayburn 1996:54).

The committed fixed costs originate in plant capacity decisions, and the discretionary fixed costs originate in decisions on the use of that capacity (Belkaoui 1991:41 and Horngren et al. 2000:478). Advertising cost is a discretionary fixed cost, incurred by a company to generate a sales volume that allows its plants to operate at efficient levels. Discretionary fixed costs on sales personnel are made for the same reason. Staff levels in administrative functions are discretionary fixed costs, and the level of these costs is planned by considering the number of personnel required to perform the planned level of work. Consequently, managers can increase discretionary fixed costs whenever they decide to do so. Even though there is often no clear line between committed and discretionary costs, the distinction is useful for planning and control decisions (Rayburn 1996:54).

Finding a strictly fixed cost in practice is difficult. A distinguishing feature of fixed costs is that for a given time period they are fixed within specified activity levels (relevant ranges), but they eventually increase or decrease at various critical levels (e.g. if production activity
increases significantly management will run extra shifts, thus affecting the fixed costs to vary from normal levels) (Maher 1997:40). These changes provide the alternative terms semi-fixed and step fixed costs. Semi-fixed or step fixed costs are costs that increase in discrete increments (steps) as activity level increases (see figure 8.2). The "steps" may be large (more like a fixed cost) or small (more like a variable cost). If the activity increments are relatively small, the step fixed cost may be approximated by a strictly variable cost. On the other hand, if the increments are relatively large, each increment may be considered a relevant range of activity and the step fixed cost approximated by a strictly fixed cost (Belkaoui 1991:38 and Rayburn 1996:59). Thus, the level of activity must be large enough to avoid confusion with the strictly fixed cost and variable cost.

The opposite cost behavior pattern of a fixed cost is a variable cost which varies in direct proportion to the level of cost driver (see figure 8.2). A good example of a variable cost is the raw materials cost. For example, 10 percent increase in the production usually results in a 10 percent increase in this cost. However, the relevant activity range should be included in this definition because the greater this range the less it may be true to say that the cost is in direct proportion to the activity (Hansen and Mowen 2000:69). For example, quantity discounts on materials above a given level can lower the cost per unit so that the direct proportion to the activity may be less true. However, in practice this point is much less important in the case of the variable costs than it is in the case of the fixed costs.

Unfortunately, there are many costs that neither remain unchanged nor vary in direct proportion to activity (see figure 8.2). These costs change with changes in activity but not in direct proportion. Careful examination of a cost of this nature often shows that it is a combination of a fixed cost element and a variable cost element (Horngren et al. 2000:329). For example, the cost of a telephone expense comprises a fixed rental charge plus a variable charge for calls. Similarly, the cost of maintenance is often made up of the costs of regular maintenance (e.g. weekly servicing) which tend to be fixed and the costs of breakdown maintenance that tend to vary with machine running time. A cost having this dual nature is called a semi-variable cost and can be defined as a cost that is partly fixed and partly variable (Hansen and Mowen 2000:70).
In cost behavior management, it should be noted that the classification of a cost into fixed or variable sometimes depends on the time-span involved (Rayburn 1996:55, Hansen and Mowen 2000:71 and Horngren et al. 2000:330). According to economics, in the long run all aspects of the enterprise's operations can be adjusted, so all costs are variable in the long run. Thus, in order to understand the difference between variable and fixed costs, managers and accountants need to distinguish between the time frames of the short and long runs (Rayburn 1996:55). In regard to costs, the short run is the period of time within which some contractual obligations associated with management, plant, and equipment are not alterable by changing the firm's managerial capacity or its scale of operations (Hansen and Mowen 2000:71). The duration of the short run of course varies from enterprise to enterprise and situation to situation, and thus cannot be specified in discrete terms.

In the long run all aspects of the enterprise's circumstances are changeable. The impetus for long-run change may come from a variety of sources such as: recognition from short-run decision contexts that total and overhead costs are not being adequately covered, increasing or decreasing demand which requires changes in the scale of operations, the departure or acquisition of managerial ability and entrepreneurial capacity, and technological advances which alter production functions or result in new products (Maher and Deakin 1994, Harper 1995, Rayburn 1996, Atkinson et al. 1997 and Hansen and Mowen 2000). It is necessary to recognize that any long run consists of a sequence of short runs. All decisions affecting both the enterprise's scale and rate of operation are made in short-run settings, even those decisions affecting the long runs. Fundamentally, managers need to understand and manage cost behavior to make informed decisions about resources, processes and products, to plan, and to evaluate performance (Maher and Deakin 1994:41).

8.2.2. Cost Behavior Management - the Concept and Objective

The object of cost behavior management is cost behavior that is determined and influenced by cost drivers (Arnaout et al. 1997:165). One of the beneficial uses of the concept of cost behavior management is a logical implication of choice among many available strategic plans (Porter 1998a:62). In reality, the company must be able to identify what customers want to buy, at what cost, and to organize the great variety of available resources into more efficient business processes. In addition, it must sell its product at a price that covers the cost of its resources, yet allows it to compete with other companies. Moreover, it must accomplish those
objectives while competing companies are seeking to meet the same goals. In this context, Porter (1998a:62) argued that cost behavior management is of vital importance to such strategies and managers often want to know cost behavior and how the cost behaves in relation to cost drivers.

In fact, making good decisions is very dependent on knowing the current and future costs and this in turn means that managers need to understand and manage cost behavior in different circumstances (Horngren et al. 1999:263). Cost behavior management provides managers with valuable insights about how cost will respond to managers’ decisions as well as to outside influences (Horngren et al. 1999:265). Cost behavior management aims to achieve competitive advantage through the long-term influence on the cost behavior (Männel 1995:32). There are number of factors that markedly affect the behavior of costs and consequently play a significant role in cost level management. It should be recognized that cost behavior and cost level management stand in close relationship to each other. The influence on cost behavior and then cost level can be reached by an effective utilization of capacity, economies of scale and experience effects, complexity management, and cost flexibility. These factors will be discussed in the following sections.

8.2.3. The Effective Utilization of Capacity and Cost Behavior Management

Capacity utilization is a key driver in cost management and production efficiency (Männel 1995:28 and Arnaout et al. 1997:165). Capacity utilization is important for all organizations, and at all levels of an organization. In addition, it becomes important in many industries where fixed costs are high. Stevenson (2002:175) stated that capacity utilization decisions have a real impact on product lead times, customer responsiveness, costs and a firm’s ability to compete:

- Capacity limits the rate of output possible. Having capacity to satisfy demand can allow a company to take advantage of tremendous opportunities.
- Capacity decisions affect operating costs. Ideally, capacity and demand requirements will be matched, which will tend to minimize operating costs. In practice, this is not always achieved because actual demand either differs from expected demand or tends to vary (e.g., cyclically). In such cases, a decision might be made to attempt to balance the costs of over- and under-capacity.
• Capacity is usually a major determinant of initial cost. Typically, the greater the capacity of a productive unit, the greater its cost. This does not necessarily imply a one-for-one relationship; larger units tend to cost proportionately less than smaller units.

• Capacity decisions often involve long-term commitment of resources and the fact that, once they are implemented, it may be difficult or impossible to modify those decisions without incurring major costs.

• Capacity decisions can affect competitiveness. If a firm has excess capacity, or can quickly add capacity, that fact may serve as a barrier to entry by other firms. In addition, capacity can affect delivery speed, which can be a competitive advantage.

• Capacity affects the ease of management; having appropriate capacity makes management easier than when capacity is mismatched.

In fact, the capacity utilization strategy develops from the main business strategy and gives more support to the other strategies and objectives adopted by a company (Porter 1998b:324). The capacity utilization strategy can be defined by knowing how or what to use as a sign for need for a change in capacity and the sizing of such changes. When to change capacity and how much to change capacity are critical decisions that affect the cost behavior and level and ultimately the ability of the company to compete (Hax and Majluf 1991:316 and Van Mieghem 2003:288). Capacity changes involve either the expansion or reduction of capacity resources. There are three options or strategies that a company can follow for the timing of capacity utilization in relation to a steady growth in demand (see figure 8.3).

Utilizing a lead strategy, capacity is expanded in anticipation of demand growth. Capacity can be increased incrementally or in one large step as shown in the figure 8.3. This strategy results in frequently unused capacity but greater flexibility and reliability as variability in demand can be accommodated within a capacity cushion (Hayes and Wheelwright 1984, Olhager et al. 2001:218 and Van Mieghem 2003:288). This aggressive strategy is used to lure customers from competitors who are capacity constrained or to gain a foothold in a rapidly expanding market (Russell and Taylor 2003). Utilizing a lag strategy, capacity is added only when demand persistently exceed existing capacity. This conservative strategy produces a higher return on investment but may lose customers in the process (Russell and Taylor 2003). It is used in industries with standard products and cost-based or weak competition. The strategy
assumes that lost customers will return from competitors after capacity has expanded. Average capacity strategy seeks a closer match between average expected demand and capacity over time, generally by adding capacity in smaller increments (e.g. by subcontracting or casual labor) (Olhager et al. 2001:218 and Russell and Taylor 2003). Under this strategy, capacity utilization readily adjusts to average expected demand, resulting in minimal residual capacity costs not already captured by the demand (Van Mieghem 2003:289). Also, this is a moderate strategy in which managers are certain they will be able to sell at least some portion of the additional output.

The firm’s competitive strategy affects the viability of particular capacity management strategy choices and their associated costs (Hayes and Wheelwright 1984). A lag strategy with its emphasis on high utilization, potentially at the expense of reliability and flexibility, is consistent with a strategy focused on low unit cost (Olhager et al. 2001:218). At the opposite
end of the spectrum, a lead strategy maintains a capacity cushion to support flexibility and
reliability, potentially at the expense of higher unit costs and lower utilization (Olhager et al
2001:218). Thus, this approach to capacity management can be viewed as consistent with an
emphasis on customer responsiveness. In more general terms, the lead strategy reflects
commitment to invest in resources to allow for the disruption, uncertainty, and flexibility
required to execute a responsiveness strategy. Figure 8.3 illustrates a typical lead strategy in
capacity management, demonstrating the relatively permanent idle capacity created by the
strategy.

Capacity utilization strategy is based on a set of assumptions and predictions that determine
how much to changes capacity. These assumptions and predictions include, for example, the
predicted growth and variability of primary demand, the costs of building and operating plants
of different sizes, the rate and direction of technological innovation, the likely behavior of
competitors, and the anticipated effects of international competitors, markets, and resources of
supply (see e.g., Hayes and Wheelwright 1984, Porter 1998b, Maguire and Health 1997 and
Stevenson 2002). The problem with the term capacity is that it determines the rate of capacity
utilization but nothing about how the rate can be sustained (Stevenson 2002:182). It does not
reveal if it is one-day peak or an average of a longer period. Neither, if it is the rate of
capacity utilization that has influence on cost behavior. To overcome this, the concept of “best
operating level” has been introduced. The best operating level is the percent of capacity
utilization that minimizes average unit cost (see figure 8.4). Rarely is the best operating level
at 100 percent of capacity - at higher levels of utilization, productivity slows and things start
to go wrong. An industry with an 80 percent average utilization would have a 20 percent
capacity cushion for unexpected surges in demand or temporary work stoppages. Large
capacity cushions are common in industries where demand is highly variable, resource
flexibility is low, and customer service is important (Russell and Taylor 2003 and Olhager et
al. 2001).
Managers can use several approaches to utilize capacity effectively and influence on costs especially fixed costs, revenues and the ability of the company to compete. The study by Institute of Management Accountants (IMA), Consortium for Advanced Manufacturing-International (CAM-I) and Arthur Andersen LLP (2000:53) found that optimizing capacity utilization can be pursued from several different approaches as shown in figure 8.5. While any of these approaches can be used alone, in most complex situation several approaches are used as the basis for the optimization effort.

![Figure 8.5 Optimizing approaches of capacity utilization](Based on information from IMA 2000:53)
Maximizing throughout

Maximization throughout or production is one of the basic approaches to utilize capacity effectively and has an impact on the cost and revenue (IMA 2000:53). Throughout or production which has a specific demand, has an important influence on the cost and revenue. When throughout or production is maximized, the resources of the organization are, by definition, being used to their fullest effective level. Some companies use inventory-build as an easier way to maximize throughout (Bartol and Martin 1991:674 and Stevenson 2002:180). However, in this way, throughout may become waste if it does not have a ready market. Unsold inventory does not create value for customer or profits for the organization - it requires costs associated with storage, insurance, handling, obsolescence, tracking, disposal, and capital invested (Bartol and Martin 1991:674). These costs typically consider an important percent of the value of an item annually.

The second way that can be used to maximize throughout, is by producing those products or providing those services that consume the least amount of the bottleneck resources (IMA 2000:54). Maximum capacity is limited by bottlenecks in the production process. Bottlenecks limit increased production or throughput (Lawrence and Buss 1995:342 and Brausch and Taylor 1997). They occur for varying reasons, mostly when products are not standardized, have varying features, and when production processes are less continuous and unbalanced. This way is obviously no better than inventory-build way (Brausch and Taylor 1997). In order to utilize capacity effectively through throughout maximization, a company must improve its processes that allow it to respond to customer and market demand rapidly and effectively (IMA 2000:54). In addition, it must take waste out of the system and redeploy the freed resources to new production to meet customer requirements.

Maximizing profitability

Many companies approach capacity maximization differently. Contribution analysis is one approach in which a company can pursue optimization of capacity utilization through profit maximization strategy (IMA 2000:54). This approach has strengths such as gaining the highest return on investment, gaining the maximum benefit for unit of resource deployed, and providing flexibility for growth through improved profitability (IMA 2000:54 and Edmonds et al. 2003:57). However, optimization capacity utilization through pursuing profit maximization is not without weaknesses or risks. This approach may focus on achieving
short-term profits at the cost of long-term strategic positioning (IMA 2000:54). For example, a certain product might be currently consuming significant amount of capacity without any direct revenue or profit being generated, this capacity considers productive capacity because it is dedicated to making the product that the customer is willing to pay for or can be the result of product development efforts (IMA 2000:54). However, if profit maximization is the driving goal, it is quite possible that development of new products may be delayed or avoided. While short-term performance may be strong, it is quite likely the organization will lose viability in the long term. Today’s profits always have to be balanced against the long-term best interests of the organization.

Hence, using profit maximization as a basis for capacity optimization requires a company to build some form of “pseudo-profit centers” into company to create profit maximizing behavior in what were formerly cost centers and to ensure that they move forward according to plan (Cooper and Kaplan 1998:74). Once this development use of capacity is safeguarded, the relative profitability of one order or product versus another becomes a logical basis for allocating remaining capacity.

**Minimizing Total Cost of Operation**

Today's competitive environment requires companies to find ways to reduce operating costs. Minimizing operating costs can be chosen as another approach that capacity optimization can be defined. In this case, the company’s attention turns to finding low-cost alternatives to meeting customer demand, such as moving production to areas where labor rates are low (IMA 2000:55). The company can use other alternatives to deploy this approach such as reducing material costs but not at the cost of quality, substituting technology for people when economies of scale provide savings, and increasing run sizes to achieve a low-cost position.

Minimizing operating costs may not guarantee maximizing performance or profits because profit is the difference between price and cost and price is determined by the market based on the value content of the product (IMA 2000:54). However, minimizing operating costs can actually improve the value content of the product and its market price (McNair et al. 2001:33). This requires the company to deploy capacity resources to those products and services that are highly valued by customer, in this case, the company can receive a premium price. In addition, if cost reductions eliminate non-value-added activities that do not
contribute to customer value, and so eliminating such activities will not reduce customer value (Cooper and Kaplan 1998:158). Eliminating non-value-added activities will, however, eliminate their cost and can actually result in capacity maximization.

**Minimizing Wasted Resources (Idleness)**

The capacity model developed by the Consortium for Advanced Manufacturing-International (CAM-I) provides unique insight into the capacity utilization of specific production lines and processes (Klammer 1996). The model illustrated in the figure 8.6 suggests that any organization can subdivide total or rated capacity into idle, nonproductive, and productive capacity (Klammer 1996).

The ability to manage capacity utilization effectively requires pursuing a reduction or elimination in idle and non-productive capacity within an organization (Klammer 1996 and Muras and Rodriguez 2003:38). The middle area of the figure 8.6 identifies potentially recoverable nonproductive capacity - areas of lost production and process improvement opportunities. Such areas include setups and changeovers, delays or downtime during processing, and rework (Klammer 1996 and Muras and Rodriguez 2003:38). Plant management generally has primary responsibility for reducing or eliminating non-productive capacity or time to free up additional capacity or to reduce costs (i.e., by changing non-productive to idle capacity).

![Figure 8.6 The summary capacity model developed by CAM-I (Klammer 1996:15)](image)

The top area of the figure 8.6 indicates idle capacity that resulting from policy decisions such as operating schedules, legal or contractual issues, or unmarketable production capability
(excess not usable) that can be used if more products are sold (Klammer 1996 and Muras and Rodriguez 2003:38). This is capacity or time available in the plant that is not currently used because of market conditions or management decisions. Sales and upper management usually have primary responsibilities for changes in this area. Their goal is to change idle to productive capacity by obtaining more orders and increasing production. The freed resources need to be used to create more value for customers or meet new demand in the market - not to create unneeded inventory.

The bottom area indicates productive capacity - actual runtime devoted to producing goods and services, which is the responsibility of plant management (Klammer 1996 and Muras and Rodriguez 2003:38). Managers might be surprised at the low percentage of productive capacity in many of their production lines. Such low runtime percentages show the significant opportunities available to manufacture more products in-house - and at potentially lower costs - through better capacity management.

**Maximizing Flexibility and Responsiveness**

Flexibility has been well recognized as one of the key competitive advantages for many manufacturing companies. In particular, it is important in dealing with the current manufacturing environment with a growing dominance of high mix and low volume production, increased customer expectations, along with the prevailing uncertainties (Slack and Correa, 1992:82, Toni and Tonchia, 1999:1593, Kahyaoglu and Kayaligil 2002:2188). One way that capacity optimization can be defined and pursued, then, is by seeking to achieve high degrees of responsiveness to the changing requirements of the market (IMA 2000:56). If this flexibility is highly prized it may lead to cost reductions and price premiums (Slack and Correa, 1992 and Kahyaoglu and Kayaligil 2002). In addition, flexibility can provide a solution to other undesirable situations, such as the need to produce to inventory to achieve cost and performance targets.

A flexible manufacturing system can be easily redirected to new uses (Toni and Tonchia, 1999:1592). This way to optimize capacity utilization may lead to lower efficiencies - a flexible system may not achieve the same level of throughput and economies of scale as dedicated plants or facilities can attain (IMA 2000:56). However, dedicated facilities can fall victim to market shifts in demand or high levels of idleness and non-productive time, both of
which can be avoided if the process can be flexed to meet new needs (Kahyaoglu and Kayaligil 2002 and IMA 2000). Thus, using this way to optimize capacity utilization requires an organization to measure and understand the trade-off between flexibility and efficiency before this way is pursued.

**Minimizing Investment**

In many cases, some organizations focus on vendor partnerships and virtual structures to reduce the amount of investment made in capacity (see e.g., Fitzpatrick and Burke 2000, Rahman and Bhattachryya 2002 and Kasper-Fuehrer and Ashkanasy 2003). This way for capacity optimization requires minimizing the capacity resources tied to the existing product/service bundle. Within a virtual structure, an organization has few fixed assets and its attention is focused on a few core competencies critical to long-term market success (IMA 2000:56 and Kasper-Fuehrer and Ashkanasy 2003:47). While any non-core activity or capacity resource is outsourced.

This way has strengths such as increased flexibility and responsiveness, reduced inventory risk, and improved returns on investment. However, optimization capacity utilization through this way is not without weaknesses or risks (IMA 2000:57). The risks come from the precarious nature of the virtual structure - it can survive only if the market conditions are right (Rahman and Bhattachryya 2002). Particularly, the organization has to be able to exert enough power in the market to drive suppliers to meet its demands. If industry capacity becomes constrained, it can become quite costly for the virtual corporation to get needed products and services.

The reliance on leased rather than purchased equipment and plant and the use of people rather than fixed assets for the majority of production can be another way to minimize investment in capacity (IMA 2000:57). In this situation, capacity utilization may be high however it is also possible that costs will be higher than in an organization that has a higher level of investment (IMA 2000:57). Thus, the cost and profit performance should be compared to investment levels in order to detect these undesirable trends. In addition, using the bundling of several optimization ways provides the greatest potential for overall performance improvements.
Maximizing Economies of Scale (Technology)

The opposite way of minimizing investment in capacity is to pursue state-of-the-art technology. For many manufacturers, identifying and implementing state-of-the-art technology is an important step to achieve the greatest economies of scale in the industry (Porter 1998a:164). However, this way to optimize capacity is related to one key dimension - productivity (IMA 2000:57). Buying advanced technology that provide the highest possible throughput and yield can put an organization in an enviable cost position in the industry (Porter 1998a). However, pursuing capacity optimization through scale will always place an organization in a position of exposure and risk if technology advances make these investments obsolete or competitive demand change.

Finally, any of the previous ways can be used alone, however, it is best to choose several dimensions of capacity as the basis for the capacity optimization effort. For example, low cost and profit maximization may be pursued jointly if resources are focused on the areas where cheap resources are available to meet a currently unmet level of demand (IMA 2000). For each way, the goal must be to identify what business risks each represents to the organization, and then choose one or more offsetting ways to ensure that these risks are reduced or managed.

8.2.4. Experience Effects and Cost Behavior Management

A policy of systematically managing costs on a continuous basis is fundamental to stability, strength and growth potential for any organization operating in a competitive market (Tanaka et al. 1993:3). Generally, the strength of the organization relies on its ability to produce and deliver products at costs lower than its competitors. Hence, the organization should not look at the cost of a product as the simple accumulation of direct and overhead costs for its manufacture and sale, but it should view the cost of the product as an indictor of its ability to manage its resources (Hax and Majluf 1982:51).

The experience curve is a key tool to help managers in formally addressing the question of the competitive cost behavior (Hax and Majluf 1982:51). The experience curve effect belongs to the beast known concepts in strategic and operational management. It provides an empirical relationship between changes in the cost and the accumulated volume of production. For a number of industries it would be shown that average unit costs can be reduced by a certain
percentage each time accumulated production doubles (Boston Consulting Group 1972). These effects are often expressed graphically. The curve is plotted with cumulative units produced on the horizontal axis and unit cost on the vertical axis. For example, a curve that depicts a 30% cost reduction for every doubling of output is called an “70% experience curve”, indicating that unit costs drop to 70% of their original level as shown in the figure 8.7.

Although the impact of experience on lowering costs has been measured empirically in a number of industries, its benefits can only be realized by careful management (Hax and Majluf 1982:52). In addition, the effects of the experience curve can be perceived in every stage of the value-added chain. It affects each one of the value-added steps: research and development, procurement of raw materials, fabrication, assembly, marketing, sales, and distribution. Some studies (such as Hax and Majluf 1982:53, Day and Montgomery 1983:46, Henderson 1984:7, Ghemawat 1985:145, Alberts 1989:39) emphasize that the most important factors for a systemic effect on the cost behavior by the experience curve are: Learning, Product and process improvements and Economies of scale.

Learning

Learning includes the increased efficiency of all aspects of labor inputs as a result of practice and exercise of ingenuity, skill and increased dexterity in repetitive activities (Day and Montgomery 1983:46). Learning with regard to individuals and entire organization in the process of repetition is one a cause of reduction in costs (Hax and Majluf 1982:53).
Obviously, recurring costs are only influenced by learning. Nonrecurring costs, such as cost of acquiring equipments, are not affected by learning. However, nonrecurring costs may affect the learning rate experienced, but their acquisition cost will not be affected by learning on the process (Porter 1998a:74). In other words, if a company invests in process improving equipments, it might expect the learning rate in the process to be altered. However, the learning rate will not affect the cost of that initial tooling.

Learning also involves the discovery of better ways to organize work through improved methods and work specialization or getting better performance from production equipment as personnel become well acquainted with it (Day and Montgomery 1983:46). These factors contribute to the cost reductions reflected in the learning. By reviewing these factors, it becomes obvious that it is reasonable to expect a reduction in labor hours as a result of personnel learning, as well as improved methods (Day and Montgomery 1983:46). However, other types of costs such as material costs can be affected by learning as well (Hax and Majluf 1982). As personnel learn through repetition of a process or activity, they may find ways to reduce scarp and material waste. In addition, the cost of personnel turnover may be affected by improved processes that reduce personal fatigue or improve safety (Day and Montgomery 1983). Many factors can contribute to the cost reductions reflected in the learning, and the learning may be on the part of either individual or the entire organization.

**Product and process improvements**

Product and process improvements consider important factors for a systemic decrease in cost with the experience effects (Hax and Majluf 1982:53, Day and Montgomery 1983:46 and Alberts 1989:39). As production volume increase, many opportunities open up to look for ways to make product and process improvements, research new manufacturing techniques and materials and thereby achieve higher productivity and cost reductions (Hax and Majluf 1982:53 and Day and Montgomery 1983:46). The kinds of changes that generate increases in productivity and decreases in costs are modifications in the product, better utilization and substitution of materials, and rationalization of the product-mix; all of them dictated by the increased experience resulting from larger volume.

Opportunities increase for improving productivity and reducing costs by changes in the processes (Alberts 1989:39). Changes such as improved technologies, layout changes, better ways of handling and storing materials, parts, and products, adoption of more efficient
maintenance methods, and better distribution of final products are some of the alternatives that can drive costs down (Ghemawat 1985:145, Hax and Majluf 1982:53, Day and Montgomery 1983:46). In general, the idea is to look for all improvements that can reduce costs.

**Economies of scale**

Economies of scale are another source of cost reduction. In fact, the cost reduction observed in a historical series of real costs can be partly explained by the impact of accumulated volume of production and partly by the changes of scale from increased throughout (Hax and Majluf 1982:53). The economies of scale correspond to the decline in unit costs as throughout increases. These scale effects apply to the majority of functions and can be observed in distribution, sales, research and development, general administrative activities, and all stages of production (Day and Montgomery 1983:47).

In the economies of scale, many technological factors combine to produce the downward trend of the cost-curve as volume increase. Hax and Majluf (1982:53-54) stated that such dominant factors are:

- Improved technological processes for high volume production
- The resources that can be profitably used together only in large operations
- The possibility of integrating manufacturing processes for the various business activities of every large firms operating in stable environment
- The sharing of resources, mainly those managed at the corporate level, that is possible for diversifies firms with businesses in related product markets.

Cost reductions with increased scale are another way for managers to improve their competitive cost position. When these factors are properly managed, they can reduce the total cost of a product. In addition, sustaining such competitive advantage requires aggressive pursuit of market share (Ghemawat 1985:145). However, the effects of scale economies will succeed only to the extent that competitors are unwilling or unable to match investment in large, efficient facilities.

The importance of the experience curve lies in its implications for business strategy (Hax and Majluf 1982:54 and Day and Montgomery 1983:56). If costs decline systematically with
increases in cumulative output, then a firm’s costs relative to its competitors depend on its cumulative output relative to that of competitors. If a firm can expand its output at a greater rate than its competitors, it is then able to move down the experience curve more rapidly than its rivals and can open up a widening cost differential. However, a firm’s increase in cumulative output compared to a competitor’s depends on their relative market shares (Hax and Majluf 1982:54 and Day and Montgomery 1983:56). Among those who advocated this view is the Boston Consulting Group, who stated the following chain of causal relationships: high market share causes high accumulated volume of production that causes low unit cost causes high profits. The association between market share and profitability has received empirical support in the work of project PIMS (Profitability Impact on Marketing Strategies) (see for example, Schoeffler et al. 1974 and Buzzel et al. 1975).

Finally, in some industries, experience curve may not seem to play much part in cost reduction (Hax and Majluf 1984:119). In such industries, the strategic position of a business does not rely exclusively in cost advantages (Hax and Majluf 1984:119). This is the case with producers of specialty products. Commodity products have few opportunities for differentiation that can induce the consumer to pay a price premium. Specialty products, on the other hand, offer distinctive features valued by the consumer. The closer a product is to a commodity, the more its cost becomes as a crucial strategic decision variable (Hax and Majluf 1984:119). The experience curve with its implicit message for the benefits to be attained by increasing volume of production is still valid and relevant. However, a blind and narrow pursuit of cost reductions by simply accumulating experience could lead to an unexpectedly poor position in the market (Hax and Majluf 1982:61). The important message of the experience-curve methodology is that cost can and should be managed if organizations want to insure a solid position in the marketplace.

8.2.5. Complexity Management and Cost Behavior Management

Paradoxically, “complexity” is a word that has as many meanings as the number of concepts and activities it strives to define (Elliott 2002:87). Defining and understanding complexity is an important step before determining the question of how a company can manage complexity and its costs. The concept of complexity is discussed in different fields such as manufacturing, computer systems, and organizational structures. As expressed by some studies (e.g., Saeed and Young 1998, Khurana 1999 and Miragliotta et al. 2002), the
Complexity concept has five dimensions that are purposely defined for manufacturing companies. These dimensions include market, logistics, product design, process design, and management and organization. Therefore, complexity is the cumulative effect that diversity products, customers, markets, processes, parts, and organizational entities have on activities, overhead structures, and information flows (Saeed and Young 1998:1). All managers have to understand what complexity means and its effect on activities and cost behavior of the company. They should have a clear framework for decision-making that directs their efforts onto activities that yield real values for customers and shareholders.

Complexity is a multidimensional problem that generates costs for a company. The complexity costs are closely related with the cost behavior and have influence on costs of many areas of the company (Männel 1992:290 and 1995:32, Corsten and Stuhlmann 1996:14 and Kremin-Buch 1998:11). Every single part variant needs to be designed, tested, purchased or built, assembled, verified, documented, sold and serviced, thereby causing increased cost as shown in figure 8.8. As a result, unmanaged growth of complexity leads to an explosion of costs in many areas of a company that can affect the competitive position of the company (Gingrich and Metz 1990:64 and Tanner et al. 2003:2).

![Figure 8.8 Results of increased complexity (Tanner et al. 2003:2)](image)

Complexity related costs consist of non-hidden (direct) and hidden (indirect) costs of complexity (Homburg and Daum 1997:151, Saeed and Young 1998:1, Hungenberg 2000b:545, Fischer 2002:54 and Tanner et al. 2003:6). Non-hidden costs are visible such as
raw materials, equipments, labor, and some overheads. These costs are determined by the variety of products, raw materials needed, type of process necessary to manufacture the products, equipment to perform the processes and handle the materials, labor, and overheads (Homburg and Daum 1997, Hungenberg 2000b and Fischer 2002). In general, the higher the complexity of the products and the production system, the greater the cost.

On the other hand, the main problem triggered by much complexity is the hidden costs that are generally not visible (Saeed and Young 1998:1 and Tanner et al. 2003:6). These costs include, but are not limited to, rework costs, quality costs, storage costs, warranty costs, servicing costs, etc. that can badly affect the competitive advantage of the company. Complexity’s costs are real and often significant. Some studies (e.g., Child et al. 1991:53 and Rommel et al.1993:24) have seen it range from 15 percent to 20 percent of total costs, depending on the number of items (e.g., materials, parts, features, and package); tasks (e.g., making design changes, filling out purchase orders, and preparing production schedules); flows (e.g., production sites and distribution channels); and inventories (e.g., raw materials, work in process, and finished goods - see figure 8.9).

![Business system complexity diagram](image)

Figure 8.9 Complexity areas throughout the business system (Child et al. 1991:54)

When increasing or decreasing complexity elements, companies need to consider how these changes will affect cost areas such as logistics, operations, marketing, sale, general and administration and other internal areas (Homburg and Richter 2002:64). Estimating the cost effect on such areas is critical or important to effectively manage complexity (Child et al. 1991:54). Companies should know the key cost sensitivities involved as their products, processes, logistics, parts, etc. becomes more complex. Understanding how costs behave
provides the basis for estimating the impact of such changes. It is also important to track and tie each cost to its source, whether the source is an individual customer, abroad customer segment, a certain product, a specific channel or some other factors (Tanner et al. 2003:6).

It is equally important to consider how changes in the complexity elements fit with the business model and how they will affect each internal area. Will the change help to gain or reduce scale economies? Will it require a change in investment levels? Will it add or reduce risk? How will it affect predictability? A deep understanding of cost behavior - both for current costs and under potential scenarios - give a platform from which to estimate the resulting effects on the cost and profitability levels (Edmonds et al. 2003). Some cost management systems such as activity based costing, target costing, and life cycle costing can give practical support in understanding and determining the impact of this increase in complexity.

If managers do not understand the costs and the drivers of complexity, they may engage in low-value activates with serious consequences. Managing complexity can significantly improve competitiveness by simultaneously lowering costs, reducing response time, and improving customer benefits (Child et al. 1991:54 and Rosenberg 2002:226). Complexity management has emerged to be the essential part of any management. Some studies argued that companies should pursue serious concerns on their capability to successfully manage complexity and strive to simplify their business, retrenching to a stable portfolio of core products and processes (Wildemann 2000 and Maroni 2001). Others stated that companies should manage complexity through systems, structures, procedures, complex organization, and group decision-making (Reiß 1992, Hoege 1995 and Rosenberg 2002). However, in the face of growing cost problems, more companies are now taking steps to manage complexity and to identify and reduce complexity costs (see figure 8.10).

**Creating transparency**

A company can reverse and prevent excessive complexity. First of all, in order to assess the extent and sources of excess complexity costs, transparency of costs information is required - activity based costing systems can produce the appropriate cost transparency (Turney 1996 and Cooper and Kaplan 1998). Creating transparency involves identifying the drivers of total complexity and quantifying their impact on cost, quality, and time. This quantification may be
not apparent to managers. For example, in some companies 30 percent of product variety accounts for as little as 3 percent of sales, while such variations may generate well 30 percent of costs (Child et al. 1991:54).

Creating transparency forms a sound basis for developing ways to influence complexity. Complexity drivers have two dimensions that refer to the company’s ability to influence the complexity (Hagel 1988:4, Child et al. 1991:54 and Größler et al. 2003:2). The first dimension - internal drivers - is the main focus of action for complexity management and its tools. Internal drivers include, for example, more complex processes, larger factories, integration of more process steps, and a higher degree of process and product mix within the factories (Größler et al. 2003:4). External drivers are traditionally more difficult to influence, but still need to be carefully analyzed to understand their impact on the company. External drives include, for example, globalization of facilities and suppliers, changing business demands and business models, introduction of new technologies, and increasingly segmented and uncertain product markets (Größler et al. 2003:4). All complexity-driven cost components have to be taken into consideration. Based on transparent complexity costs, steps for minimizing the cost of product/part/process variety can be developed. Armed with a thorough understanding of complexity costs and with a knowledge of critical benefits valued by

Figure 8.10 The basic steps to shape up total complexity management (Child et al. 1991:53)
customers, managers have to rethink decisions in all areas of a company’s business system (Child et al. 1991:54).

**Optimizing variety**

Managers often assume that less variety, and therefore less complexity, is more efficient at maximizing the returns on investment (Child et al. 1991:54f.). Many low-volume products may lose money after the associated complexity costs are accounted for - and these are the very products meant to satisfy customers by offering variety and increasing the available range. However, some products thought to be adding complexity are quite profitable, because they generate high margins or support the image of the overall brand (Child et al. 1991 and Rosenberg 2002). Companies should seek to balance the costs of complexity and the value of complexity (Rathnow 1993:43 and Rosenberg 2002:227). Instead of simplifying products lines, managers should consider how to develop a complete picture of complexity, how it affects customers, costs, and margins, and how to achieve the best balance in the trade-off between complexity and variety.

The proliferation of product variety is generally associated with additional costs due to increasing complexity. An empirical study carried out by Wildemann (1995:13) has shown that with higher variety, the inverted effect of the learning curve can be observed (see figure 8.11). For plants with conventional manufacturing technologies, with every doubling of variant numbers, unit costs increase about 20-35%. However, by means of flexible automation and shop floor reorganization and segmentation, costs increase about 10-15%. The principal goal of an efficient variety management is to find an optimal product variety that corresponds to the optimum of the cost-benefit equation. Rathnow (1993:43) has shown that high product variety is not usually profitable because the cost curve exponentially increases compared to the benefit curve. Nevertheless, this description has only a theoretical importance because in practice an accurate determination of variety benefit and variety costs, which include not only monetary but also non-monetary costs, is a very complex task.
In order to optimize variety, a company must assess the level of variety at which customers will still find its offering attractive and the level of complexity that will keep the company’s costs low (George and Wilson 2004). Management should identify and prioritize the factors that provide value to the customers, if it wants to standardize its product range, sales and marketing must adapt. The basic key to this decision is understanding the fundamental requirements of customers (Child et al. 1991:57 and George and Wilson 2004). Understanding the requirements and other factors that drive buying decisions of current and potential customers is important - often critical. The challenge lies in understanding value-added variety. Value-added variety is any product or service differentiator that the customer is willing to pay for (Saeed and Young 1998 and Anderson 1997).

The problem remains to determine how much variety is optimal. Saeed and Young (1998) propose to identify the variety the customer rewards and the variety the market is not willing to pay. Anderson (1997:45) also defines two categories of external variety. The first category is useful variety, which is appreciated by customers and contributes to their satisfaction. The second category is useless variety, which is transparent, unimportant and causes bad effects such as customer confusion. In order to approach the variety optimum, useless variety should be eliminated. A simple tool such as ABC-analysis can be applied to support decision-making (Blecker et al. 2003:6). For example, Nissan automobile had 87 steering wheels available. Seventeen types had been installed in 95 percent of Nissan cars, while 70 types in only 5% of
the manufactured cars (Anderson 1997). In general, the benefit of such a variety does not compensate the additional costs due to complexity.

However, the effects of variety are not usually reversible. Increasing product variety generally necessitates the creation of additional structures and investments such as flexible equipments or expensive electronic data processing systems, which are fixed costs (Anderson 1997, Rosenberg 2002 and Blecker et al. 2004). A rationalization of the product assortment by reducing the number of variants can make these investments or some of them superfluous. These costs cannot be reduced in the short run and their effects are generally irreversible. This observed phenomenon having a similar effect to the hysteresis effect (see figure 8.12), is called costs’ remanence (Caesar 1991:14, Loesch 2001:46).

![Figure 8.12 Costs remanence by reducing variety (Hichert 1986:674)](image)

Optimizing variety requires understanding the buying and switching behavior of the customer. Management must understand the current levels of cannibalization (i.e., substitution rates among its own products) and substitution (i.e., how much of a product’s sales would automatically go to a particular competitor if the product were withdrawn) (Child et al. 1991:58). Management can then weight the long-term profit and market share impact of withdrawing a product against the benefits of reducing complexity. Armed with knowledge of customer needs and substitution-cannibalization rates, management can design a product range that optimizes market variety, maximizes sales, and minimizes complexity (Child et al. 1991:59). Deciding on the optimum market variety is part of an iterative process that never really ends, and, although a company may arrive at a optimum market variety from the
customer’s perspective, complexity costs well change it. Thus, management must simultaneously minimize business complexity while optimizing market variety.

**Minimizing business complexity**

At the basic level, managing business complexity involves rationalizing, standardizing, and simplifying organizational structures, materials, parts, tools, products, business processes, and information technology in order to help departments, employees, and suppliers improve their respective tasks (Child et al. 1991:59). One way in which organizations try to cope with business complexity is by transferring it to their suppliers (Rosenberg 2002:232). This way can be described in terms of exporting complexity. Exporting complexity can be an effective response to dealing with business complexity if the supplier’s organization is more flexible and can better handle huge business complexity (Child et al. 1991:59 and Sivadasan et al. 2002:551). Suppliers can incur high precautionary costs to deal with imported customer complexity such as building up inventories, investing in extra capacity, acquiring advanced information management systems, and training personnel (Sivadasan et al. 2002:552). Thus, increased operating costs of the supplier will be passed on to the customer if the supplier does not have the means to deal with them internally.

Poor ability and insufficient resources internally to control and contain complexity may lead some companies to push their complexity on to their suppliers (Sivadasan et al. 2002:551). Such companies can never reach the cost, time, and quality position of companies that discuss and address complexity with their suppliers, have longer-term relationship with suppliers, jointly develop products and entrust a larger share of quality control to suppliers (Günter 1991:44). For example, in a German machinery company, certain parts were connected to each other by different methods thus the company could hardly enjoy the benefits of economies of scale. After cooperating with the supplier, the company decided to standardize the methods of connection to use the same manufacturing process for all parts. In this case, the company reduced purchasing costs of the parts by 30 percent, decreased delivery time, and improved the quality (Child et al. 1991:59). Thus, a company should bring suppliers into the design stage after defining the functions of the different components. Suppliers will be able to make suggestions and reduce complexity.
A company should give its priorities to ways that prevent, contain, or reduce business complexity rather than transfer it to its suppliers (Rosenberg 2002:232 and Kajüter 2002:45). A company should look at all areas of the business system in order to minimize business complexity. These areas include procedures and systems, people and organization, production facilities, and product-process design (Child et al. 1991:59 and Rosenberg 2002:232). Many complexity costs are caused by complexity of procedures and systems within the business system. Procedures and systems contain management and operational procedures and systems, and parts and information flow. Excessive complexity in this area is created by making procedures and systems too perfect, using the same procedures and systems for both series and one-time events, and emphasizing postprocess controls rather than preprocess intervention (Child et al. 1991:61). In order to avoid this kind of complexity and its costs, a company should simplify its procedures and systems by empowering organizational units to create their own procedures and providing them with the competence to define their information needs and implement them (Gingrich and Metz 1990:64, Child et al. 1991:61 and Saeed and Young 1998). However central management can simply set a few rules to manage interface between organizational units. In addition, a company should design different procedures and control systems for both series and one-time events, and emphasize preprocess intervention to avoid mistakes before they happen.

Many complexity costs generated throughout the company are actually caused by organizational complexity (Gingrich and Metz 1990:67, Child et al. 1991:62). This includes layers of hierarchy, bureaucratic methods, functional compartmentalization, and a sheer inability to respond quickly to challenges. The excessive business complexity and its costs may be found in the organization that is divided by functions, has large organizational units, and has more levels from divisional. Such organizational types require several resources and costs to fulfill any given task (Child et al. 1991:63). Thus, such companies must find ways to simplify their organizational structures through a disciplined analysis of the value of the functions and activities, or must use other organizational forms. Typically, according to some studies an important portion of complexity costs can be saved by eliminating low-value activities and functions (Turney 1996 and Cooper and Kaplan 1998).

The flexibility of Production facilities may be useful in the management of business complexity (Rosenberg 2002:232). The availability and flexibility of production facilities
enable a company to cope with any rapid and specific demand from customers. Some companies have traditionally used fixed facilities of interlinked production processes to make a single end product, like an assembly line for a car (Kauffman 1995:128). Such fixed facilities are used for long production runs. Coordinating a large number of interlinked plants and manufacturing departments is very costly (Child et al. 1991:63). In addition, mixing small and large lot sizes at one facility creates problems of both kinds of products. For example, the large number of production orders generated by small lots leads to increasing production planning and control costs in a system designed for large lots (Child et al. 1991:63). On the other hand, the inflexible processes in place for large lots with their high set-up costs hurt small lots. Thus, a company can take some actions to reduce the interlinked of plants or manufacturing departments. For example, it can dedicate plants and manufacturing departments to a type of finished product and not to a function or process step. It also can separate manufacturing facilities for small and large lots (Child et al. 1991). It is becoming important to shift to flexible manufacturing (Rosenberg 2002:232). The idea here is to be able to determine a diverse range of end products, reconfigure production facilities quickly and cheaply, and carry out short production runs to yield small quantities of specialized products for niche markets.

Another area of complexity management is product and process design. Product and process design must get the attention they deserve as drivers of costs, quality, time, and business complexity (Hagel 1988, Child et al. 1991 and Miragliotta et al. 2002). In many companies, an important portion of costs, quality, time, and business complexity can be influenced through product and process design (Child et al. 1991:64). Since product and process design have such a major influence on the complexity and costs, it is especially critical that the company must eliminate or avoid complexity in the early steps of product and process cycle. However, many companies do very little to limit complexity in the early stages of product life cycle but they try to reduce it after the products and processes are already well in place (Child et al. 1991:64). Thus, efforts of complexity management to avoid complexity after production begins may be of limited effectiveness.

During product and process design, specifications are determined, functionality is defined, process requirements are detailed and met, and key interdependencies in the product, its components, supply system, and service and performance requirements are established
(Youssef 1994:6 and Miragliotta et al. 2002:387). Once these decisions and their resource implications have been made, it is difficult and quite costly to reverse or modify them. Estimates of complexity product and process related change costs vary from situation to another. However, it is certainly true that the change cost multiplies as it affects each interdependent activity, process, resource, or component part (Ansari et al. 1997b:147). Many companies incurred costs annually to develop, implement, and track complexity related changes and other activities that could have been avoided with minimal cost and effort during the design stage.

Many factors should be addressed and realized during the product and process design in order to avoid business complexity and its costs. These factors include, for example, the current customer requirements, the ability of company and partners to meet these needs, changes of technologies, competitive markets, current core competencies, the internal performance requirements for the product and process, the ability of competitors to meet customers’ requirements, the existing processes and process capabilities, core processes, the bottlenecks, and how can they be managed, etc. (see, e.g. Hammer and Champy 1993 and Davenport 1993, Cooper and Slagmulder 1997a and Ansari et al. 1997b). Each of these factors helps to narrow down the range of business complexity as the iterative design process is completed. Product design and process design must work together and resolve business complexity and its costs in order to create the best and most profitable product for the company. There are many methods for use in product design and they should be adjusted to the various situations, it is therefore important to understand what needs to be done. Some companies have found effective ways such as modularization and standardization to manage product and process design (Child et al. 1991:64). In addition, target costing provides the framework for structuring the analysis and decision making inherent in choosing one product/service bundle and set of features over another (Ansari et al. 1997b and Cooper and Slagmulder 1997a). There are also many methods in process design such as business process reengineering and total quality management that consider always important (Imai 1986, Hammer and Champy 1993 and Davenport 1993).

Finally, complexity management is started by top management with the choosing of a cross-functional team consisting of key members from across the company, who are encouraged to break traditional territorial thinking to make integrated business decisions (Child et al.
1991:57 and Tanner et al. 2003:7). The team analyzes the company and its environment to flush out the hidden linkages between costs, activities, and the decisions that generated them. Ideally, this analysis should be extended to include major suppliers and important customers. By involving these partners, the team will not only gain a better understanding of the total costs of complexity, but will also win the partners commitment to business complexity reduction.

### 8.2.6. Cost-Flexibility and Cost Behavior Management

The cost-flexibility is closed related with the cost behavior management and has a significant influence on the cost structure. In the relation between fixed and variable cost behavior, the cost-flexibility manifests itself (Männel 1995:31). Cost-flexibility has been considered as a major determinant of competitiveness in an increasingly intense competition in the marketplace (Oecking 1994:1). In the competitive environment, cost-flexibility should replace cost stability as the underlying strategic imperative. There is considerable pressure for organizations to become cost-flexible in order to establish, retain or maximize their market position. In order to achieve this objective for organizations, the working toward cost-flexibility should be goal of the cost management (Männel 1995:31).

A cost-flexible organization has the ability to respond to financial imperatives (see e.g., Johnson 1992, Triest 2000 and Edmonds et al. 2003). In essence, a cost flexible organization is better able to adjust its costs to react more quickly to changing business conditions (Simchi-Levi et al. 2000). It does this by reducing the proportion of its total costs that are fixed costs. Cost flexibility is rooted in the idea that the cost of a certain resource, activity or process is treated as the major fixed cost. Cost-flexibility is, thus, achieved through some procedures and actions that enable the organization to adjust its costs especially fixed costs to match the changes its costs and profit (Oecking 1994:186). In addition, cost-flexibility is related to the ability of an organization to substitute its available resources, activities, or processes in another direction than the current one (Simchi-Levi et al. 2000 and Feenstra and Helden 2003:16). For example, if an organization has relatively high labor costs related to employees with a regular labor contract, its cost flexibility is low. If, on the contrary, an organization has many employees with a flexible labor contract, its cost flexibility will be high (Feenstra and Helden 2003:16). Similarly, assets that are owned by the organization induce costs that are inflexible, whereas leased assets lead to comparatively more flexible costs.
Organizations in most industries are experimenting with organizational innovations (may be directed to change the organizational structure, technology, human resources, product, process, or service) that are intended to enhance cost-flexibility and affect cost behavior (see e.g. Imai 1986, Johnson and Kaplan 1991, Johnson 1992, Hammer and Champy 1993, Oecking 1994 and Carr and Smith 2000). Cost-flexibility is heavily driven by many factors, actions, or procedures that determine largely the cost-flexibility within the company. Requirements for cost-flexibility in companies differ depending on the conditions in which the companies operate. However, there are major sources of cost-flexibility in organizations such as the personnel policy, technology, process design, product design, outsourcing, lease or buy decisions (Oecking 1994:186, Männel 1995:31 and Franz and Kajüter 2002:26).

An important starting point of the cost flexibility is the **personal policy** (Oecking 1994:187, Männel 1995:32 and Franz and Kajüter 2002:26). Personnel policy determines to a great extent the cost flexibility in the company. In the last few years, a wave of major changes has swept through the labor market with globalization and market deregulation in the forefront (see e.g., Valverde et al. 2000, Bühner 1997). In order to cope with increased competition and with the demands of cost and resource management, firms have to devise, among other solutions, new management models, based on greater flexibility of the workforce (Valverde et al. 2000:649). Personnel costs are mainly fixed, and thus do not automatically decline with decreasing volume (Franz and Kajüter 2002:26). Specific personnel management measures are therefore needed to adapt personnel capacity to changing market conditions. Many companies have adopted more flexible working methods. Flexible working - whether flexible working hours, flexible tasks, part-time, temporary or outsourced - has increased rapidly in the recent years as companies have attempted to influence on the cost behavior by adjusting job patterns more closely to the work available (see e.g., Ballot et al. 1992, Bühner 1997 and Valverde et al. 2000). Flexible work arrangements can be used as a means to enhance cost-flexibility within the company. However, the extent to which companies are able to make use of these concepts depends on legal restrictions.

In any company, the level of **technology** used in its activities has a powerful effect on the cost-flexibility. Advanced manufacturing technologies such as robotics, computer-aided design and flexible manufacturing systems have substantially changed the behavior and the composition of product costs (Berliner and Brimson 1988:1 and Kerremans et al. 1991:147).
Technology causes higher ratios of fixed costs to variable costs and many costs viewed as indirect costs in traditional companies are in fact direct costs in high technology firms (Berliner and Brimson 1988). Concerning cost-behavior patterns, most authors agree that direct labor costs have decreased and have often become insignificant while overheads (factory overhead, distribution costs, logistics costs) have become more important (Berliner and Brimson 1988, Monden 1992, Maher and Deakin 1994, Turney 1996 and Horngren et al. 2000).

High technology production systems often mean higher fixed costs and lower variable costs. However, technology has a powerful effect on competitive advantage in either cost or differentiation. Since technology is embodied in every value activity and is involved in achieving linkages among activities (Porter 1998a:169). It will affect the costs if it influences the cost drivers of activities. Porter (1998a:169) argued that technological development can change scale economies, make interrelationships possible where they were not before, create the opportunity for advantages in timing, and influence nearly any of the other drivers of cost. Thus, a company can use technological development to alter cost drivers in a way that favour it, or to be the first and perhaps only company to exploit a particular driver.

Technological advances can affect cost-flexibility by direct and indirect ways. For example, they may improve the production process, so that less inputs have to be used to produce a unit of the good. In addition, they may lower input prices. In either case, technological advances lower variable costs and, consequently, shift the total cost curve downward (Berliner and Brimson 1988, Monden 1992:153). Another benefit of the introduction of technology will often be in the reduction of fixed costs. For many companies labor is the most expensive fixed cost component and by using technology to reduce labor and to make labor more effective, fixed costs can be often substantially reduced (Maher and Deakin 1994:11). Reducing fixed costs enables the company to achieve break even much more rapidly, especially as technology may also have the effect of reducing the variable cost of production. Technology will also make the company able to manufacture small volumes more cost effectively, thereby having an effect on the variable cost of production.

The **product and process design** is crucial in today's highly competitive manufacturing environment. Since the design of product and process affects cost-flexibility, quality,
flexibility, lead-time, and responsiveness (Youssef 1994:6 and Tatikonda and Tatikonda 1994:22 and Kusiak 2002:224). Concerning cost-flexibility, the design of product and process affects materials, labor, energy, equipment, tooling, building, maintenance, overheads, and cost of capital. A flexible product and process design together with materials selection, and materials handling, can determine to a great extent the cost flexibility in the company (see e.g., Hammer and Chamy 1993, Hutchinson and Pflughoeft 1994, Kusiak 2002 and Boothroyd et al. 2002). Some companies have used product and process design methods that enable them to achieve a broad range of flexibility in the product and process costs. Examples of design methods applicable to both product and process include design for manufacture and assembly, customer oriented design, design to cost objectives, continuous process improvement, total quality management, business process reengineering (see section 7.1.1 and 7.2.4). The proper use of these methods in the product and process design can help companies achieve multiple advantages in terms of quality, flexibility, responsiveness and cost flexibility.

Companies are constantly trying to find out ways, how their cost behavior could be improved, and how the fixed costs can be transformed to variable costs. Outsourcing has become a normal way of doing business and in trying to solve the above-mentioned challenge. Cost flexibility is often cited as an expected benefit of outsourcing. Outsourcing can be used as a means to enhance cost-flexibility within the company by converting fixed costs into variable costs (Gilley and Rasheed 2002:765, Kakabadse and Kakabadse 2002:190, Quelin and Duhamel 2003:654 and Brown and Wilson 2005:75). Companies are concentrating especially their resources on core activities or processes, and non-core activities or processes are outsourced increasingly to external service providers (Kakabadse and Kakabadse 2002:190 and Gilley and Rasheed 2002:766). Outsourcing such activities or processes has proven to be an effective technique for achieving cost flexibility within the company. Since most businesses’ administrative costs and procurement, accounting, human resources, assets or property management and the information technology are relatively fixed. Almost immediately, outsourcing can improve the vitality of an organization’s bottom line by reducing fixed costs and capital investments and this leads to a lower break-even point (Gilley and Rasheed 2002:765, Kakabadse and Kakabadse 2002:190 and Quelin and Duhamel 2003:655). Additionally, outsourcing can help secure a competitive foothold by refocusing the organization’s critical resources on improving and differentiating its core competencies.
The most often discussed advantages of outsourcing are connected with improved financial performance and various non-financial performance effects, such as reduced overheads and operational costs, possibility of converting fixed costs into variable costs, price competitiveness, lower involvement (freezing) of capital, improved cost control, a heightened focus on core competencies, higher flexibility, easier and more economic access to the latest technologies, improved quality, etc. (Lewin and Johnston 1996, Gilley and Rasheed 2002:765, Kakabadse and Kakabadse 2002:190 and Quelin and Duhamel 2003:654) Many believe that if these expected benefits are realised, outsourcing will remain one of the strongest and most sustained trends in business over the next years (see Lewin and Johnston 1996 and Gilley and Rasheed 2002). Despite its many advantages, outsourcing involves considerable risks such as hidden costs, loses some control over its future, loss of know-how, service provider’s lack of necessary capabilities, communication and coordination difficulties, etc. (Gilley and Rasheed 2002:766 and Quelin and Duhamel 2003:656). Consequently, to be able to take advantage of all the potential benefits of outsourcing, a firm has to know the related risks and threats.

Leasing production facilities such as equipments and tools instead of buying them is called often as strategy for temporal making of cost-flexibility within the company (Oecking 1994:188). Firms generally own fixed assets and report them on their balance sheets, but what is more important is the use of these assets instead of their ownership. From this point of view, the idea of leasing becomes more important, since leasing can be defined as a contractual agreement in which the owner (the lessor) of the asset or the property grants to a firm (the lessee) the use of the asset’s services for a specified period of time and in return the lessee must make periodic payments to the owner of the asset (see e.g. Oecking 1994:188f. and Ross et al. 1996:625). Leasing is important for firms because of many reasons or advantages. The convenience of the leasing for any time specifications, cancellation options available (i.e. in the operational lease), maintenance provided, use of tax shields and standardization are the basic advantages of the leasing that can lead to low administrative and transaction costs, avoid the costs of idle equipments, and create cost flexibility (see e.g. Lumby 1994, Oecking 1994, Ross et al. 1996, Lasfer and Levis 1998 and Weiss 2003).

Leasing has further advantages such as freeing up working capital for other business uses, giving the company the advantage of having new equipment with the latest technology that is
available at that time, etc. However, the advantages of leasing change from situation to situation according to the type of the lease. In addition, the leasing has some disadvantages such as leasing may cost more, a company loses the economic value of the asset at the end of the lease term, and the lease contract is a long-term obligation (i.e. financial lease) and not cancelable (see e.g. Lumby 1994, Oecking 1994, Ross et al. 1996, Lasfer and Levis 1998 and Weiss 2003). While leasing instead of buying might primarily be made on many considerations, such as finance availability and likelihood of obsolescence, cost flexibility could be an important factor in this decision. Leasing instead of buying can be a cost-effective option, particularly if a company does not have the sufficient working capital to support the purchasing decision of the assets or the properties, but need them.

Finally, in order to achieve the goals set for the organization, management makes critical choices - choices that guide the future activities of the organization. These choices include decisions about resources, processes, products, services, organization structure, and so on. Choices about product or service attributes (mix, quality, features, performance, complexity, etc.), capacity (committed and discretionary fixed costs, capacity utilization), resources or processes (flexibility, lease or buy, outsourcing), and technology (capital/labor considerations, alternative technologies) can greatly affect cost-flexibility and cost behavior.

8.3. Cost Level and Cost Structure Management

8.3.1. The Concept and Objects of Cost Level and Cost Structure Management

Cost level and cost structure management are another activities or analysis fields of strategic cost management (Männel 1995:28 and Götze 2004:263f.). Cost level management means the effect on the cost level purposefully - normally reducing the general cost level, i.e. the height of the costs (Corsten and Stuhlman 1996:14 and Kremin-Buch 1998:10). For this purpose, there are several starting points such as reducing the level of total costs, the cost level of an individual organizational unit or the level of unit cost. Cost structure management means the purposeful influence on the relationship or proportion of certain cost categories to each other to improve the firm's cost-structure and search for a sustainable competitive advantage (Reiß and Corsten 1992:1484, Shank and Govindarajan 1993:6, Dellmann and Franz 1994:19f., Männel 1995:28, Götze 2004:263 and Franz and Kajüter 2002:9).
Identifying and understanding the cost structure of the company is the first step in the process of cost level and cost structure management. Cost structure refers to the relative proportion of certain costs categories to each other in an organization (Reiß and Corsten 1990:390, Franz and Kajüter 2002:14 and Reiß 2002:441). Consequently, the cost structure can be broken down through some dimensions or criteria. These dimensions or criteria are shown in the figure 8.13 and consider the basic objects of cost level and cost structure management (Männel 1995:28f., Roolfs 1996:125f., Götze 2004:264 and Franz and Kajüter 2002:14). It should be recognized that cost level and cost structure management stand in close relationship to each other, since the change of the costs of an object usually affects both the cost height and the cost structure (Dellman and Franz 1994:20 and Götze 2004:265). For example, by lowering of overhead costs both the cost level and the relationship to direct costs are affected (Götze 2004:265). However, the exceptions may also occur, in the case of change of the cost level and the cost structure is retained unchanged or a substitution between cost categories can take place without influence on the cost level.

Cost categorization in direct and overhead costs leads to an important object of the cost level and cost structure management (Reiß and Corsten 1992:1484, Becker 1993:15, Burger
In many contemporary manufacturing companies the nature of production has changed significantly. The change is seen in the traditional accounting classifications as a decrease in direct labour costs and a steady increase in both manufacturing and non-manufacturing overhead costs (Maher and Deakin 1994, Turney 1996 and Horngren et al. 2000). This change reflects a move from direct cost management to overhead cost management. Overhead costs pose a special problem for all organizations, especially manufacturing companies. The combination of indirect and fixed costs which make up overhead creates problems of measurement and allocation and the effect on profit and competitiveness (Miller and Vollman 1985:142, Cooper and Kaplan 1988a:96, Tanaka et al. 1993:107f., Turney 1996:32 Sakurai 1996:87f., and Müller 1998:21f.). Also measuring and improving of overhead productivity consider a critical problem. Activity-based costing, overhead value analysis, and zero-base budgeting serve as useful instruments in addressing these problems (Sakurai 1996, Turney 1996, Arnaout et al 1997, Cooper and Kaplan 1998 and Müller 1998). Without overhead cost management, any attempt at cost management is bound to be both partial and inevitably ineffective. Effective cost management depends on the measurement and improvement of overhead productivity and will be one of the keys to success in the future. Overhead cost management will be discussed in the section 8.3.3.

Also an important object or influence area of cost level and cost structure management is the functional cost structure (Männel 1995:29, Götze 2004:264 and Fischer 2002:53). The total cost of an organization is the sum of all the costs of its functions such as research and development, purchasing, production, administration, and selling and distribution. Cost level and cost structure management in this object or influence area will require shifting, substituting, and intensification of the activities in and between functions or divisions to affect the cost level and structure (Männel 1995:29). For example, the intensification of the development activities for the improvement of products and processes can reduce the level of activity and the activity structure in production and marketing departments. Hereby accompanying costs of manufacturing, logistics, marketing, service, etc. can be reduced and replaced with development costs. In this case, it is obvious that functional cost structure management is primary an influence area on the firm’s structure and operational sequences (Männel 1995:29). The influence of functions changes on the functional cost structure results only indirectly. If a company can affect its cost structure and then cost level through the focus on the R&D activities, it also is possible to pursue this influence through administrative,
selling and operational costs that are directly product-related working functions (Männel 1995:29). The influence direction through the cost management is given by many goals such as reducing or eliminating non-value-added activities and consequently their costs and continuous improvement of administrative, selling and operational functions. Many ways can serve in this field such as activity based costing and management and kaizen costing system (Imai 1986, Turney 1996 and Cooper and Kaplan 1998).

Another object or influence area of cost level and cost structure management is life cycle-costs (Männel 1995:30 and Götze 2004:265). Product-life-cycle costs include all costs incurred over the phases of a product’s life cycle. Cost categorization into upstream costs, manufacturing costs as well as downstream costs in the product life cycle gives an important structural image for cost management. In this connection, life cycle costing provides a long-term perspective, because it considers the entire life cycle costs of the product. It therefore provides a more complete perspective of product cost structure and product profitability (Horngren et al. 2000:145). For example, a product that is designed quickly and carelessly, with little investment in design costs, may have significantly higher marketing and service costs later in the life cycle. Cost level and cost structure management require managers to interest with the total costs over the entire life cycle and not manufacturing costs only (Berliner and Brimson 1988 and Shields and Young 1991). While traditional cost management methods have tended to focus on manufacturing costs, upstream and downstream costs can account for a significant portion of the cost structure, especially in certain industries such as auto manufacturing and pharmaceuticals (Horngren et al. 2000:146). Life cycle costs structure can be managed by many ways such as the life cycle costing - this instrument will be discussed in the section 9.1.3.

There are many opportunities to improve the cost position of the company on the basis of cost objects-management purposefully. Cost structure and cost level are influenced by three basic objects within the company (Corsten and Stuhlmann 1996:14, Götze 2004:265 and Franz and Kajüter 2002:19). These three basic objects are resources, processes, and products. They constitute another dimension of the cost level and cost structure management. In the field of product-related cost management, many considerable procedures and ways can be pursued to affect the cost level and cost structure such as product design and development (e.g. design product for manufacture and assembly, customer oriented product design and development,
and product design to cost objectives), product complexity management, and target costing technique (see the section 7.1). The second object is the process cost. This object considers an important influence area because the real driven of overhead costs comes from different activities and processes (Cooper and Kaplan 1999 and Miller and Vollman 1985). Consequently, in order to manage cost level and cost structure, a company should give a particular interest to the cost impact of activities and processes on the cost level and cost structure. In this connection, strategic cost management has the appropriate techniques for carrying out process-related cost management for example activity based costing and activity based management. In addition to ABC/M, many other useful management techniques have become known over the last years, including business process reengineering (BPR) and continuous process improvement (CPI) (see the section 7.2.4). Finally, in the most manufacturing companies, purchases of materials and services, and human resources consider an important portion of their cost structures (Franz and Kajüter 2002:24f.). Thus, resources-related cost management has a very important role for improving cost position of the company. Many ways can serve in this field such as the total cost of ownership approach, human resource cost management, target costing and activity based costing and management. For more details about this object, see the section 7.3.

The objects of cost level and cost structure management include cost categorization into variable and fixed costs (Reiß and Corsten 1992:1484f., Männel 1995:30, Götze 2004:264 and Reiß 2002:441). This classification which is more useful for cost level and cost structure management is based on logic of cost behavior - the behavior of cost as a function of activity or cost driver. The relationship between variable and fixed costs is the center of focus of the cost level and cost structure management (Oecking 1994:10, Männel 1995:31, Arnaout et al. 1997:166 and Kremin-Buch 1998:12). Companies operate in highly competitive environment in which cost level and cost structure management are related to a large extent by fixed cost management. Consequently, fixed cost management is crucial for their continued competitiveness. In this light, fixed cost management will discuss in the section 8.3.4.

8.3.2. The Implications of Cost Level and Cost Structure

Many companies have spent considerable time, money, and effort on their policy and strategies, and time and effort spent on these areas can be financially rewarding (see e.g., Day 1990, Thompson, 1993, Porter 1998a and Wheelen and Hunger 2002). However, the
importance of cost level and cost structure on competitive position of the company should be of primary concern (Shank and Govindarajan 1993, Männel 1995 and Franz and Kajüter 2002). In some companies, the cost structure is characterized by a relatively a large proportion of total costs that is fixed and/or overhead and a low proportion that is variable and/or direct (Günther 1997:99). The high cost level and strong competition will probably induce many companies to continue reducing costs and rationalizing. The cost structure with these components and cost level have significant and powerful implications for the company’s profitability and its strategies. This section will emphasize the importance of a fundamental and essential understanding of how cost level and cost structure will affect profitability and management strategies.

The first implication of the high fixed-cost structure is that plant or business unit shutdown decision is much less responsive to price decreases. In contrast, with the cost structure that has a large proportion of variable costs, modest declines in prices will result in shutdown of the factory because prices or revenues will not cover variable costs; fixed costs and total costs are irrelevant in the plant shutdown decision (Maher 1997:447f. and Wang and Yang 2001:182). However, the fixed costs affect the shutdown decision very differently depending on whether they are sunk or recoverable. Recoverable fixed costs are only the recoverable portion of fixed costs that matter since sunk costs cannot be avoided by closing the plant (Belkaoui 1991:309, Horngren et al. 2000:379 and Wang and Yang 2001:182).

A second implication is that traditional cost management strategies are less effective in a high-fixed (or overhead)-cost structure (Günther 1997:101f. and Müller 1998:54). If a large proportion of the costs are fixed or overhead, traditional strategies that by their very nature focus on direct or variable costs have less potential impact because direct or variable costs are a lower proportion of the total cost. Cost management strategies in the current business environment should focus on overhead and fixed costs not only because they are a larger proportion of the total costs, but also because they have a significant influence on profit and competitiveness (Oecking 1994, Arnaout et al. 1997 and Müller 1998).

In a high-fixed-cost structure, fixed asset utilization is critical, because fixed assets are the basic source of fixed costs in some industry such as steel, automobiles, machinery and electronics (Deo 1992:83 and Triest 2000:3). This is particularly the case for companies under
financial stress. For most companies in financial trouble, the problem is excessive fixed costs rather than variable costs (see e.g., Harris and Pringle 1989 and Ross et al. 1996). Excessive fixed costs can be reduced by selling or disposing of the fixed assets that are resulting in the fixed costs (Ross et al. 1996:811), or by increasing throughput (increased volume with the effective utilization of the same fixed asset base) to spread the fixed costs over more output. Throughput can be increased by tighter scheduling of production, operating machinery and equipment more hours per day or days per year, by custom operations, or utilizing capacity resources effectively, etc. (Tanaka et al. 1993). Traditional cost management strategies are generally ineffective for many firms under financial stress because the cause of that stress is usually excessive fixed costs, not excessive variable costs.

Cost structure also affects the sensitivity of profitability to sales volume and level (Hansen and Mowen 1994:350, Hilton 1994:339 and Edmonds et al. 2003:55f.). The implications of different cost structures for two firms are shown in the figure 8.14. To make the analysis easier to understand, it is assumed that total costs for Firm X and Firm Y are both equal to total revenue at the same break-even level of sales. Figure 8.14 illustrates that the significantly greater change in profit and loss angle as one deviates from the point of breakeven sales volume when fixed costs comprise a higher proportion of total costs (Firm X), compared to the narrow profit and loss angle when variable costs dominate the cost structure (Firm Y). Sales volume above the break-even level has a much larger impact on profits for the high-fixed-cost firm (Firm X), compared to the low-fixed-cost firm (Firm Y), and likewise volume below break-even results in a larger loss. Consequently, maintaining volume above break-even has a much higher payoff for the high-fixed-cost firm, and volume below break-even results in more risk of loss (Edmonds et al. 2003:55). In essence, the low-fixed-cost firm is not hurt as much by volume declines, nor does it benefit as much from volume increases - there is a higher payoff for a firm like this to emphasize cost control rather than volume to increase profits (Hansen and Mowen 1994, Hilton 1994). For the high-fixed-cost firm, volume is paramount (Horngren et al. 2000:71).
Figure 8.14 Impact of the proportion of fixed and variable costs on profitability and risk

A high-fixed-cost company is less flexible - less adaptable (Berliner and Brimson 1988:24). It is relatively difficult for such a company to respond to changing economic conditions, adjust to new market realities, or adopt new technologies and ways of doing business. With the rapid change occurring in the business environment, a company that has more capacity to respond to that change, to adapt, and to be flexible has a higher chance of surviving (Oecking 1994:1). The challenge becomes flexibility at what cost? If flexibility results in inefficiency and high costs - it may not be worth the “price” that is being paid. High-fixed-costs result in high risk (particularly if those fixed costs are also cash costs) and reduced flexibility, so one strategy that should be considered to reduce risk for firms with high-fixed-costs is to convert fixed costs into variable costs (Oecking 1994:186). Such conversion can be made by many ways or procedures such as outsourcing, leasing instead of buying, personnel policy, etc. (Oecking 1994:186 and Männel 1995:31 and Franz and Kajüter 2002:26). However, this conversion should not be done without evaluating the implications for quality and availability of the service/resource and the comparative cost of obtaining the service/resource with various strategies.

A high-fixed-cost industry is also an industry with a high entry fee. This means it is relatively difficult for new entrants to acquire the resources and financial backing to enter the industry (Porter 1998b:9f.). In a market with few producers who are producing differentiated products,
a high entry fee would also provide some protection from competitors who are less likely to enter and take market share (Porter 1998b:9). Thus, there is generally less competition and lower risk of losing market position, power, or share if the entry fee is high because of the dominance of fixed cost.

Finally, as reflected in Figure 8.14, in a high-fixed-cost firm with a high profit and loss angle, increasing revenues by increasing product price has an identical absolute but smaller relative or percentage impact on profitability for a given level of sales (Edmonds et al. 2003:55). Similarly, a decline in product price because of a less effective marketing strategy and/or price discounts results in the same absolute but smaller relative decline in profitability for a high-fixed-cost firm (Edmonds et al. 2003:55). Consequently, relative to other means of enhancing profit margins such as increasing efficiency or reducing costs, price enhancement is less critical for the high-fixed-cost firm and more critical for the low fixed-cost firm (Edmonds et al. 2003). In fact, for a low fixed cost firm, a significant decline in prices or price discounting to maintain market share can quickly result in losses and financial failure. Price declines or discounts are relatively less painful for a high-fixed cost firm.

In summary, the cost structure has significant and powerful implications for management decisions and strategies. The high-fixed-cost structure of the firm affects cost management strategies, pricing decisions, and risks, and reinforces the critical nature of maintaining throughput. The cost structure also has policy implications - a high-fixed-cost firm will tend to overproduce and frequently will need some form of output control by an industry group or the government to maintain industry stability. The high cost level has a substantial negative impact on the profitability and management strategies. A firm should be able to reduce its cost level as rapidly as its competitors to improve its cost position. In order to realize such a change in the cost level, it is important to maintain a strong focus on several areas such as effective utilization of capacity, economies of scale and experience effects, complexity management, and cost flexibility. In addition, cost elements that are of great significance for many companies are fixed costs and overhead costs. Thus, focus must be placed on these cost elements because they are a larger proportion of the total costs and have a significant influence on profit and competitiveness.
8.3.3. Overhead Cost Management

8.3.3.1. The Causes of the Rapid Growth of the Overhead Costs

It is known that the overhead costs have grown prodigiously during the last years. This problem was discussed many years ago (see e.g. Plaut 1965, Neuman 1975a, Miller and Vollman 1985). During the seventies and eighties, some instruments such as zero-base budgeting (ZBB), overhead value analysis (OVA) and activity based costing (ABC) have used to deal with the problem of increasing overhead costs (Pyhrr 1970, Neuman 1975a and Cooper and Kaplan 1988b and 1998). Many reasons can lead to increase the portion of overhead costs in the total costs of an organization. In the last years, the tertiary sector of industry, also called the service sector or the service industry has developed (Roolfs 1996:37). This development points out expansion of the external service sector of the individual enterprise. In addition, many developments in the business environment have leded to increase in the internal service sector of the enterprise (Müller 1998:16). Particularly, the indirect service activities and functions that contribute to a large extent to the problem of the overhead costs (Picot and Rischmüller 1981:331 and Konrad 1985:1). The growth of overhead costs is therefore attributed to the increase and diversity of overhead activities and functions in the enterprises. These activities include, for example, research and development, procurement, logistics, programming, production planning and control, maintenance, quality assurance, selling and administrative, accounting and auditing, personnel development and administration, customer service, and controlling (see e.g. Neuman 1975b:14f, Konrad 1985:2f and Huber 1987:39f). The figure 8.15 shows some of the functions in a typical industrial or consumer goods company that can fairly be termed overhead, including a good many subfunctions of so-called line organizations.

In addition, the strong growth of overhead costs can be attributed to the following overlapping factors of the influence such as (Müller 1998:17):

- Increasing automation of production activities and indirect activities by rationalization and computer integrated manufacturing.
- Rising variety of the products and the activities in the areas of overhead costs because of:
  - Smaller job order numbers
  - Smaller lot sizes in production
  - Higher variety of parts and components in the procurement and storage
• Larger customer variety with more differentiated service requirements
• More changes in the production process and in the design
• Increasing product complexity
• Increased requirements for product quality and shorter delivery times
• Shorter product life cycles
• Seeking to increase flexibility in the company
• Increasing information technology in the production activities and indirect activities

In close connection to these factors that have a significant influence on the level of overhead costs, there are important decisions that are related to the structure and changes of the resources and capacity, which are used by a multiplicity of processes as well as products over several periods (Küpper 1994:37). Also, the level of the overhead costs can be influenced by the increasing competition intensity and dynamics on many markets as the maintenance and/or improvement of the competitive position requires more efforts and activities in the areas of the overhead such as market planning, R&D, quality, etc. that become ever more
important. Increasing complexity and dynamics of the internal and external environment of
the organization put the management in the challenge to cope with these changes (Müller
1996). In particular the complexity of the organization can be regarded as a critical overhead
and dynamics are due to many dimensions such as diversity products, customers, markets,
processes, parts, and organizational entities, consequently, complexity management play an
important role in the managing of overhead costs (see section 8.2.5).

8.3.3.2. Effects of the Increasing Costs of Overhead and Objectives of Overhead Cost
Management

Some studies (such as Miller and Vollman 1985) illustrated the development of the growth of
overhead costs during more than hundred years. Miller and Vollman (1985:42f.) argued that
the overhead costs represent a significant increased percentage of the value added. In the last
years, further empirical studies in Germany are related to the overhead costs problem were
accomplished (see, e.g. Backhaus and Funke 1996 and Troßmann and Trost 1996). These
studies argued that overhead costs increased in different industries and the portion of
overhead costs of the total costs varies between different industries such as mechanical
engineering, textile industry, automobile industry, chemical industry, communications
technology, and electro-technology. This change in level of the overhead cost reflects the
change of the cost structure and this change will continue also in the future.

The growth of overhead costs for many enterprises represents a serious problem, in particular
if the predominant fixed cost characteristic is considered (Müller 1998:22). One serious
problem that faces the enterprises is mainly the development, if the increasing of overhead
cost is because of the increased competition pressure, the overhead costs increases can be
passed on only in limited degree or extent to the customers (Jehle 1982:61). This may be the
case in many products markets.

Thus, it is critical for the enterprise, in order to be able to exist in an intensified competition to
get meaningful information about the overhead costs and the total costs of the product
(Cooper and Kaplan 1988a:96). That means for the deployed cost accounting systems that
new requirements of the internationalization of the competition, globalization of the markets,
automation of the manufacturing, shorter product life cycles, new technologies etc. must be
corresponded (Biel 1991:85). With the increase of the overhead costs portion, the meaning of an effective overhead costs management has increased at the same time (Cooper 1990:273). One study by McKinsey & Company at the German companies showed that the differences of return on investment between the companies with comparison variety of products and manufacturing methods can be explained primarily by different overhead costs structures (Roever 1980:686). Overhead cost management can be seen as break-even-point management, by overhead cost management the break-even-point is kept as low as possible (Wäscber 1987:297).

Under overhead cost management, many tasks or functions can be understood in many forms such as a permanent, objective-oriented, and operational controlling of overhead costs as well as strategic management of overhead costs (Roolfs 1996:154f.). The target system of the overhead cost management contains a strategic orientation view of the existence of the enterprise safety and this view affects the resources and capacities of the company as well as the liquidity. Overhead cost management should contribute effectively to achieving the success objectives of the company (see figure 8.16).

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**Figure 8.16 The target system of overhead cost management (Roolfs 1996:171)**

Müller (1996:24) argued that overhead cost management has other functions or tasks such enhancing the value added activities or processes, eliminating and/or reducing non-value-added activities or processes, disclosure of the resources and capacities of the indirect functions, and critical analysis of absolutely necessary cost increases. Thus, the main focus of
the overhead cost management is not only cost reducing, but also performance improving and/or utilization or benefit increasing, in particular for the customers (Jehle 1992:1506f.). A wide growth and diversity of the indirect functions or activities within and out of the company threw light on performance of the overhead cost areas (Jehle 1992:1506). Also administrative processes can be understood as performance creation processes, with inputs, various transformation rules and outputs (Scholz 1995:1). Generally, quality, cost, and time should be considered as substantial attributes of any business process (Mollenhauer and Ring 1992:119 and Sommerlatte and Mollenhauer 1992:26). This applies naturally also to administrative processes, which must be submitted on the basis of these goals of an evaluation regarding their effectiveness and efficiency.

In summary, the cost reduction is not the only target in the indirect performance areas and generally in the service functions, many others targets must be considered such as performance improving, benefit increasing, flexibility increasing, lead-time lowering, quality improving, and customer satisfaction. Over the last few years, many studies have argued that the traditional cost management systems may be relatively unable to deal with the problems of the overhead costs such as effective planning, controlling, management, and measurement and allocation of overhead costs (see, e.g. Cooper and Kaplan 1988b and 1998, Huber 1987 and Turney 1996). Thus, the next section will discuss the instruments of overhead cost management that contribute effectively to solving such problems of the overhead costs.

8.3.3.3. Instruments of Overhead Cost Management

8.3.3.3.1. Introduction

The instruments for the overhead costs reducing and/or increasing of the productivity within the overhead costs areas are developed, because the traditional overhead cost management is not able to ensure an optimal allocation of resources as well as an effective cost management in the indirect activities and functions (Müller 1998:54). The conventional overhead cost-reduction programs tend to suffer from a number of shortcomings such as: they deal with each overhead function in relative isolation - they fail to use top managerial talent to guide the cost-reduction program - they take too long to complete - they fail to provide strategies for dealing with free-up human resources -they don’t change the ways in which overhead resources will be managed in the future -they produce only short-long savings (Neuman 1975a:118f. and Doyle 1994:94). In the comparison to the traditional overhead cost
management, instruments such as Overhead Value Analysis (OVA), Zero-Base Budgeting (ZBB), and Activity Based Costing (ABC) can be used to deal with the problems of overhead costs.

Although overhead costs are distinctive with predominant fixed cost characteristic and short term, they can be influenced by such instruments. Starting point of such instrument is the assumption that distorted product costs and resource (cost) allocation inefficiency is present to considerable extent by and in the indirect activities and functions (see, e.g. Cooper and Kaplan 1988b and 1998, Jehle 1982 and 1992 and Turney 1996). The traditional budgeting within the overhead costs areas is usually oriented at past values, i.e. at the budget of the previous periods. This leads frequently to a dominance of the old patterns of the costs, however, with the OVA and the ZBB also the past overhead costs performances are examined (Jehle 1982:63).

In addition, instruments such as overhead value analysis and zero-base budgeting can improve cost-benefit relationships of the functions and activities that are related to overhead costs (Seibel 1980:116 and Konrad 1985:7). It can be quite justifiable to spend higher costs in the indirect functions and activities if these are overcompensated by appropriate higher benefits. Also, the instruments of overhead cost management are based on the functional analysis. By this analysis, these instruments can help a company to determine and eliminate unnecessary indirect functions and activities as well as to generate new ideas for the rational completing or developing of the available indirect activities and functions (Jehle 1982:63f). One fundamental strength of the instruments of overhead cost management such as activity based costing is the fact that the allocation of overhead costs is based on volume- and non-volume-based measures or cost drivers. This can handle the problem of distorted costing information that may cause undesirable strategic effects, such as wrong product decisions, unrealistic pricing, and ineffective resources allocation. In the following sections, the instruments, OVA and ZBB that are used to achieve efficient allocation of resources and cost management in overhead areas will be discussed briefly. ABC/M will be discussed in more details in the section 9.1.1.
8.3.3.3.2. Overhead Value Analysis

8.3.3.3.2.1. The Concept of Overhead Value Analysis and its Development

Overhead value analysis was developed at the beginning of the seventies by McKinsey & Company (Neuman 1987:36 and Huber 1987:36). In Germany, the value analysis of the costs of the overhead activities was introduced in the middle of the seventies and called overhead costs value analysis (Wagenhoff 1984:33 and Mensch 1998:174). Overhead value analysis is based on the approach of the value analysis which was developed by L.D. Miles at the General Electric Corporation in 1947, in order to reduce material costs but not at the cost of product quality (Huber 1987:21).

The notion of the concept of overhead value analysis is not very complicated. In the traditional value analysis, a study team first determines what performance criteria a selected product or item must accomplish, and then either develops a better, lower-cost design or devises an engineering method to accomplish the same results more economically without sacrificing the required level of the quality (Neuman 1975a:117). Overhead value analysis simply adapts the same principle to overhead functions and their costs. It provides an efficient mechanism for scrutinizing rapidly and in an organized way all of the activities that make up overhead, identifying all the areas where cost reductions can safely be made, and pointing to the right cost-benefit tradeoffs where quality is concerned (Neuman 1975a:117).

But overhead value analysis differs from traditional value analysis by making both the managers who incur the costs of the end products and services (suppliers) and those who receive or benefit from them (receivers or demanders) responsible for identifying which costs to reduce (Neuman 1975a:117 and Doyle 1994:95). The traditional approaches to overhead reduction produce at best only short-term savings. Overhead value analysis is a method that involves both the users and suppliers of overhead activities in organized cost/benefit analysis of overhead activities that can reduce costs with consequent profit improvement (Neuman 1975a:117 and Doyle 1994:96f.).

Some studies argued that overhead value analysis is an approach that is targeted to reorganize the overhead activities that are the focus of attention, in order to increase efficiency and to improve effectiveness (see e.g. Huber 1987:45, Müller 1996:58 and Burger 1999:284). Thus, overhead value analysis is one way to affect efficiency and effectiveness of the overhead
activities, by this way the management can be able to manage overhead costs to assure the financial health of the organization (Huber 1987:45 and Neuman 1987:37). While the concept of overhead value analysis appears to be straightforward on the surface, implementing it is highly complex and requires many efforts for effective overhead cost management (Neuman 1987:37).

Finally, overhead value analysis tries to get management’s arms around the leviathan by creating analytic conditions and procedures that motivate an entire organization toward the desired goals - in contrast to the more traditional top-down, authoritarian approaches (Neuman 1987:36). Thus, the success of overhead value analysis depends on the top management’s total and visible involvement of the entire management team in the process (Burger 1999:284, Mensch 1998:175 and Neuman 1975a:117). An overhead value program must be internally managed at all hierarchical levels. Although top management makes the final decisions, it is guided by the combined judgments of its entire management team.

### 8.3.3.2.2 The Objectives of Overhead Value Analysis

In the literature, different objectives of overhead value analysis are discussed. Overhead value analysis is an instrument for reducing costs of the overhead activities (Neuman 1975a:117 and Jehle 1982:59). In addition, some studies stated that overhead value analysis can help a company to determine and eliminate unnecessary overhead activities as well as to accomplish the overhead activities in a rational manner (Picot and Rischmüller 1981:340 and Stamm 1984:26). In essence, overhead value analysis ensures that the overhead activities should be performed with more economical manner without negative impact on their functionality (Schwaiger and Thomas 1985:10).

In addition to the objective of cost reductions of the overhead activities, an important objective of overhead value analysis is improving and increasing the benefits of overhead activities (Hitschler 1990:288). Thus, overhead value analysis targets to examine and analyze the performance of the overhead activities carefully to determine and ensure that the costs of overhead activities are covered by appropriate higher benefits, or whether there are better alternatives (Schwaiger and Thomas 1985:10). Conceivably, the expansion of overhead activities is required if the benefits increase is higher than the costs increase (Huber 1987:45).
Overhead value analysis is targeted on reorganization of the overhead activities that are the focus center of the enterprise’s management to achieve efficiency and effectiveness objectives (Huber 1987:46, Müller 1998:59 and Burger 1999:284f). This requires determining and implementing some measures or procedures (e.g. shifting or redeploying of the activity, changing of organizational structure, removing of errors, change of leadership style, etc.) to reorganize the overhead activities in order to increase the efficiency and improve the effectiveness of the overhead activities (Huber 1987:46 and Burger 1999:287).

Overhead value analysis is necessary if the overhead activities are ineffective and/or inefficient. The effectiveness is concerned with the relationship between the results and the goals of overhead activities (Huber 1987:44). The notion of effectiveness is about doing the right things, i.e. achieving the set goals (Drucker 1964:1). This means that effectiveness is directly related with achieving the set goals of the company, functions, activity, etc. For the overhead activities, the question here is, whether the right activity is done, i.e. whether the activity performance in the light of the set goal and the current realized performance degree is needed, whether shifting or redeployment are necessary in the range or size of the overhead activity, etc (Burger 1999:285).

The efficiency is concerned with the relationship between the inputs and the outputs, also the relationship between the inputs utilization and performance results of the overhead activities (Huber 1987:44). There is a handy phrase coined by Drucker (1964:1) that the efficiency is about doing things right. Doing things right means achieving the optimal relation of inputs and outputs. For the overhead activities, in this sense one can distinguish two types of efficiency: production efficiency and economic efficiency (or cost-efficiency). An increase in production efficiency means achieving more output for a given input, while an increase in cost efficiency means reducing the costs of inputs for a given output (Burger 1999:286).

Both effectiveness and efficiency measures are needed to properly assess overhead activities (Huber 1987:46 and Burger 1999:287). Effectiveness measures demonstrate what a function or activity hopes to achieve. Some examples of different types of effectiveness measures include: cost reducing, risk reducing, quality improving, quantity increasing, customer satisfaction, etc. (Doyle 1994). Without effectiveness measures, the cheapest form of service delivery would be perceived as optimal because it would yield the lowest cost per unit. With
effectiveness measures, other factors are evaluated such as how well services meet goals and expectations of the receivers or demanders. On the other hand, efficiency measures target how overhead functions can deliver a service with the least cost and time and with the least number of errors. Common efficiency measures include cost per unit measures (how much did it cost to deliver the service), cycle times (how long did it take to deliver the service), and accuracy rates (how many units of the service were produced without error) (Nimocks 2005).

8.3.3.3.2.3. The Phases of Overhead Value Analysis

The overhead value analysis has developed into a proven means of permanent reduction of costs of overhead as scores of large companies can testify (Jehle 1982:59, Neuman1987:37 and Müller 1998:58). Although the complexity of the whole overhead ecology that may be difficult to understand, analyze, and control, overhead value analysis turns for information and insight to the best source available - the workers themselves (Neuman1987:37). Quite apart from overhead value analysis’s ability to reduce overhead costs and enhance productivity, it creates a new base of information and management awareness that encourages more efficient overhead cost management in the future.

There are no two overhead projects quite alike in their preparation, execution and realization because each project springs originally from the specific corporate circumstance of each company (Neuman 1987:37). The overhead value analysis is characterized by clearly structured steps or phases (Müller 1998:60). Although every overhead value analysis is unique, there are processes and procedures common to all. They fall into four steps as shown in the figure 8.17.

Step 1: Estimating the cost

Overhead costs represent a nuisance for the management of the company because of the diversity of the activities they reflect and because they are inherently hard to evaluate (Neuman 1975a:119, Picot and Rischmüller 1981:331 and Konrad 1985:1). In addition, in most organizations overhead costs also have a natural tendency to grow out of control (Doyle 1994:94). In the face of these difficulties, the large task of overhead cost management successfully is delegated to every manager in the company. Thus, OVA program requires establishing a steering committee and selecting and training an operating management team of higher-level managers (Roever 1982:250f., Neuman 1987:39, Huber 1987:222ff. and Müller
Aim

Reduce overhead costs by getting users and suppliers of services to work together to identify economics, weight costs and benefits of overhead activities, and identify options and make tradeoffs between the cost reductions and risks of the overhead options.

Steps

1. Estimating the overhead cost of support products and services flowing between organizational units.
2. Creating an extensive list of options for eliminating or reducing the demand for these support products and services.
3. Recommending those options where cost savings would outweigh any likely adverse consequences of elimination or reduction.
4. Deciding the actual cuts to be made (this step is reserved for top management).

Approach taken by operating manager (user)

1. Identifying the various services the unit receives from other cost centres in support of its own activities.
2. Listing each of the end products or services the unit supplies and stating to whom they go.
3. Estimating the cost and effort that go into each service the unit supplies.

Figure 8.17 Overhead value analysis (Doyle 1994:99)

Usually the lowest level of managers included in the OVA unit are about 15 to 30 employees, however the total number of managers participating in the overhead value analysis may depend on the size of the company (Neuman 1987:39). In the course of their performance of the overhead activities to another unit of the organization, managers incur overhead costs. Thus, the keys to managing overhead costs are to specify what overhead functions can do and decide which capabilities are essential to the strategy, to reduce demand for services and to make delivery more efficient (Develin 1999:22ff. and Nimocks 2005:106ff.)
Accordingly, in this step, OVA approach requires from each manager responsible for a cost center to: identify the various services his department receives from other cost centers in support of its own activities - list each of the end products or services he supplies and state to whom they go - estimate how much total efforts and costs go into each service he supplies (Neuman 1975a:120 and Doyle 1994:98f.). Thus, a service should be broken down into its various components and their costs. In some services and activities that cross department lines and have cost-reduction potential such as corporate image expenditures, management perquisites and conferences, the task of identifying such services is assigned to a senior manager or a subcommittee (Neuman 1987:36).

Examining the capabilities of overhead functions and tracing the flow of over single end product or service of overhead functions and getting an accurate fix on its cost may take some times (Neuman 1975a:120 and Nimocks 2005). However, in practice the OVA task force should guide managers in making tradeoffs between speed and detail, and in quickly developing rough estimates of how subordinate employees deploy their time against the list of services (Neuman 1975a:120). Only an order-of-magnitude cost for each service is required, since latter judgments on the value of these services will be understandably rough.

The benefit of this step is that it enables managers to compare the capabilities of their overhead functions with the basic mission or charter of their overhead functions and with that of the major supportive functions. This examining and comparing may detect inconsistencies or mismatches that are often clues to services that can readily be reduced or dropped (Neuman 1975a:120 and Doyle 1994:100). In addition, this step leaves behind it a valuable data base in the form of a comprehensive set of descriptions of what services each function supplies and receives, along with the associated costs, this information and other features of OVA can latter be built into the ongoing budgeting process and provide top management with a better basis for making decisions about the major reorganizations or weighing of the alternative business strategies (Doyle 1994:100).

**Step 2: Identifying the overhead options**

Before starting of the OVA program, it is difficult for a company to judge the extent of the low-risk cost-reduction opportunity in each overhead function. Inter- or intra-company comparisons or trend analyses seldom throw much light on the question, and in any case are
always open to challenge (Neuman 1975a:119). Accordingly, in order to not ignore some opportunities or options available for overhead cost management, it is wise to set an initial target, uniform for all overhead functions, that overshoots whatever the true potential may be (Neuman 1975a:119, Roever 1980:689 and Müller 1998:62). The target most often used is 40 percent and this target is admittedly somewhat arbitrary (Neuman 1975a:119, Roever 1982:251 and Menach 1998:177). Thus, the target should be stretching and not so high in order to do not lose its credibility. In fact, in most overhead areas, attractive cost-reduction opportunities will most often fall in the 15% to 30% range (see, e.g. Roever 1985:21, Schwaiger and Thomas 1985:13 and Develin 1999:23). Nonetheless, cost-reduction opportunities totaling 40% or more are expected. This ambitions target requires each OVA unit to question every unit task and expenditure.

Neuman (1975a:119) stated that a really challenging target of OVA program will support a thorough search for the opportunities of cost reduction and productivity improvement of the overhead activities, allow the real trade-offs of cost-reduction decisions across the organization, and support, if necessary, a fundamental rethinking of basic overhead functions. In addition, another benefit of a really challenging target of OVA program is that managers of overhead functions will perceive in the future that the target is fair through tough since no overhead area has been chosen in advance to achieve a higher target than others.

After setting the demanding target, identifying the capabilities of overhead functions, and estimating the cost of each service, in this phase, by task force assistance, a series of “challenge groups” are established - the members of the challenge groups should be chosen from among suppliers and users of the services and the higher management (Neuman 1987:36 and Doyle 1994:98). Optimizing the delivery of overhead activities before assessing demand for them risks misjudging both the total amount of work to be done and the level of staffing needed (Nimocks 2005). Thus, the challenge groups should analyze and evaluate reasonable methods of reducing demand for overhead activities and suggest a series of possible incremental reductions, short of eliminating the service entirely (Neuman 1975a:121 and Doyle 1994:100).

The figure 8.18 shows a framework that has proved useful for thinking through ways of reducing demand. This framework makes managers to consider every combination of service
and cost-reduction options to meet the stretching target (Neuman 1975a:121 and Doyle 1994:97). Cost savings are never applied equally to all overhead areas of the organization (Develin 1999:23). In some overhead areas, it is reasonable to make some effort to discover options for a significant cost reduction without change a specific service, but in most areas this added effort may produce only marginal improvement on the basic approach of the overhead function (Neuman 1975a:121 and Develin 1999:23).

Usually most of the listed options for reducing overhead are known to the managers of overhead functions. Accordingly, the managers of overhead functions should be asked by the task force to produce a tentative list of feasible options. Subsequently, the challenge group will seek to modify and build on this list (Neuman 1975a:121). The challenge group should continue its search for the best feasible overhead options and associated advantages and disadvantages to make substantial reductions in the costs of and demands for a particular service (Doyle 1994:97). However, the group should list all options, no matter how risky, as long as they are technically possible and legal, until it has identified enough of them to meet the initial overall target (Neuman 1975a:122). The final decisions on what reductions to make will come only later, after review by higher management.

<table>
<thead>
<tr>
<th>End products or services</th>
<th>Eliminate</th>
<th>Defer</th>
<th>Reduce quality</th>
<th>Reduce amount</th>
<th>Reduce frequency</th>
<th>Substitute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reports</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forms</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analyses</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decisions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 8.18 Options for reducing overhead (Neuman 1975a:121)

Effective work by the challenge groups is necessary for the success of the OVA approach (Neuman 1975a:122 and Doyle 1994:101). The effective searching by the challenge groups for savings options to meet the overall target is vital because suppliers know the costs and technical details of producing services for other organizational units, but not the specific
benefits (Neuman 1975a:122). In contrast, receivers recognize the benefits but they rarely have a detailed understanding of the costs (Develin 1999:23). In addition, in some cases, a reduction in service is not in the interest of the receivers, specially, if the receivers are not charged for the services. Nor suppliers will normally welcome a drop in demand for their services. Hence, each member of the challenge group should examine thoroughly all overhead options before any forward steps are taken toward safely and intelligently reducing costs and should personally accept the responsibility to search out all the options and try on his own to identify the best possible ways to achieve the target (Neuman 1975a:122). The way that is used to shift the burden of responsibility and initiative to each supplier and receiver will differ considerably from company to company and from function to function (Doyle 1994:101).

**Step 3 and 4: Review and make the final decision**

For each of its options, each challenge group states the likely reduction in workload and the expected decrease in costs (Neuman 1975a:122 and Doyle 1994:102). Each challenge group also explicitly determines the possible adverse consequences of each option, their severity, and the likelihood of their occurrence. In the case of sharply disagreement between suppliers and receivers on these points, both points of view are recorded for consideration at higher management levels (Doyle 1994:102). Finally, each challenge ranks its choices among the options in descending order of attractiveness (Neuman 1975a:122). By this step, the lower-level managers are forced to weigh and choose among many varied alternatives. Whether or not they believe any of the various options should be implemented, they are obliged to indicate a priority list should top management decide that some of the options should be acted on.

All options or ideas are presented to the steering committee that made up of top managers to oversee the OVA program, review all options and ideas, and make the final decisions (Neuman 1987:37). For the review process, the rankings of the challenge groups move up through the chain of command as shown in the figure 8.19. In this process, each higher level of management critically reviews the listed options and rankings at the level below, challenges any judgments that appear not certain, determines new ideas (i.e. increasing spans of control, or cutting out a layer of management), and reranks the options according to its own view (Neuman 1975a:122). In addition, the higher level of management may convene a new challenge group in order to develop additional options or improve judgments. The higher
level management reviews carefully all ranking decisions and gives more attention to marginal options where the pros and cons roughly to balance out.

The review and challenge process has many implications such as top management has a chance to know a spectrum of detailed options that are normally known only by lower-level management and top management can use the detailed ranked lists to tailor overhead reductions in each department or function to appropriate and roughly uniform levels of risk (Neuman 1975a:123). In addition, top management, suppliers, and receivers all agree to all decisions that are made to reduce the frequency, extent, or quality of services thus the responsibility for decisions is shared (Neuman 1975a:123 and Doyle 1994:101).

For the final decision-making, the top managers make the final decisions according to a series of tradeoffs between possible cost savings and possible adverse consequences as shown in the figure 8.20. Cost reduction must not put the business at risk (Develin 1999:22). Thus, all overhead options that have no or little risk, regardless of the amount of savings involved, will be implemented and all overhead options that their risks far outweigh their benefits will be dropped (Neuman 1975a:124 and Doyle 1994:102). For overhead options that their risks appear about equal their savings, the final decisions for implementing such options will
depend on the company’s strategic need for savings, its management style, and its overall capabilities (Neuman 1975a:124). In this case, the final decision should be made only after a thorough review and unimplemented overhead options may form a valuable ranked contingency plan if the need for cost reductions is acute.

<table>
<thead>
<tr>
<th>Adverse consequences</th>
<th>None or low</th>
<th>Medium</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Certain approved</td>
<td>likely</td>
<td>Not likely</td>
</tr>
<tr>
<td>Medium</td>
<td>Certain approved</td>
<td>?</td>
<td>Certain rejection</td>
</tr>
<tr>
<td>Low</td>
<td>Certain rejection</td>
<td>Certain rejection</td>
<td></td>
</tr>
</tbody>
</table>

Figure 8.20 Overhead value analysis trade-off decisions (Neuman 1975a:124)

In the majority of cases, most selected overhead options fall into the low-risk and small savings, however, they can achieve really large overall reductions, because the overhead options identified are typically so numerous and all the decisions are approved at the same time, so a company can reduce or eliminate a large number of overhead activities (Neuman 1975a:124). The way that is used to implement the overhead options will depend on the company’s circumstances.

Although the management team may fail to understand the adverse consequences of a given overhead option, the associated risks are usually less than they might appear (Neuman 1975a:124). This is because most overhead options that are determined by the challenge groups are reversible - the end product or service (e.g., a particular daily report) can be reinstated at a later date if necessary. The OVA program considers with the cost reductions in the overhead services that flow between the departments in the company. Where there is another source of cost savings - company-wide services and expenditures - such as
telephones, travel, management perquisites and secretaries, all of which are often controlled by corporate policy. However, analyzing and evaluating options for reducing the level of the costs of such services, can be completed during the course of the main overhead value analysis program (Neuman 1975a:124).

For the implementation of the OVA program, the OVA steering committee sends all approved cost-reduction ideas to the appropriate unit managers so they can begin implementation planning. Each implementation plan must include: a full description of the approved idea, specific steps required to implement it, a list of individuals responsible for its implementation, a specific timetable for completion of each step, and the expected cost reduction in the unit’s budget by the month (Neuman 1987:37). OVA unit managers implement the ideas and submit periodic progress reports to senior management.

8.3.3.3.2.4. Evaluation of the Overhead Value Analysis

The OVA approach represents an attractive method to get to grips with the overhead costs problem and to achieve advantages for all parties involved in the OVA program (Mensch 1998:180). The OVA approach involves all overhead departments into the search for feasible options and ideas for the cost savings, in particular those, which are involved directly in the contribution of the individual services, and those, which use them. Thus, the "isolationism" is overcome, which is connected with the traditional analysis of overhead costs (Doyle 1994:102). By the OVA approach, the company's executive management can bring in all their abilities and also a more comprehensive business philosophy (Neuman 1987:38). Moreover, the OVA approach exercises pressure on the suppliers of the services to get a grip on overhead costs. The OVA approach offers a framework, which is based on cost estimating (what overhead costs can be charged to satisfy the needs or requirements of the others), a detailed listing of the overhead activities and cost-benefit tradeoffs, this framework can be integrated into the ongoing budgeting process and can form the basis for further analyses (Neuman 1987:37, Doyle 1994:103 and Mensch 1998:181).

The OVA approach pursues a middle way between drastic overhead costs-reduction and improvement in overhead activities performance in shortest possible timescale (Huber 1987:45 and Neuman 1987:38). The OVA approach aims for significant cost reduction - and for improvements in customer satisfaction and service levels. It takes its direction from top
management - and ensures the close involvement of some of the most knowledgeable people
in the business, the staff and middle managers (Neuman 1987:37 and Mensch 1998:173).
Thus, OVA approach stimulates and increases the cost-benefit awareness in all levels of the
management (Neuman 1987:37 and Mensch 1998:180). In addition, communications between
departments often improve as a result of managers having worked together in the cross-
functional groups. Moreover, the OVA approach works to challenging short-term deadlines -
and seeks opportunities for significant changes in the long term (Neuman 1987:38).

All these advantages accruing from OVA should not however obscure the disadvantages of
the OVA approach. To achieve its target, an OVA program may have the undesirable side
effects of hurting employee morale and of terminating a disproportionate share of minority
employees (Neuman 1975a:125). This can lay the company open to pressure from the labor
unions. Conceivably, it can also have an undesirable effect on the company’s external image.
The OVA approach may be costly in the terms of the money (e.g. hire outside consultants to
make substantive judgments about specific cost-reduction ideas) and time lost when the
employees are participating in the overhead analysis team (Mensch 1998:181). In addition,
the OVA approach works by making all overhead departments responsible for scrutinizing,
identifying, analyzing and evaluating the overhead options and ideas to achieve the
demanding target. Thus, if an OVA program takes too long time to complete, uncertainty,
insecurity, and disruption day-to-day operations may cause paralysis or panic (Neuman

The purpose of a demanding 40 percent cost-reduction goal for every organizational unit is to
make sure that almost all cost-reduction options are identified and fairly evaluated (Neuman
1975a:125). However, management may set this goal for all organizational units without
determining whether the overhead activities performed efficiently/effectively or
inefficiently/ineffectively (Huber 1987:246 and Mensch 1998:181). This means that in an
organizational unit, in which the performance is already efficient and effective, a very strong
restriction is caused by the cost-reduction goal, while in other organizational unit, in which
the performance is little efficient/effective, this cost-reduction goal is relative easily to realize
The OVA approach may be confined to in-house services; it concerns thereby internal customers (Doyle 1994:104). Many senior managers are fully conscious of the fact that the strong concentration on the internal customer diverts the attention of the enterprise from the actual goal - satisfying the external customers - customers who pay for a product and/or service (Doyle 1994:104 and Develin 1999:23). External customers now demand that they be assured and satisfied that the products or services for which they are paying will meet their specifications and expectations and will perform as anticipated.

It is understandable to be inclined to focus on the external customers, however, it is imperative to remember that internal support activities and services enable or inhibit the degree to which external customers’ needs can be met (Develin 1999:23). For many overhead departments, like accounting and human resources, the primary customers are internal to the organization. However, goals should start with the customer’s needs and wants and defined from there, not the reverse. Developing and managing the activities of overhead should not be in isolation from the events in the "real" world outside of the organization.

Finally, the OVA approach is not for every organization because its effects are uncertain (Neuman 1975a:125). Thus, a company should apply the OVA approach when it has an acute short-term need to improve profits, or badly needs to gain a competitive edge by improving its economic structure (Neuman 1975a and Doyle 1994). In addition, a strong management structure is a prerequisite for applying the OVA approach. Although the OVA approach can be applied to particular divisions such as manufacturing or marketing, its full potential can not be achieved unless it is applied across the entire company. There are risks in undertaking any sweeping program of change like OVA. However, the possibility of overhead costs-reduction by one-fourth or even more, with a consequent profit improvement of between 50 and 100 percent, supplies a powerful incentive to take the required risk (Neuman 1975a:126).

8.3.3.3.3 Zero-Base Budgeting

8.3.3.3.3.1 The Concept and Objectives of Zero-Base Budgeting

ZBB is a further instrument of the overhead cost management. ZBB was developed at the end of the sixties by P. A. Pyhrr at Texas Instruments as a method of controlling its overhead costs (Tattersall 1989:45, Hitschler 1990:287 and Meyer-Piening 1990:5). In Germany, ZBB was introduced in the middle of the seventies (Meyer-Piening 1990:5 and Mensch 1998:182).
During the 1970s, many private businesses and state and federal agencies used ZBB as their primary budgeting tool. This widespread use of ZBB is owing to its usefulness as a tool in integrating the managerial functions of planning, control, and performance evaluation (Dean and Cowen 1979a:73). While certain concepts of ZBB continue to be used today, only a small percentage of organizations use it as their primary budgeting tool (Horngren et al. 1999:582).

In industry, ZBB can be suitably applied to overhead activities, rather than to manufacturing activities (Pyhrr 1976:5, Dean and Cowen 1979a:75, and Meyer-Piening 1990:13). In most cases, the use of ZBB would be inappropriate for production activities where costs are largely dictated by sales volume and calculated using standard cost procedures (Dean and Cowen 1979a:76). In addition, the cost-benefit analysis that is important to ZBB cannot be straightforwardly applied to decisions to increase or decrease costs in the manufacturing area (Pyhrr 1976:6). Since a decision to increase the manufacturing costs of the company does not necessarily bring increased benefits in the form of increased sales, although, it does tend to boost production volume.

In contrast, ZBB is most appropriate as a tool in managing overhead costs. Budgeting for the overhead activities is a particularly complex process because the outputs of these activities are not directly related to the final outputs of the company, thus it is difficult to develop and use standard costs (Dean and Cowen 1979a:76). In the overhead areas, a cost-benefit relationship can be identified where the manager has discretion to choose between different activities (and between different levels of activity) having different direct costs and benefits (Pyhrr 1970:112). However, it is noted that some overhead activities such as quality control and maintenance may be heavily influenced by the manufacturing level or by changes in this level. Pyhrr (1970:112) argued that the ZBB process can still be used in these activities because the manager’s decision to fund quality control or maintenance activities depends on the relative benefits he thinks these activities will ultimately provide to the central manufacturing operations.

The basic idea of the ZBB is that all overhead activities - current as well as new - are planned from the ground up (Tattersall 1989:45, Meyer-Piening 1990:13 and Müller 1998:64). This means that at the beginning of the budget development process, all overhead activities budgets start from scratch and have a value of ZERO. This is in sharp contrast to the
incremental budgeting system where the primary focus is on the proposed changes from the level of costs of the previous year with little attention given to the base level of costs (from the previous year) and the relevance of this level despite changing conditions (Dean and Cowen 1979a:76, Joiner and Chapman 1981:8 and Tattersall 1989:45).

In addition, the incremental budgeting system gives little attention to the complex interrelationship between different overhead areas (Tattersall 1989:45). Where all overhead activities provide or receive services from other activities, and the effectiveness and quality of service provided can have a significant impact on the resource requirements in the receiving activities. The incremental budgeting system does not promote operational efficiency because it does not require managers to review and justify their activities or the funds requested (Dean and Cowen 1979a:76). In addition, the previous-year inefficiencies can be carried forward, and information is provided with little effective analysis of cost-benefit relationships or of the cross-functional impact of different levels of expenditure (Dean and Cowen 1979a:76 and Tattersall 1989:45).

ZBB was originally developed to overcome the problems of incremental budgeting system and to be used as a planning and control technique in the overhead activities where managers usually have more discretionary control over costs. Phyr (1973) defines the approach as a “planning and budgeting process that requires each manager to justify his or her entire budget request in detail from scratch (hence zero base) and shifts the burden of proof to each manager to justify why he or she should spend any money at all.” Thus, ZBB in its correct context refers to a general management tool that companies can use to improve planning, budgeting, and decision-making (Phyr 1976:5 and Hitschler 1990:287).

In any manufacturing company, overhead costs are significant, because they provide management with the leverage it needs for affecting both profits and profitability. The purpose of the ZBB process is to help management evaluate the overhead costs and make tradeoffs among current overhead activities, development needs, and profits for top management decision-making and allocation of resources (Phyr 1976:6). By ZBB, managers can reduce overhead costs and optimize resources allocation as it is based on needs and benefits (Jehle 1982:60 and Hitschler 1990:287).
Procedurally, the ZBB process is intended to provide a means of involving the managers responsible for each function in (Tattersall 1989:45):

- Reassessing all overhead activities and costs within their function, establishing the objectives and benefits of these activities in relation to their cost, seeking better ways of achieving the benefits and identifying different levels of service that can be provided by each activity, starting with the minimum feasible level of service (zero-base) to meet the objectives of the business.
- Documenting proposals for resources needed above the zero-base to support operations in the future period, and specifying the benefits to be gained at each level of service compared with the resource required.
- Discussing, evaluating and reviewing the proposals with senior managers and, most importantly, with the receivers of the service.
- Ranking requests for resources in order of priority as a basis for deciding the most effective allocation of resource and level of service that can be afforded within the constraints of expected revenue.

This process is repeated each year, requiring managers of overhead activities to justify their budget requests continuously and to have their requests constantly reviewed in terms of the existing priorities of the organization. ZBB tries to help management answer the question: Supposing we were starting our business from scratch, on what should we spend our money and to what should we give the highest priority?

8.3.3.3.2. Zero-Base Budgeting Steps

The ZBB process is a top-to-bottom-to-top approach to budgeting and requires the participation of managers from top management, middle management, and first-level management (Mensch 1998:173 and Doyle 1994:31). It must be emphasized that the methodology of ZBB provides an effective approach to managing the overhead costs (Tattersall 1989:46). This methodology is not a rigid set of procedures or forms that can be uniformly applied from one organization to another (Pyhrr 1976:7 and Tattersall 1989:46). The ZBB methodology can differ significantly from one organization to another, and the process must be adapted to the specific needs of each organization. Nevertheless, the basic steps to effective ZBB are (Pyhrr 1977:2):

- Identify decision units
• Describe each decision unit as a decision package
• Evaluate and rank all decision packages by cost-benefit analysis
• Preparation of a detailed operating budget

Identify decision units

The ZBB approach attempts to focus management’s attention on analyzing and evaluating overhead activities and making decisions related to their contribution (Pyhrr 1976:7). In order to assist managers in their decisions, ZBB requires that an organization’s activities be isolated into decision units for analyzing, evaluating and making decision. The definition of decision units in most organization is straightforward, and the decision units may be done on the basis of existing budget units (Pyhrr 1976:7). However, it is important to ensure that this will provide the basis for meaningful analysis of the output in relation to inputs (Tattersall 1989:46). In practice, top management usually determines the organization level at which decision units must be defined however budget-unit manager has discretion to identify additional decision units within his budget unit if he considers them appropriate (Pyhrr 1976:7). Functional analysis and actual state analysis can be used in this process (Meyer-Piening 1990). The decision unit can be a traditional cost center, a program, or a group of activities. The decision unit should be such where a particular activity or a group of activities can be independent and meaningfully identified and evaluated. Further there is no overlapping between the activities of one decision unit and the other. The decision unit should be managerially viable.

Formulation decision packages

Decision packages are the main component of the ZBB process (Pyhrr 1976:8 and Doyle 1994:30). A decision package is an actual budget document that identifies a decision unit and describes its specific activities. The purpose of developing a decision package is to evaluate the activity described in the package against other activities competing for funding and to decide if the activity should be approved or disapproved (Pyhrr 1970:112). The specifications in each package must provide management with the information it needs to evaluate the activity. These may include a statement of the purpose of activity or service provided, measure of the activity or service performance, cost of the activity or service, benefits of the activity or service, consequences of not performing the activity, and alternative actions (Pyhrr 1976:8).
One key to the success of ZBB is to identify and evaluate alternatives for each activity (Tyer 1977:91). The ZBB approach emphasizes that managers should identify and evaluate alternative methods of performing the activity or providing a service and alternative levels of effort for performing the activity or service (Pyhrr 1976:8). When a manager determines the best way of performing an activity, he must identify alternative levels of effort and funding to perform that activity. At this point, decision packages for the various levels of effort are developed based on the recommended method of performing an activity. A decision package is prepared for each level of effort (Pyhrr 1976:8). The first level should be the minimum level of effort (which must be below the current level of operation), below which the activity would become worthless. Alternatives are then prepared based on incremental levels of service and describe clearly the benefits and costs of each incremental level. Thus, there may be several decision packages for each decision unit (Pyhrr 1976:8). These packages used to describe each activity level should be designed to show clearly the key information on which top management can make evaluation and judgments to determine the priority that should given to each activity level (Tattersall 1989:46).

The ranking process

The second main component of the ZBB process is the ranking of decision packages (Pyhrr 1976:9 and Tyer 1977:92). The criteria or basis for ranking a decision package is implicit in the objectives of decision unit, on the one hand, and that of the organization, on the other. The ranking process is normally completed on a hierarchical basis (Pyhrr 1970:116). The ranking process is used to establish a rank priority of decision packages within the organization. This process provides management with a technique to identify the best allocation of the limited resources among various overhead functions by deciding how much to spend and where to spend it (Pyhrr 1976:9 and Tyer 1977:92). During the ranking process managers and their staff will analyze each of the several decision package alternatives. The analysis allows the manager to select the one alternative that has the greatest potential for achieving the objective(s) of the decision package (Pyhrr 1976:9). Ranking is a way of evaluating all decision packages in relation to each other. Since, there are any number of ways to rank decision packages managers will no doubt employ various methods of ranking (Pyhrr 1976:10). The main point is that the ranking of decision packages is an important process of ZBB.
With the decision packages ranked in order of priority, management have a thorough priority list of current activities with clearly defined costs and measurable benefits (Pyhrr 1976:10 and Doyle 1994:30). This process can help management to establish a cut-off level for the approval of packages at a level that equates costs with the available resources (Pyhrr 1976:10 and Doyle 1994:30). In addition, this process can direct top management attention towards better cost management by (Doyle 1994:30):

- Conducting an orderly reshaping of internal services and avoiding reducing the level of service provision without first taking the longer-term perspective.
- Avoiding the risk of near-defunct or low priority activities being allowed to continue at the expense of more strategically important activities.
- Establishing clearer priorities in relation to all the projects under review and ongoing activities in which it is involved. In this way, management can identify those areas that can be deferred, cancelled or safely reduced.

**Preparation of a detailed operating budget**

Once all the decision packages have been ranked on the basis of pre-determined criteria, the manager should be able to submit requests for spending authorizations. When the cost of total decisions packages is higher than the affordable level, as frequently occurs, the ZBB process can provide a mechanism whereby managers can adjust their budgets by raising or lowering the cut-off level in the ranking of decision packages (Pyhrr 1977:7). In the final analysis, each organization will have a number of approved decision packages that determine the budget of each organizational unit. In addition, the decision packages can provide managers assistance in organizational unit control and evaluation through the use of goal statements, objectives, and performance measures included in decision packages (Pyhrr 1977:7).

The success of ZBB comes from implementing it properly and tailoring it to the specific needs of the organization (Doyle 1994:31). The approach of implementing ZBB is important as the methodology of ZBB. There are many successful and failed cases of ZBB implementation (Dean and Cowen 1979a:78). However, the reasons for the lack of success may be the result of poor implementation approach rather than the fault of the methodology. For the most organization, the ZBB approach forms a major change in budgeting practice. Implementation process of ZBB requires commitment, interest and participation from different levels of management. Implementation of ZBB is often done by a task force of
operating and financial managers who are responsible for the design and management of the process throughout the organization (Pyhrr 1976:13). The implementation process requires to be planned and thought through like any other major business strategy. There are many crucial factors to manage this process (Pyhrr 1976:13):

- Designing the process to fit the specific needs and culture of the organization - this is critical to successful implementation of ZBB. The specific formats and implantation procedures vary from company to another, however, the concept of ZBB remain the same.
- Preparing a simple, straightforward budget manual that illustrate the type of zero-base analysis required and explains the decision package and ranking concepts.
- Presenting the process to management and teaching operating managers responsible for zero-base analysis of a decision unit how to apply the techniques.
- Working with decision-unit managers to improve and expedite the zero-base analysis.
- Working with middle and top management to review and rank decision packages, compare similar functions across organizational lines, and prepare and finalize the profit plan.
- Evaluating the process and revising it accordingly.

The implementation of ZBB must involve the management team who will then own the process and its result. Many functions within the company can assist a project team in successful implementation of ZBB such as the planning and quality control as well as some external assistance or guidance can benefit the initial implementation by providing adequate training and project guidance (Tattersall 1989:48).

**8.3.3.3.3. Evaluation of Zero-Base Budgeting**

The ZBB approach has many advantages. The ZBB process that is properly implemented provides an organization with an effective approach to management and control of its overhead costs (Tattersall 1989:50, Doyle 1994:32, Mensch 1998:191, Müller 1998:67 and Burger 1999:320). During the financial constraint periods, the most benefit direct benefit of ZBB is a planned and controlled reduction in the costs of overhead activities (Tattersall 1989:48). By the ZBB process, reductions will come from reduction or elimination of the least required overhead activities, improved methods and redirection of resources to core activities or activities that will provide the most impact on future or potential cost-reduction
opportunities (Tattersall 1989:48 and Doyle 1994:32). In the periods of the growth, the ZBB process can provide the company with a significant means to meet the resource demands required to support new developments and initiatives without increasing overall indirect costs (Tattersall 1989:48 and Doyle 1994:32). This may be a most effective way to improve the profit of the company - the company can increase its revenue with stable fixed costs (Tattersall 1989:49). The ZBB process therefore provides the company with a significant means for a better allocation of resources in relation to the key objectives of the business.

The experiences of organizations using ZBB have indicated that the ZBB process successfully integrates the planning and budgeting functions and contributes to increased corporate profitability (Pyhrr 1976:5 and Dean and Cowen 1979b:58). In addition, the ZBB process enables a company to prioritize its choices and to select those overhead activities and level of costs that best meet organizational objectives (Doyle 1994:32). By the ZBB process, managers become deeply involved in the budget process and it forces them to explore alternatives in making budgetary decisions. There are many indirect benefits that will result from the ZBB process such as improving the culture of the organization in terms of developing a better understanding of the business and, in particular, of the interface relationships between departments and team development amongst management groups (Tattersall 1989:49).

Since overhead activities are appraised from scratch, ZBB eliminates one of the major disadvantages of the traditional budgeting system - the focus on the incremental cost increases from year to year - managers should be anxious to focus on creative objective-setting rather than tinkering with yesterday’s products, systems and structures (Doyle 1994:32). ZBB overcomes this traditional budgeting weakness by subjecting all proposed activities, programs and expenditures to the type of scrutiny that is normally conducted for new programs or activities (Hitschler 1990:287 and Burger 1999:320). In the ZBB process, splitting budget elements into decision packages allows management to look at their business from a micro point of view; and from the point of view of a detailed analysis of cost behavior, production and productivity and so on. Another primary advantage of the ZBB process is that cost-benefit analysis becomes an integral part of the manager’s decision-making kit (Doyle 1994:32 and Mensch 1998:191).
All these advantages or benefits accruing from ZBB should not however obscure the disadvantages or problems of the ZBB approach. There are major problem areas that companies should be aware of before introducing ZBB. The ZBB system requires considerable time and effort to make it work well (Brown 1981:45). This may make it unsuitable for annual implementation. Thus, in some situations, the ZBB review process is necessary periodically not annually (Doyle 1994:33). In addition, the general problem of the ZBB approach is that the costs of introducing the ZBB concept and making it work well (Dean and Cowen 1979b:59 and Doyle 1994:33). These costs represent the initial time and management effort spent in the build and design the system and the costs of training programs on ZBB methodology within each department (Dean and Cowen 1979b:59 and Doyle 1994:33).

In the ZBB process, some managers may have problems in creating decision packages at different service levels. One of these problems that face the manager of business unit is to determine a “minimum level” decision package that is less than the current level of the service (Dean and Cowen 1979b:58). Thus, guidelines should be provided in the form of a percentage of current level of services. A similar problem in the ZBB process is to determine a sufficient number of improved and extended level decision packages that provide for variety of funding levels for the decision unit (Dean and Cowen 1979b:58). There is no fixed rule for establishing the total number of decision packages for a unit. In the ZBB process, ranking of priorities is impractical in some cases, for example, the ranking of interrelated decision packages from different areas or departments of a company may be based on subjective ranking process (Dean and Cowen 1979b:59). In addition, formulating and ranking decision packages are difficult to accomplish in a companies that have little experience to doing this (Pyhrr 1973). Thus, it is significant to provide specific procedures and training to perform this task.

For some companies it is relatively difficult to categorize costs by department, much less by function, and to generate meaningful output measurements (Brown 1981:44). A company can determine the output measurements but the problem then becomes one of comparing them with the input (costs) in order to create a cost-effectiveness ratio. This ratio is necessary to rank one function against another. This may be a difficult task because an objective input is being compared with a subjective output (Brown 1981:45). However, this can be done, but it
requires a high level of managerial experience and judgment. Thus, ZBB really can be cost-effective if some conditions are present such as determining the input-output ratios of services functions - a good accounting system - managers at all levels who will diligently prepare decision packages - output measurements that exit or can be generated - top management that actively support the system (Brown 1981:45).

Finally, the main problem of OVA and ZBB is that the fact that both approaches are concerned with a temporally limited action as well as the fast effects on the overhead costs problem - overcome the problem of overhead costs development that is constant and dynamic problem will last for long time (Wagenhoff 1984:31, Witt and Witt 1990:36, Jehle 1992:1512f. and Striening 1996:10). For this reason, the task of overhead cost management must be permanent or continuous definitely. In addition, OVA and ZBB do not focus on cause-effect or causal relationships of overhead costs allocation (Picot and Rischmüller 1981:340). OVA and/or ZBB provide the framework for current periodic planning and control of the overhead activities and costs. This step is consistently pursued so far in the context of the activity based costing and management. Moreover, reorientation must be done, from short-term cost reduction procedures to integrated strategies and for process optimization (Striening 1996:10). These problems can be overcome to large extent by using activity based costing and management – ABC/ABM will be discussed in more details in the section 9.1.1.

8.3.4. Fixed Cost Management

8.3.4.1. Concept, Tasks and Objectives of Fixed Cost Management

In the field of cost accounting and management, fixed costs represent a substantial challenge and have become of increasing significance because of a number of factors. According to Gutenberg (1967:359), there are three factors: the lack of divisibility of lumpy fixed costs (e.g. machine or employees can not be divided), operational and strategic decisions (e.g. acquisition of a machine or establishment of a manufacturing plant in place X) and the limited adjustment rate (reaction of the management to the events and the corresponding adjustment). A company can improve its cost position through fixed cost management. (Oecking 1994:2). Fixed cost management considers one of the analysis fields of strategic cost management (Nink 2002:117f.) where strategic cost management has emerged as a key element for helping companies to gain competitive advantage, in a rapidly changing business world, through a positive long-term influence on the costs (Horvath and Brokemper 1998:585).
Fixed cost management deals only with the block of fixed costs of the total costs (see figure 8.21). Fixed cost management depends clearly on determination of the fixed costs because fixed costs are not only related to the cost structure of the product, but are also due to the organizational structure of the company. Thus, the fixed costs result form many operating potentials (Oecking 1993:82). In this context, cost managers should have wide knowledge of the organization's activities and how those activities interact to be able to provide information, interpretations, and analyses of alternative courses of action that managers are contemplating (Ray 1995:64 and Hilton et al. 2001:23). Fixed cost management thus is one of the tasks of the cost manager. It represents an attractive method to get to grips with the fixed costs problem and to achieve advantage through influencing on the cost flexibility, cost transparency, and cost level of the company (Oecking 1994:48 and Nink 2002:120).

![Figure 8.21 The block of fixed costs and total costs (Funke 1994:324)](image)

There is no formal definition of fixed cost management. A broader definition of fixed cost management is provided by Oecking (1993:83) who defined fixed cost management as the process that includes all procedures of the planning, designing and controlling of fixed costs as well as their consequences on the company/the company environment. However, he stated that this definition does not serve the tasks and objectives of fixed cost management (Oecking 1993:83). For concretizing the term "fixed cost management", Oecking (1993:83f.) and Nink (2002:117f.) argued that fixed cost management with its two aspects (operational and strategic) can be understood as an approach to reduce or avoid the fixed costs, increase cost transparency, increase cost-flexibility as well as increase the flexibility of the company through the future-oriented design of the fixed costs potentials. This definition shows that
fixed cost management seeks to affect the fixed costs, cost transparency, cost level and structure, and cost-flexibility. It also supports a problem-oriented structuralizing of current and future fixed costs potentials. Oecking (1993:83) argued that fixed cost management requires a company to take actions that increase the flexibility of the fixed costs structure. Such this approach can help a company in the high market fluctuations.

In addition, fixed cost management does not question at the beginning, the existing fixed costs/performance (outputs) relationships; this task is fulfilled by the instruments of overhead cost management but fixed cost management primarily deals with the aspect of the flexibility of the fixed costs potentials (Oecking 1993:84 and Arnaout et al. 1997:166). However, a narrow understanding of fixed cost management as an approach to reduce the fixed costs, does not meet the requirements of strategic cost management. Fixed cost management is concerned with the aspects of cost-flexibility, transparency, cost structure, and company flexibility. Fixed cost management must clearly provide cost information about the performance or outputs, in the cases where no relation to performance or outputs can be determined, the meaningful possibility of the decrease of fixed costs on a long-term basis cannot be proven (Oecking 1994:49). In the manufacturing area, fixed cost management is a relatively successful process because there is clearly structured relationship between the cost and output. Within the so-called overhead costs areas the structure becomes much more difficult, because the outputs cannot be measured on the basis of simple measures (Oecking 1994:49).

There is a fundamental difference between the methods of fixed cost management and those of overhead cost management (see figure 8.22). Both methods pose questions about the structure of the costs concerning necessity, flexibility, transparency and level. The methods of overhead cost management are time-related and may be accomplished through outside consultants in order to improve the economic situation of the company. Fixed cost management however is process that is used in a certain rhythm permanently. It also poses questions about the necessity, flexibility, transparency and level of the fixed costs. The ultimate objective is the improvement of the cost structure and cost level (Oecking 1994:52f., Arnaout et al. 1997:166 and Nink 2002:135).
In the context of strategic cost management, fixed cost management can be regarded as an independent analysis field. It attempts to achieve some tasks. Oecking (1993:84) argued that the major tasks of fixed cost management are: **Transparency**; it should be made visible for the management, how the fixed costs are connected with the associated performance. Thus, achieving the task of transparency is through the possibility of influence on fixed costs in connection with the associated performance in the company. **Disposition (planning) information for operational management**; involvement of "disposition information" in decision-making (operational management of the potentials) - information about the arrangement or planning of the fixed costs potentials must be made available to the managers for their decisions. **Strategic design of the fixed costs policy**; with the help of fixed cost management, concepts or strategies should be developed, so that existing and/or future fixed costs potentials can be structured more flexible.

In the last years, the fixed costs problem has required a special consideration because of increasing the portion of fixed costs in the total costs of the companies and increasing the risks associated with the fixed costs (see Schehl 1994 and Funke 1995). To tackle this problem, fixed cost management should have specific objectives. For this purpose, it is deemed necessary to define the objectives resulting from the tasks of fixed cost management in more concrete terms. Oecking (1994:46f.), Kremin-Buch (1998:15f.) and Nink (2002:120) argued that the objectives of fixed cost management with its two aspects are: avoiding fixed
costs, reducing the level of fixed costs, increasing the cost-flexibility, increasing the flexibility of the company and identification of the strategic cost drivers as well as the influence on behavior and motivation of the employees.

Strategic cost management seeks to improve the competitive position of the company, in this context, the objective of fixed cost management is reducing the level of fixed costs. This can be basically carried out through two views (Nink 2002:121): on the one hand, fixed cost management aims at, in principle, avoiding of fixed costs; avoiding emergence of fixed costs or avoiding the actions and procedures that cause the fixed costs therefore the fixed costs do not develop at all. On the other hand, fixed cost management attempts to reduce the fixed costs that are already occurred by decisions in the past. The necessary decisions to reduce fixed costs should be made through fixed cost management. It is of special importance in this connection, to determine to what extent these fixed costs that already occurred before still available and can be reduced or whether they are irreversible and consequently generally no longer avoidable (Nink 2002:121).

Another objective of fixed cost management is to increase cost-flexibility. Cost-flexibility has a significant influence on the cost structure and cost level of the company. Cost-flexibility considers one of the key elements in the competitive business environment (Oecking 1994:1 and Männel 1995:31). In such business environment, the organizations seek to become cost-flexible in order to keep or maximize their market position. The working toward cost-flexibility should be a goal of fixed cost management and generally cost management (Männel 1995, Oecking 1994 and Nink 2002). Cost-flexibility enables a company to adapt its costs in order to react more quickly to changing business circumstances. A company can achieve that through reducing the proportion of its total costs that are fixed costs or by substituting available resources, activities, or processes in another direction than the current one. Many factors, actions, or procedures can largely determine the cost-flexibility within the company however the extent of cost-flexibility in the companies will differ depending on the circumstances in which the companies operate. There are major sources of cost-flexibility in the companies such as the personnel policy, technology, process design, product design, outsourcing, lease or buy decisions (for more details, see section 8.2.6).
Increasing flexibility of the company considers another objective of fixed cost management (Oecking 1994 and Nink 2002). The concept of flexibility of the company characterizes the ability of the company to adapt itself adequately in market and competition changes (see Jacob 1982, Meffert 1985 and Horvath and Mayer 1986). The faster a company can adapt itself to such changes and the lower adverse consequences that are related to this adaptation, the more flexible such a company is characterized (Jacob 1982:72). In contrast to the objective of increasing cost flexibility, with which the adaptation ability of the company stands basically at the cost aspect, the objective of increasing flexibility of the company refers to all fields of performance of the company (Funke 1995:68).

According to Meffert (1985:124ff.), there are two basic options to build and to sustain the adaptability of the company in market and competition changes (Nink 2002:124): The so-called built-in-flexibility, as the first basic option, is aimed at retaining the effects of negative influence of environmental changes on the company as low as possible. It should be recognized that not all the flexibility will be needed, and it is expensive to predict and maintain flexibility. The cost of unnecessary built-in flexibility needs to be balanced against the cost of unpredicted change. For built-in-flexibility, procedures for protection against the risk should be considered (risk spreading by e.g. diversification and transferring the risk to another party - this is done through insurance or hold harmless agreements) (Nink 2002:124). The second basic flexibility option is action flexibility (e.g. flexible manufacturing systems, flexible organizational forms, etc.). In contrast to the first option, this option aims to create proactive actions and allow the company much room for maneuver by which the company can react suitably to negative environmental developments.

In this context, fixed cost management will pursue its task through initiating the procedures of conserving and increasing the flexibility especially for such companies or strategic business units that are characterized by high fixed costs intensity coupled with high risks as a result of decreasing of activity level (Nink 2002:124). In this case, it should be considered on the one hand that increasing flexibility reduces the negative effects of the risks on the company as a result of decreasing of activity level, on the other hand, at the same time, it can also lead to decrease the cost-flexibility because the increased procedures of flexibility can lead to rise the fixed costs intensity. Such effects that move in opposite direction should be recognized, for example, when flexibility-increasing procedures are connected with spending on fixed assets.
that lead subsequently to an increase of fixed costs (e.g. depreciation, capital costs) (Nink 2002:124). The total effect of both opposite effects on the company is not definite (Vormbaum 1959:197ff.); nevertheless, it should be realized that flexibility increasing with accompanying rise of the fixed costs intensity may not lead by itself to deterioration of the total position of the company under fixed costs aspects (Nink 2002:124). Thus, in such case, a company can balance on the one hand between increase flexibility under (if necessary) acceptable lower cost flexibility and on the other hand increase cost flexibility under (if necessary) acceptable lower flexibility.

Fixed costs - like the costs in general - have cost drivers and result from primary acting factors (Reiß and Corsten 1992:1479). The identification of strategic cost drivers that determine fixed costs represents a basic requirement for systemic and continued management of fixed costs and considers an essential objective of fixed cost management (Nink 2002:128). In addition to the identification of cost drivers, quantification of their effects is necessary in particular for changeable strategic cost drivers - this quantification can imply to development alternatives. Although the process of quantification of cost drivers is difficult, it is necessary to determine the relative significance of each cost driver. Also, it can help a company to estimate its relative cost position in comparison with competitors. For such quantification, plausible estimates are often sufficient (for more details about cost drivers see section 6.2.1).

The personal-related objective of fixed cost management is the influencing on the behavior and the motivation of the employees by means of fixed cost information (Nink 2002:128). When employees understand the organization's objectives and have accurate fixed cost information, they will excel at cost management. This objective helps in creation the acceptance and reducing the resistance of employees to the considerable changes and to the procedures of fixed cost management as well as creating the fixed cost-conscious for all employees.

Strategic cost management as a proactive attitude can be considered as chance management or may be as risk management (Reiß and Corsten 1992:1479). In this context and within the indicated objectives of fixed cost management, Nink (2002:128) stated that fixed cost management can be understood as chance and risk management. On the one hand, the risks which can originate from activity declines of the company that has high fixed costs intensity
should be limited by building of a higher flexibility of the whole company, the specific exploitation of cost reduction potentials and the building of a higher cost flexibility (risk management). On the other hand, an improvement of the competitive position and the courses of actions can be achieved at the same time by the above-mentioned procedures, by which the offered chances can be utilized (chance management) (Nink 2002:128).

8.3.4.2. The Difference between Operational and Strategic Fixed Cost Management

The difference between operational and strategic fixed cost management refers in particular to the difference between operational (short-term oriented) and strategic (long-term oriented) tasks definition (Oecking 1994:50). Fundamentally, managers direct and control work processes by defining tasks and technologies to improve productivity, implying that better management makes resources more productive. The operational dimension of management thus focuses on securing essential services from deployed organizational resources to fulfill the organization’s goals (see Barnard 1948 and Ansoff 1965). The strategic dimension of management centers on the formulation of organizational purpose and the development of an informed plan for realizing that purpose (see Ansoff 1965).

In this context, Becker (1992:116) stated the basic temporal and factual distinction features of the tasks definition that are necessary for the classification of fixed cost management (see figure 8.23).

<table>
<thead>
<tr>
<th>Strategic dimension</th>
<th>Operational dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structure-determining (constitutive)</td>
<td>Operational-determining (situational)</td>
</tr>
<tr>
<td>Optional decisions or non-repetitive decisions</td>
<td>Routine decisions or repetitive decisions</td>
</tr>
<tr>
<td>Based on middle / long-term</td>
<td>Based on short-term</td>
</tr>
<tr>
<td>Delayed effect</td>
<td>Immediately effect</td>
</tr>
<tr>
<td>Hardly correctable</td>
<td>Easily correctable</td>
</tr>
</tbody>
</table>

Figure 8.23 The basic differences between the operational and strategic dimension (Becker 1992:116)

If these basic criteria are applied for the distinction between operational fixed cost management and strategic fixed cost management, the following statements can be derived (Oecking 1994:51 and Reichmann 1997:128f.):
• Fixed cost potentials represent the structure of the enterprise in the form of plants, properties, employment contracts and other contracts and are thus structure-determining (constitutive).
• Fixed costs reduction is always only possible by separate single decisions and therefore mostly not a routine task.
• The term of fixed cost decisions depends on the change-ability of the different potential factors. However, there are normally only few potential factors that are lastingly influenced in the short time. Therefore, fixed cost management is to be considered only in few cases as short-term.
• Fixed cost decisions mostly produce delayed cost-effects (cost remanence) in particular through the lead-time with terminations or cancellations of contracts.
• The correcting-ability of fixed cost decisions is difficult to estimate in the majority for both contractual and property potentials. It is doubtful whether after reduction-decisions, personnel potentials or property potentials can be rebuilt with the same quality at the short-term.

From this examination of the previous criteria, it can be said that the majority of setting of tasks and the decisions connected with fixed cost management are not operational but strategic kind (Oecking 1994:51). Nevertheless, this does not mean, in fact, that fixed cost management has not operational component. The acceptable conclusion is rather that a much higher significance is attached to the strategic aspect.

The classification of fixed cost management into operational fixed cost management and strategic cost management can be also derived from the concept of the cost management (Oecking 1994:52). Cost management has shifted away from a focus on the stewardship role - product costing and financial reporting. The new focus is on management-facilitating role - the development of cost and other information to support the management of the firm and the achievement of its strategic goals. When the early influence on the costs is applied, this indicates that fixed cost management does not end with the cost accounting-related documentation of the fixed costs flexibility (Oecking 1994:52). The documented reducibility can be used as database for the operational and strategic instruments of fixed cost management. Furthermore this analysis is a prerequisite for recognizing strengths and
weaknesses of the cost flexibility and thus the basis for developed strategies to improve the adaptability of the company in the changing market conditions (Reichmann 1997:129).

**8.3.4.3. Instruments of Fixed Cost Management**

To achieve the objectives of fixed cost management, it must provide relevant information for decision-making as decision-oriented system and results-related system with the help of suitable instruments. The instruments of fixed cost management as a component of cost management can be deduced from the primary, defined tasks setting (Oecking 1994:70). The available instruments for operational or strategic fixed cost management are separated just as the respective tasks according to the time horizon, in order to make a clear separation of short, medium-term disposition possibilities and long-term fixed cost policy (Oecking 1994:70). The connection between the specific tasks and the instruments of fixed cost management are showed in the figure 8.24.

![Figure 8.24 Tasks and instruments of fixed cost management (Oecking 1994:70)](image)

According to their time-orientation, all analysis instruments of fixed cost management are classified either as operational or strategic analysis instruments (Oecking 1994:71). The basic instruments of fixed cost management serve for ensuring one of the tasks of fixed cost management and supplying sufficient information in order to achieve this task. Task of the
basic instruments is at first to produce transparency in the company by the possibilities of influencing on the existing fixed cost potentials.

The operational control should be supported in the context of operational fixed cost management by involvement of "disposition information" in decision-making (operational management of the potentials); in this connection further instruments of the operational planning and control are aimed at achieving such task (Oecking 1994:71). For strategic optimization, in the frame of the fixed cost policy, by development of concepts for the future flexible design of existing and future constructive fixed cost potentials, an improvement of the company situation in view of the possibilities of adaptation in changing market conditions is to be aimed (Oecking 1994:71 and Reichmann 1997:154). In the following sections, the instruments of fixed cost management will be discussed briefly.

8.3.4.3.1. Instruments of Operational Fixed Cost Management

Structural Analysis of Fixed Costs

The objective of structural analysis of fixed costs is documentation of the flexibility of the company in view of the adaptation possibilities of the fixed costs potentials in changing market conditions. The structural analysis of fixed costs is an instrument for describing and analyzing the current state of the flexibility or influenceability on fixed costs. The structural analysis of fixed costs serves as situational analysis, database for decisions in the fixed costs areas, basis for the development of strategies for the fixed costs structuring and basis for crisis plans in the case of declining or canceling of the activity (Oecking 1994:77). The structural analysis of fixed costs is divided into 3 steps (Oecking 1998:43):

1. Problem oriented structuring of the fixed costs
2. Disposition time analysis of the fixed cost potentials
3. Results representation and analysis

In the literature, it is indicated that the overall analysis in particular in large-scale enterprise can lead to difficulties because of the complexity of the data on the one hand and the absence of treatment-routine, on the other hand (Oecking 1993 and Reichmann 1997). Thus, an exemplary investigation of selected strategic business unites appears meaningful, because it
allows a defined orientation of the fixed costs analysis and helps to find out optimal handling of the subject in the enterprise individually (Oecking 1994:77).

In the first step, the **problem oriented structuring of fixed costs** offers itself in the overall analysis to structure the operational fixed cost potentials for determining the room for maneuver of the company in the case of slump or decline in the sales. In this connection, the fixed cost potentials are structured by the theoretical construction of quantifiable relationship with the output as possible, in which both the qualification of the employees and the indivisibility of resources are considered (Oecking 1994:78). Moreover, in this step, the simplification of analysis of the fixed cost potentials may be beneficial. This simplification can be carried out through categorization of the fixed cost potentials according to timing-based reducibility - reducible under one year / reducible not within one year (Oecking 1994:78). Figure 8.25 shows an example of the result of such preliminary overall analysis.

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**Figure 8.25** Fixed cost management - overall analysis (Oecking 1994:78)

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In the case of inability to establish the quantifiable relationship with the output, then the relationship between the areas whose activity level is in connection with the output and the areas whose activity level is independent on the output should be distinguished. In the first case (the relationship with output is present), the sizing of performance or output can be effected by process-oriented analysis (as in activity-based costing), which gives information
about the reduction times of fixed costs and which process reduction or elimination makes possible reduction in the costs (Oecking 1994:79). The figure 8.26 shows the structure of reducible fixed costs at fluctuating activity level.

![Figure 8.26 Structure of reducible fixed costs at varying activity level (Reichmann 1997:154)](image)

In the second case (no relation to the output), a service or budget thinking forms in principle the basis. At this point, management must decide whether e.g., accounting and controlling department or public relations department with the existing structure or funding is sustainable (Oecking 1994:79). These cost categories can be reduced to a large extent without thereby creating short-term negative consequences. A connection of the performance and fixed costs information is required or essential for the differential analysis of a budget area in view of the adequate funding resources.

Before the implementation of the second step - **disposition time analysis of the fixed cost potentials** - for time-related reducibility analysis, the distinction between the property potentials and contractual potentials should be carried out due to the different influence possibilities and analysis methods (Oecking 1994:79 and Reichmann 1997:129). The figure 8.27 shows such a differentiation.

In the property potentials, the timing determination of the reducibility is problematic because these potentials represent “costs of open periods” (Riebel 1967:11 and Reichmann 1997:129). Costs of open periods mean that the useful lifetimes of the property potentials are not exactly determinable in advance, wherefore also no accurate fixed cost allocation is possible to the accounting periods (Reichmann 1997:128). In these cases, only the estimated values are used,
e.g. the estimated operational useful life (Weber 1985:28). With the property potentials there are no possibilities of the fixed costs reduction except for the sales of the potentials (Reichmann 1997:129). Sales periods and revenues can be only estimated within the scope of the structural analysis of fixed cost mostly (Oecking 1993:85).

<table>
<thead>
<tr>
<th>Property potentials</th>
<th>Contractual potentials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land and buildings</td>
<td>Employment contract</td>
</tr>
<tr>
<td>Machines</td>
<td>Hiring contract</td>
</tr>
<tr>
<td>EDP</td>
<td>Leasing contract</td>
</tr>
<tr>
<td>Plants</td>
<td>Repairing contract</td>
</tr>
<tr>
<td>Vehicles</td>
<td>Energy supply contract</td>
</tr>
<tr>
<td></td>
<td>Insurance contract</td>
</tr>
<tr>
<td></td>
<td>Consultancy contract</td>
</tr>
<tr>
<td></td>
<td>Maintenance contract</td>
</tr>
</tbody>
</table>

Figure 8.27 Differentiation between property and contractual potentials
(Oecking 1994:80 and Reichmann 1997:129)

The timing disposition is more simply realizable with the contractual potentials, because the contractual potentials are subject usually to time-related consumption and their useful lifetimes are known in advance (Oecking 1994:80 and Reichmann 1997:129). Nevertheless, Reichmann (1995) stated that a restriction of the investigation of the fixed costs reducibility to the contractual potentials is possible to the simplification, but not meaningful, since the contractual potentials may not even correspond to 50% of the entire fixed cost potentials depending upon the structure of the regarded enterprise.

To every “contractual commitment” fixed cost potential, reducibility can be determined and documented with the date (Oecking 1994:80 and Reichmann 1997:129). This statement is at first completely neutral - based on the used measures. The problem of operational management becomes however different with the property and contractual potentials (Reichmann 1995:145f.). Contractual potentials can be cancelled or terminated mostly only at specific contractual time or predetermined legal time. These termination times and periods (= reduction periods) can be exactly documented. The figure 8.28 shows an example of the detailed documentation of the contractual potentials of a cost center.
In this example, the subsequent costs (e.g. social plans, severance payments etc.) of reduction decisions are not taken into consideration yet. A complete matrix with all (known) subsequent costs and the possibilities of fixed costs reducibility is substantially more complex (Oecking 1993:85). However, the entire range of termination of contractual potentials - if desired - for the entire company can be documented, managed and evaluated. The implementation requirements for such a representation are varied and complicated. Possible solutions exist in the deployment of fixed cost management-oriented cost category plan in accordance with the cost category method or the use of special databases for property and contractual potentials (Oecking 1994:206).

To the results representation and analysis, it should be warned before the attempt to make automatic adaptation decisions or to develop specific strategies due to the determined deficiencies emphatically (Oecking 1993:86). Without involvement of performance information, the reduction decisions of fixed costs will not be suitable (Reichmann 1997:130f.). Thus, at least an extension of the matrix of the reducible fixed costs to include performance information is essential. The alternative summarization in the cost distribution sheet (see e.g. Kilger 1993 and Haberstock 2004) and the integration of the information into the contribution analysis are two examples of the results representation and analysis (Oecking 1993:86).

<table>
<thead>
<tr>
<th>Potential</th>
<th>Amount</th>
<th>1. Quarter</th>
<th>2. Quarter</th>
<th>3. Quarter</th>
<th>4. Quarter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Truck 1. (Leasing)</td>
<td>5000</td>
<td>0</td>
<td>5000</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Truck 2. (Leasing)</td>
<td>8000</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>8000</td>
</tr>
<tr>
<td>Truck 3. (Leasing)</td>
<td>6000</td>
<td>0</td>
<td>6000</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total Truck</td>
<td>19000</td>
<td>0</td>
<td>11000</td>
<td>0</td>
<td>8000</td>
</tr>
<tr>
<td>Employee A</td>
<td>3000</td>
<td>3000</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Employee B</td>
<td>5000</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5000</td>
</tr>
<tr>
<td>Employee C</td>
<td>4000</td>
<td>0</td>
<td>0</td>
<td>4000</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>12000</td>
<td>3000</td>
<td>0</td>
<td>4000</td>
<td>5000</td>
</tr>
<tr>
<td>Total amount</td>
<td>31000</td>
<td>3000</td>
<td>11000</td>
<td>4000</td>
<td>13000</td>
</tr>
</tbody>
</table>

Figure 8.28 The (contract-) matrix of the fixed costs-reducibility for a cost centre (Oecking 1993:86).
The economics of the realization of such analysis is at least problematic. Mostly, using of an accurate documentation faces disproportionate costs of data collection and maintenance. In addition, codetermination laws and data protection will make such documentation almost impossible in the case of the employment contracts for example (Oecking 1993:86). The consequences on the company climate and therefore on the motivation of the employees can (and will) be disastrous when such keeping data becoming known. Hence, one must find an approach that excludes the specific disadvantages in view of the economics of the analysis as well as under the point of view of the acceptance in the enterprise.

Oecking (1993:86) stated that the structural analysis of fixed costs could be carried out as the overall analysis instead of the detailed analysis. In this connection, the fixed costs potentials of the defined areas can be analyzed in form of the business game at the round table on basis of estimations (e.g. relating to the cost center, the amount can be broken down into personal and physical resources). The overall analysis provides in comparison to detailed analysis only limited information content, which results primarily from estimation errors. Empirically, it can be said that the limited information content can be justified based on the considerations of the costs and benefits. The problems of the data protection and the operational co-determination that result from the detailed fixed costs analysis can be avoided by the overall analysis as much as possible (Oecking 1993:87).

The standardized, periodical structural analysis of fixed costs is surely no suitable instrument for the support of the permanent employment of the fixed cost management (Oecking 1994:82). Nevertheless, varied knowledge can be gained, as a preliminary investigation and as a basis for the analysis of investment decisions. For the process of fixed cost management, involvement commitment periods analysis of the potentials factors must be taken into consideration because the integrative approaches provide improved long-term perspective (Reichmann 1997). Thus, the possibility of the utilization of property and contractual potentials databases will be discussed alternatively as an approach of fixed cost management.

**The contractual and property potentials databases**

The contract database deals with analyzing of the commitment periods of the contractual potentials and summarizing dates of change and termination of the contractual potentials (Oecking 1994:96). The types of information about the concluded contracts of the company
with different contracting parties are mainly found in many accounting information systems in the company (Reichmann 1997:272). For example, information about short-, middle- and long-term contracts concerning the supply or purchase of the services is stored in the selling or in the purchasing information system. The data of personnel contracts is found in the personnel information system. However, in few companies, there is a system in which the information about all contractual obligations of a company is managed centrally (Oecking 1994:96).

In the contract database, all relevant information for fixed cost management from different tables and files or from results of the single contract analysis is thus united. A contract database must contain the following fields (Oecking 1994:96 and Kremin-Buch 1998:22):

- **Contract labeling / number**: the contract number corresponds to the reference number of the contract with the contracting party or with the supplying data for EDP-system.
- **Contracting party**
- **Termination period or date**: this field can provide a structured representation of the timing-reducibility of the contractual potentials
- **Monthly / quarterly / semi-annual / annual amount**: to determine the monthly, quarterly, semi-annual or annual burden for particular company
- **Change date**: the change date is the date of a possible change of the period of cancellation of the contract.
- **Organizational unit**: the assignment of the field of organizational unit allows the cost allocation to the analysis objects. Analysis objects can be for example the cost centres or the strategic business units of the considered enterprise. Hence, through this an important interface can be produced to the overhead costs controlling.
- **Subsequent costs**: for the determination of the success effectiveness of all measures in the context of operational fixed cost management, subsequent costs (e.g. severance payment or contractual penalties) can be of substantial importance. Nevertheless, the subsequent costs can be estimated in many cases only with difficulties. The table 8.1 shows an example of a contractual potentials database.
<table>
<thead>
<tr>
<th>Ser. No</th>
<th>Contract number</th>
<th>Contracting party</th>
<th>Period of Termination</th>
<th>Amount</th>
<th>Organizational unit</th>
<th>Subsequent costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>55-152 985</td>
<td>Signal-insurance</td>
<td>Quarter</td>
<td>24.500 €</td>
<td>Entire-company</td>
<td>0 €</td>
</tr>
<tr>
<td>2</td>
<td>55-152 986</td>
<td>Signal-insurance</td>
<td>Quarter</td>
<td>45.000 €</td>
<td>Vehicles fleet</td>
<td>0 €</td>
</tr>
<tr>
<td>3</td>
<td>55-152 987</td>
<td>Signal-insurance</td>
<td>Quarter</td>
<td>3.200 €</td>
<td>Selling</td>
<td>0 €</td>
</tr>
<tr>
<td>4</td>
<td>47/0990 180</td>
<td>Leasing K.</td>
<td>Half-year</td>
<td>25.000 €</td>
<td>Line 1</td>
<td>1.250 €</td>
</tr>
<tr>
<td>5</td>
<td>47/0990 181</td>
<td>Leasing K.</td>
<td>Year</td>
<td>45.000 €</td>
<td>Line 2</td>
<td>2.250 €</td>
</tr>
<tr>
<td>6</td>
<td>47/0990 182</td>
<td>Leasing K.</td>
<td>Month</td>
<td>6.000 €</td>
<td>Line 3</td>
<td>300 €</td>
</tr>
<tr>
<td>7</td>
<td>47/0990 183</td>
<td>Leasing K.</td>
<td>Month</td>
<td>4.580 €</td>
<td>Forman</td>
<td>229 €</td>
</tr>
<tr>
<td>8</td>
<td>100 570 570</td>
<td>Personnel service</td>
<td>Year</td>
<td>8.000 €</td>
<td>Personnel dep.</td>
<td>1.600 €</td>
</tr>
<tr>
<td>9</td>
<td>101 570 573</td>
<td>Personnel service</td>
<td>Quarter</td>
<td>5.020 €</td>
<td>Vehicles fleet</td>
<td>1.004 €</td>
</tr>
<tr>
<td>10</td>
<td>102 570 574</td>
<td>Personnel service</td>
<td>Half-year</td>
<td>6.350 €</td>
<td>Personnel dep.</td>
<td>1.270 €</td>
</tr>
<tr>
<td>11</td>
<td>103 570 570</td>
<td>Personnel service</td>
<td>Year</td>
<td>8.532 €</td>
<td>Personnel dep.</td>
<td>1.706 €</td>
</tr>
<tr>
<td>12</td>
<td>31 32 23/Z</td>
<td>SNID</td>
<td>Quarter</td>
<td>450 €</td>
<td>Office building</td>
<td>23 €</td>
</tr>
<tr>
<td>13</td>
<td>32 32 25/U</td>
<td>SNID</td>
<td>Quarter</td>
<td>250 €</td>
<td>Office building</td>
<td>13 €</td>
</tr>
<tr>
<td>14</td>
<td>ABA-152 998</td>
<td>Leasing K.</td>
<td>Month</td>
<td>9.200 €</td>
<td>Maintenance and repair</td>
<td>460 €</td>
</tr>
<tr>
<td>15</td>
<td>ABA-152 999</td>
<td>Leasing K.</td>
<td>Quarter</td>
<td>11.500 €</td>
<td>Maintenance and repair</td>
<td>575 €</td>
</tr>
</tbody>
</table>

Table 8.1 Contractual potentials table (an example) (Oecking 1994:99)

On basis of the described database, various analyses are possible according to all criteria, for example (Oecking 1994:99 and Kremin-Buch 1998:24):

- Inquiry of all terminable contractual potentials within a period X
- Share the short-term terminable contracts (1 month and 3 months) in the total number
- Sum all monthly / quarterly / semi-annual / annual obligations of contracts,
- Reduction possibilities for organizational units,
- Possible reductions of fixed costs with the measures:
- All contracts till X months are cancelled
- Termination all contracts with a certain contracting party.

For the property potentials, analysis of the commitment periods may be more difficult to manage, because the problem of the assessment of possible savings is bigger with reducing decisions of the fixed costs that result from reducing of the property potentials by sale or alternative utilization. In addition, this analysis is complicated by the different changes of
value that result from deprecations of the property potentials (Oecking 1994:100). While the provided contractual potentials with the definite commitment periods can be quantified quite exactly in their monthly costs, the question about the book value and possible residual value always arises with property potentials (Reichmann 1997:129).

The property potentials database deals with the analyzing of the commitment periods of the property potentials and summarizing the dates of sales and the possible savings (Oecking 1994:103 and Kremin-Buch 1998:25). In order to make the property potentials analyzable, similarly to the contractual potentials, periodic amounts are to be determined. For the property potentials that their deprecations depend on the time and utilization, periodic amounts are taken into consideration - this periodic amount depends on the book value and the residual value of the property potential in view of the respected useful life (Oecking 1994:101 and Reichmann 1997:129). The periodic amount to be calculated can be evaluated ceteris paribus to a monthly contract value. For the other property potentials, the values of their alternative utilization that can be estimated are taken into account, for example, the monthly rent of building can be obtained.

The property potentials database must contain beside the calculated (monthly - quarter - half yearly - annual) value, information about the potential identification (corresponds to a reference number with the supplying data for EDP-system), the sale rate (monthly, quarterly, half-yearly etc.) and the affected organizational unit (Oecking 1994:102f. and Kremin-Buch 1998:25). On basis of such database then e.g. all property potentials of the organizational unit - vehicles fleet - which can be sold within a half yearly, can be determined.

Similar to the contractual potentials database, on basis of the described property potentials database, various analyses are possible according to the following criteria (Oecking 1994:105 and Kremin-Buch 1998:27):

- Possible reduction of fixed costs under the assumption: All property potentials of the group 1 (1 month and 3 months) will be sold,
- Share the short term (1 month and 3 months) saleable property potentials in the total number,
- Reduction possibilities for organizational units, etc.
Thus the gathered information from contractual potentials database and property potentials database can contribute in various ways to the improvement of the information basis of the fixed cost management.

**Cost category method**

The structure of the fixed cost management-oriented cost category plan represents an essential requirement for the integration of fixed cost management in all other cost accounting areas by the fundamental significance of the cost category accounting (Oecking 1994:82 and Kremin-Buch 1998:18). According to the cost category method, fixed cost management-oriented cost category plan is to be structured. Fixed cost management-oriented cost category plan is developed by a consistent and logical division of all relevant cost categories into - appropriate timing structuring - several subcategory of costs (Oecking 1994:83 and Kremin-Buch 1998:17).

In addition, the cost category plan must be planned to provide suitable cost categories that can be summarized in the alternative cost distribution sheet (Oecking 1994:83 and Kremin-Buch 1998:18). The basis for the extension of the cost category is the main form of cost category available in the enterprise. If the structured development of the main form of cost category is present, then a logical splitting up of cost category will substantially make the ability of summarizing of subcategories of costs easier. The figure 8.29 shows a possible outline for a structured cost category plan.

![The structure scheme of cost category](image)

<table>
<thead>
<tr>
<th>Personnel costs</th>
<th>Reducibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wages</td>
<td>≤ 1 quarter</td>
</tr>
<tr>
<td>Salaries</td>
<td>≤ half-year</td>
</tr>
<tr>
<td>Other</td>
<td>≤ 1 year</td>
</tr>
<tr>
<td>Compensations</td>
<td>&lt; 1 year</td>
</tr>
<tr>
<td>Rewards</td>
<td>Other</td>
</tr>
</tbody>
</table>

Figure 8.29 The structure of fixed cost management-oriented cost category plan for personnel costs (Oecking 1995:225)
According to the introduced structure, specific reducibility can be carried out for suitable cost category plan, fixed cost management and then for all relevant cost categories. Here it should indicate to the fact that quantifiable negative influencing on the company climate cannot originate from detailed analysis and documentation of the reducibility of the personnel costs. Nevertheless, with this detailed kind of the subdivision of the cost category plan, the question arises for each enterprise whether the costs of additional details justify the benefits.

The cost category method has a further substantial disadvantage. This is of the fact that only timing-differentiation of the fixed costs does not show the determining factors of the fixed costs (Kremin-Buch 1998:19). In other words, the cost category method does not provide information for the management to determine which circumstances form the basis of the fixed costs and consequently also the specific clues to the fixed costs reductions. For this reason, it is meaningfully to determine directly the determining factors of the fixed costs.

**Further instruments of operational fixed cost management**

In the literature of cost accounting, there are further instruments of operational fixed cost management. Oecking (1994) and Reichmann (1997) stated that instruments such break-even-point-analysis, contribution margin technique, make or buy analysis, ratio systems and early warning system can contribute to the operational planning and controlling of fixed costs. In addition, these known instruments play an important role in the improvement of fixed costs-flexibility (Oecking 1994:157). For the advantages and disadvantages of these instruments see for example Oecking (1994) and Reichmann (1997).

**8.3.4.3.2 Instruments of Strategic Fixed Cost Management**

The structural analysis of fixed costs and the documentation serve as a basis for the future oriented fixed costs policy. In this connection, the strategic orientation of the fixed costs structure stands in the center of the considerations. A renunciation of precisely quantifiable data is accepted by enterprise consciously (Oecking 1998:51). The purpose of the fixed costs policy is to work out strategies that indicate to higher action flexibility and quicker reaction possibilities in the case of falling or fluctuating sales rates (Antoni and Riekhof 1994:110). After the strategy development in the organization, further measures must be communicated, tactical or operational plans for the realization of the strategy must be introduced and the monitoring of the strategy realization must be accomplished (Horváth 1990:178).
In order to achieve the goal, market conditions and cost flexibility must be confronted and the information supply must be illuminated in view of its early warning function by the enterprise critically. In order to derive strategies, a positioning of the analysis object (e.g. a product, a strategic business unit, etc.) can occur at first in form of the fixed costs portfolio (Schimank 1990:231).

The components of the fixed costs portfolio can be described briefly as follows (Oecking 1998:51):

- **Market stability:**
  Market stability is seen as measure for the fluctuation of the demand, the price structure and the economic cycles of the market. It is differentiated with respect to the fixed costs portfolio into stable and unstable market conditions.

- **Fixed costs flexibility:**
  The fixed costs flexibility is defined as a measure of the reaction possibilities of the enterprise or the influenceability on the fixed costs in a defined period. It is divided in the fixed costs portfolio into low and high influence possibilities.

The analysis object (e.g. a product, a strategic business unit, etc.) can be positioned now in simple way on basis of estimated market stability and the structural analysis of fixed costs in the fixed costs portfolio (see figure 8.30).

![Figure 8.30 Fixed costs portfolio (Oecking 1998:52)](image-url)
The requirement of the fixed costs portfolio is the selective analysis of a product or a strategic business unite with its used fixed costs potentials. However, the difficult of this approach that should be considered is the quantification of a high / low flexibility as well as the market stability, because it always concerns estimated values. The fixed costs portfolio can serve nevertheless for a simple representation of the position of the division, but a requirement of an accurate representation of the reality is not raised. According to the classification in the portfolio, strategy recommendations or suggestions can be derived (Höfner and Winterling 1982:250). In this connection, the purpose is to reach to the ideal state of the position of the low risk.

The four positions of the fixed costs portfolio can be described as follows (Oecking 1998:52f):

- **Extreme risk (low fixed costs-flexibility and unstable market-stability):**

  Since unstable market conditions are not regarded here as external component of the portfolio which can be affected and at the same time there is minimum cost flexibility, it is to be examined by the management whether disinvestment, thus the withdrawal from this business segment or strategic business unit is advantageous. However, a risk decrease can be reached sometimes by diversification in the product portfolio or by a reduction of the commitment period of the costs (strategy of the shorter commitment period).

- **Reduced risk (low fixed costs-flexibility and stable market-stability):**

  The problem lies here in the fixed costs area, because the market was evaluated as positive. In this case, the management must primarily reduce the commitment period of the costs. Thus the reduction of the manufacturing depth can occur through increase of the portion of the purchased components after careful Make-or-Buy analyses. The state of a low risk can be reached from this position.

- **Calculable risk (high fixed costs-flexibility and unstable market-stability):**

  In this case, the fixed costs potentials have high flexibility but the market is uncertain. Possibilities for improvement exist in the concentrated employment of the marketing-mix. Product policy, price policy and promotion policy are required with this costs/market-position. Product improvements and diversifications can reduce the risk potential. For
strategic fixed cost management, there is no need for action to increase flexibility. Possibilities of the reduction of the commitment periods of fixed costs are for example a partial transition of property potentials (e.g. sale and leases back), leasing instead of purchasing of the fixed assets, as well as the temporal control of new concluded contracts in relation their termination dates. However, during the reduction of the commitment periods of fixed costs, the management should pay its attention always that economic efficiency and flexibility can have tendencies moving in opposite directions and therefore are possibly competing goals. Thus, the flexibility must be normally purchased. The state of a low risk can be reached from this position.

- **Low risk (high fixed costs-flexibility and stable market-stability):**

The ideal state is already present in this costs/market-position; the goal is to sustain this position. An examination of further possibilities can be meaningful to protect the position in the market.

The lack of accurate quantifiability is acceptable in the strategic fixed cost management. The subjective influence, the lacking quantifiability and the summarizing of the data always lead to blurring of the positioning in the portfolio, which must be tolerated with such strategic instrument inevitably (Oecking 1994:204). In order to implement the suitable strategy, different possibilities for the fixed costs-flexibility can be used by the management such as the personnel policy, outsourcing, lease or buy decisions (for more details, see section 8.2.6).

**8.3.4.4. Evaluation of the Fixed Cost Management Approaches**

In the context of operational fixed cost management, the extension of operational planning and control instruments to include information about the commitment periods of fixed costs potentials are expected to generate clear informational advantages compared with the rigid consideration of fixed costs of the conventional standard costing (Oecking 1994:157). Known analysis instruments such as break-even-analysis and make or buy decisions are essential to improve the fixed costs-flexibility. In addition, it is well possible to develop other instruments for the purposes of fixed costs management. The supply of a secured information basis proves finally to be as the central problem of operational fixed cost management (see Reichmann 1997).
For the development of the basic instruments of the operational fixed cost management, there are two different alternatives for the information collection and processing. Beside the standardized, current data processing, it is also possible to evaluate the provision of information from case to case on basis of special analyses. By the evaluation of the standardized integration of the accounting system, disproportional high costs for increasing transparency must be excluded absolutely (Oecking 1994 and Reichmann 1997).

In this connection, the structure of property and contractual potentials databases can however remedy some problems of the fixed costs potentials (Kremin-Buch 1998:20). The consequences on the company climate and therefore on the motivation of the employees should be likewise taken into consideration with this system. In the context of the requirements of cost management, an appropriate fixed cost management is required to find the approaches that exclude the described disadvantages in view of the economic efficiency of the analysis as well as under the point of view of the acceptance in the enterprise. Besides, in particular a stronger emphasis on strategic elements is to be aimed at (Nink 2002).

Strategic fixed cost management - based on the fixed cost-portfolio analysis - represents a suitable approach that supports the future-oriented flexibilization of cost potentials (Oecking 1994:203 and Nink 2002:184). Nevertheless, some problems result from the development of this analysis, which will be addressed in the following briefly. The portfolio analysis has experienced a strong spreading in almost all enterprise areas in theory and practice (see e.g. Götze and Mikus 1999). For all portfolios, defining of analysis objects (e.g. a strategic business unit) and next (often qualitative) evaluation and weighting of the selected influence parameters are common steps. Because in most cases more than two influencing variables are considered, the individual factors must be finally consolidated to the two-dimensional portfolio representation. The problems of selection and quantification linked with the portfolio analysis should be shown for the strategic fixed cost management.

The first step is - as described for developing of the fixed cost-market-portfolio - the definition of a strategic business unit as analysis unit. The market-related determining of a strategic business unit takes place here with consideration of the primacy of assignment ability of fixed costs (Oecking 1994:203). Regarding the fixed costs consideration, the problem is that relating to the costs that have different product-market combinations of the
same product cannot often be differentiated. The selection of a strategic business unit on the basis the cost center related assignment-ability creates the problems when services of the cost center are provided for different strategic business units. Oecking (1994:203) stated that this problem was taken into account, because it concerns in particular management segments by the clear distinction of these areas and the demand for a separate fixed costs analysis for management segments. If the productive cost centres remain to create different services for different strategic business units, the fixed costs flexibility values must be separately examined for the individual strategic business unit in these cost centres and a certain inaccuracy level must be accepted.

The determination and quantification of the reducible fixed cost amounts on the one hand and the evaluation of the market on the other hand represent a central problem of the indicated portfolio analysis (Oecking 1994:203 and Nink 2002:187). The accounting accuracy of the determined numbers is not given through determination the fixed cost-flexibility as special analysis. Therefore, the detailed classification or division of the temporal adaptability should be also renounced to avoid the mistakes. In this connection, because portfolio analysis is related with the fixed cost management as a strategic and thus future-oriented instrument, the lack of accurate quantifiability is acceptable (Oecking 1993:203).

A further critical point is the assessment of the reduction volumes in the portfolio scale (fixed cost flexibility). Besides, by the analysis of the weak points of the market evaluation, it becomes clear that the factor of market stability that is confronted in the portfolio of the fixed costs flexibility consists from a finest set of indicators. Possible points of criticism lie on the one hand in the selection of the criteria and on the other hand in the weighting of the groups of indicators (Oecking 1994:204 and Nink 2002:187). The pointed indicators here must be individually coordinated to the enterprise. However, it appears important to take into consideration combination of the hard facts (historical data and new orders) and the soft facts (prognoses) about real values and significant future indicators for classifying the portfolio adequately (Oecking 1994:204). By portfolio analysis, some difficulties such as the subjective influence, the lack of measurability, and summarized data lead to blurred positioning in the portfolio however these must be accepted. Before the derivation of a strategy from the portfolio, the individual strengths and weaknesses of a strategic business unite which are documented in the collection sheet, must be taken into consideration (Oecking 1994:204).
Finally, it must be stated that the presented portfolio analysis is open to attack regarding the precision, because it is example-oriented and formed from practicability considerations. However, the accuracy of the analyses is sufficient in order to advance toward cost and market-related risks early and purposefully. The strategic fixed cost management as a component of the strategic cost management must provide tools which enable to document the flexibility possibilities of fixed costs potentials taking into account the individual market, to analyze and to derive (if needed) strategies for the improvement of the cost flexibility and to lower the market risk.

9.1. Instruments of Strategic Cost Management

Instruments of strategic cost management are the critical pillar of the suggested framework. Instruments of strategic cost management may be used individually to support a specific goal or together to serve the overall needs of the organization. A set of strategic cost-management techniques that function together to support the organization's goals and activities is called a strategic cost-management system (Hilton et al. 2001:8). The design, implementation and application of new forms of cost management instruments represent a great challenge for management accountants (see e.g. Horváth 1993a, Ansari et al. 1997b, Cooper and Kaplan 1998, 1999 and Blocher et al. 1999). With ongoing pressures to reduce cost, improve revenue and satisfy customer, the need for cost management instruments is clear. What isn't so clear is which instrument to use, when, why, and how one cost management instrument interfaces with others (McNair and Bleeker 1998).

In the literature, there are many instruments for cost management such as target costing, activity based costing and management, life cycle costing, benchmarking etc. (e.g. Berliner and Brimson1988, Camp 1989, Brimson 1991, Shields and Young 1991, Horváth 1993a, Monden 1995, Turney 1996, Cooper and Slagmulder 1997a, Ansari et al. 1997b, Hoffjan 1997, Cooper and Kaplan 1998, 1999), but the important thing, is which instrument can be strategic, integrated and interacted with other instruments to achieve strategic cost management-objectives. According to these important considerations, activity based costing and management, target costing, life cycle costing, and benchmarking are chosen as integrated instruments for strategic cost management-framework.

9.1.1. Activity Based Costing and Management

9.1.1.1. The Origins of Activity Based Costing and Management

The concepts on which ABC is based are not new in the history of cost accounting and management (Johnson 1992:132, Innes et al. 1994:16 and Major and Hoque 2005:85). The starting point for a study of activity-based theories and practices in accounting offers a degree of choice. For the theory, the ideas on activity costing can be traced back for several decades, for example, Solomons (1968) and Staubus (1971) have been identified as having earlier referred to activity costing or, at least, mentioning some of the basic concepts on which ABC is based (Innes et al. 1994:16 and Major and Hoque 2005:86).
The idea of the relationship between the activity and cost was outlined within the context of standard costing in the work of Solomons (1968), where he used the activities rather than simply labor hours in developing overhead rates to improve variable overhead variance analysis (Innes et al. 1994:16). Staubus (1971) also suggested a conceptual framework for cost accounting, defining activities as the objects of costing. This framework was based on the principle that each major resource used should be identified and measured, and then traced to the objects of costing - activities. Staubus (1971) was specially concerned with understanding the fundamental features of activities.

For the practices, ABC was the result of many companies’ efforts to improve the quality of product cost accounting information (Major and Hoque 2005:86). For example, Johnson (1992) traced the origins of ABC to the early 1960s, when General Electric developed a model of activity-based cost analysis to improve the quality of its information on indirect costs. This cost system was apparently based on concepts similar to the present ABC systems. Johnson (1992:132) stated that General Electric during the 1960s was probably the first place where accountants used the term activity to describe and analyze work that causes costs. According to Johnson (1992:137) "General Electric's technique for activity-based cost analysis anticipates virtually everything that is claimed for present-day activity cost management systems”.

Despite the fact that the ideas on activity costing can be traced back for several decades, its current popularity and contemporary formation emerged from its development and use in some manufacturing and service companies in USA and Europe during the 1980s and 1990s (see e.g. Innes and Mitchell 1990, Bailey 1991, Turney 1996, Cooper and Kaplan 1998, 1999, Jones and Dugdale 2002 and Major and Hoque 2005). The firms became the subject of a series of Harvard Business School cases such as Schrader Bellows, John Deere, and Union Pacific Railroad (see Cooper and Kaplan 1999). This led to the construction of a powerful, so-called “Harvard network” (Jones and Dugdale 2002:126f.), that termed the approach activity based costing (ABC).

A second powerful network - the Computer-Aided Manufacturing International (CAM-I) - became allies in promoting new costing methods (Jones and Dugdale, 2002). Both networks have been efficient in promoting ABC as a solution for making American and European firms

In the late 1980s, ABC was the most influential new approach (see e.g. Cooper and Kaplan 1988a, 1988b, 1998 and 1999 and Turney 1989, 1996) and by early 1990s ABM was more influential (see e.g. Cooper and Kaplan 1999, 1998, Cokins 1996 and Turney 1996). Many ABC researchers (see e.g. Innes and Mitchell 1991, Cooper et al. 1992, Turney 1996 and Cokins 1996) have shifted their focus from measurement to process, and from product cost analysis to process improvement. Thus, it was natural for activity-based management (ABM) to emerge from ABC. ABC/M one from few cost management developments that has elicited an extensive and favourable response in so short a time scale. The positive attributes of ABC/M have led Johnson (1990:15) to describe ABC as: “one of the two or three most important management accounting innovations of the twentieth century”.

9.1.1.2. The Problem with Traditional Costing Systems and the Need for ABC/M

To understand the rise of ABC, one must really understand the problems of traditional costing systems and recognize the factors that leaded to the rise of the contemporary activity based costing, that will be discussed next, because ABC came as a result of these problems and factors. Many studies in the literature of cost accounting and management (e.g. Turney 1996:77ff., Cooper and Kaplan 1998:83, Cokins 1999:38, Blocher et al. 1999:94ff., Hansen and Mowen 2000:46) stated that contemporary activity based costing was developed to overcome the problem of overhead cost measurement and management caused by traditional costing systems.

According to Kaplan (1988:61), companies need cost systems to perform three primary functions: inventory valuation for financial reporting purposes, operational control for performance and productivity evaluation, and individual product cost measurement. Kaplan (1988) recognized that no single system can adequately answer the demands made by the diverse functions of the cost systems. At the same time, Cooper and Kaplan (1998:2f.) argued that, while the first function is arguably fulfilled adequately by conventional costing systems, such systems could not explain what the shop floor manager should do to manage costs,
improve performance, and these systems tended to distort product costs for strategic and marketing purposes, particularly in high overhead contexts.

As discussed in literature, conventional costing systems (cost center method) are based on a two-stage procedure and can be described as volume-based costing systems (see e.g. Innen and Mitchell 1991, Turney 1996, Sakurai 1996, Cooper and Kaplan 1998 and Blocher et al. 1999). The figure 9.1 shows the two-stage allocation procedure where direct costs are traced to products, overhead costs are allocated to cost centers, and then to production outputs. In the second stage, the traditional costing system allocates overhead costs from cost centers to products using volume-based cost drivers. This two-stage allocation procedure, however, fails to provide information that can be applied to cost management and performance improvement, and distorts product or service costs considerably (Sakurai 1996:93, Cooper and Kaplan 1998:83 and Blocher et al. 1999:96).

![Figure 9.1 Traditional cost allocation (Cooper and Kaplan 1998:83)](image)

The traditional costing systems assume that cost objects (products or services) consume resources and therefore these systems see the products as cost generating (Blocher et al. 1999:96 and Hansen and Mowen 2000:45). In this case, it is difficult to manage costs because a company can only manage what is actually being done (activities) and then costs will change as a consequence. However, in traditional costing systems, the underlying assumption is that costs can be managed, but as most managers have found out the hard way - managing costs is almost difficult (Emblemsvåg and Bras 2001:63f. and Major and Hoque 2005:84).
Traditional costing systems mostly utilize direct labor or other volume related allocation bases for cost assignment purposes and therefore these bases rarely reflect the true cause and effect relationship between overhead costs and cost objects. Thus, Cooper and Kaplan (1998:83), Cokins (1999:38) and Blocher et al. (1999:96) argued that such systems usually fails to allocate costs and distort product or service costs considerably. In addition, traditional cost systems are more concerned about the organizational charts than the actual process. These systems are therefore structurally oriented (cost classification according to organizational structure) and the process view is completely missing (Emblemsvåg and Bras 2001:65f.). From this we understand that the structure-oriented approach of traditional costing systems gives no support for resources allocating and process improvement. Over time this can lead to cost inefficient organizations and poor profitability.

The traditional costing systems worked well until the business environment changed in the late 1970s (Johnson 1992:144 and Drury 2000:340). The business scenario in the olden times for which traditional systems were developed and used is no longer the current business trend. Traditional costing systems were designed decades ago when most companies manufactured a narrow range of products, and direct labor and materials were the dominant factory costs. Overhead costs were relatively small, and the distortions arising from inappropriate overhead allocations were not significant. Information processing costs were high, and it was therefore difficult to justify more sophisticated overhead allocation methods (see e.g. Johnson 1992, Turney 1996, Cooper and Kaplan 1998 and Drury 2000).

On the other hand, today’s companies typically have a wide variety and complexity of products and services, high overhead costs compared to direct labor, an overabundance of data and substantial non product costs (e.g. distribution channels) that can dramatically affect true product cost (Drury 2000:340). The nature of overhead cost has changed from costs which were predominantly influenced by volume-related factors to a composition determined largely by non-volume-related factors (Innes et al. 1994:18). Thus, simplistic overhead allocations using a declining direct labor base cannot be justified, because computer technology has reduced the costs of developing and operating of cost systems that track many activities (Drury 2000:340). Furthermore, the cross-functional behavior within companies has gained ground, more than ever managers becoming aware of the relationships between their departments (Horngren et al. 2002:205). According to those circumstances, instead of
revealing problems to tackle and opportunities to exploit, conventional costing systems actually hide problems and fail to identify opportunities. Turney (1996) Cooper and Kaplan (1998) expressed that ABC would be a solution.

9.1.1.3. The Concept and Objectives of Activity-Based Costing

Kaplan and Cooper (1988a:96ff.) argued that, in the case of a wide variety and complexity of products and services and high overhead costs, the allocation of such overhead costs could be significantly improved, thus leading to a reduction in the distortions in product cost calculations, if an ABC system was adopted. ABC requires a new kind of thinking. Traditional costing systems are the answer to the question, “How can the organization allocate costs for financial reporting and for departmental cost control?” ABC is the answer to an entirely different set of questions (Cooper and Kaplan 1998:79):

1. What activities are being performed by the organizational resources?
2. How much does it cost to perform organizational activities and business processes?
3. Why does the organization need to perform activities and business processes?
4. How much of each activity is required for the organization’s products, services, and customers?

The term activity-based costing is itself subject to varying interpretation and its definition appears to be evolving over time (Noreen 1991:160). When Cooper and Kaplan first encountered ABC systems in the mid- to late 1980s at sites such as Schrader Bellows, John Deere, and Union Pacific Railroad, they described ABC system as an allocation procedure by which overhead costs were assigned via activities to products and services (Kaplan 1992:59). The CAM-I Glossary of Activity Based Management provides an elaborated interpretation of ABC: “ABC is a methodology that measures cost and performance of cost objects, activities, and resources, assigns resources to activities and activities to cost objects based on their use, and incorporates causal relationships between cost objects and activities as well as between activities and resources” (Dierks and Cokins 2001:35). ABC is not just about allocating overheads. ABC is about managing and controlling activities and consumption of resources that incur cost (Turney 1996:80f. and Cooper and Kaplan 1998:79f.). By recognizing the causal relationships among resources, activities, and cost objects such as products or customers, ABC allows one to identify inefficient or unnecessary activities and opportunities for cost reduction or profit enhancement.
Whatever a definition, the basic idea in ABC is: activities consume resources (and so cause cost) and products consume activities. Thus, the original ABC system proposed by Cooper and Kaplan in the mid- to late 1980s is also based on a two-stage procedure as shown in figure 9.2. However, ABC differs from traditional costing systems by modeling the usage of a firm’s resources on activities performed by these resources, and then linking the cost of these activities to cost objects such as products or services (Sakurai 1996:95 and Cooper and Kaplan 1998:83). In particular, ABC measures more accurately the cost of activities that are not proportional to the volume of outputs produced.

![Figure 9.2 The structure of an activity-based costing system (Cooper and Kaplan 1998:84)](image)

In ABC, the activity itself becomes the main point of the costing process (Sakurai 1996:95). Under ABC, the first-stage allocation is a resource cost assignment process by which overhead costs are assigned to activity cost pools or groups of activities called activity centers by using appropriate resource drivers (Sakurai 1996:95 and Blocher et al. 1999:96). The second-stage allocation is an activity cost assignment process by which the costs of activities are assigned to cost objects using appropriate activity drivers. ABC differs from traditional costing systems in two ways (Innes et al. 1994:28, Sakurai 1996:95 and Cooper and Kaplan 1998:83f.): First, cost pools are defined as activities or activity centers rather than cost centers. Second, the cost drivers used to assign activity costs to cost objects are activity drivers based on cause-effect relationships. The traditional approach uses a single volume-based driver that often bears little or no relationship to either the resource cost or the cost object.
These modifications to the two-stage procedure allow ABC to report more accurate costs than a traditional costing system because ABC identifies clearly the costs of the different activities being performed in the firm. ABC also assigns the costs of those activities to output cost objects using measures that represent the types of demands individual output products or services make on those activities. The concept of ABC began with the objective of more accurate product costing but in many companies cost management has become as, if not more, important than product costing (Innes et al. 1994:114, Turney 1996:77ff. and Blocher et al. 1999:111). The reason for this is that once managers begin to think in terms of activities and cost drivers, it is natural to ask questions about whether all the existing activities are required and whether certain activities can be performed efficiently or effectively.

ABC provides a framework for achieving the two overhead costing objectives of cost pool homogeneity and a cause/effect relationship between absorption bases and costs (Innes and Mitchell 1998). Accordingly, ABC has been put forward as the solution to many of the problems of modern businesses in competitive environments such as overhead cost problem. The basic elements of the original ABC system are the cost drivers, activity cost hierarchy (unit, batch, product, facility-sustaining, and customer), and resource consumption (Sakurai 1996:95 and Cooper and Kaplan 1998:85f.). These elements of ABC provide significant visibility in the overhead area and accuracy in the generation of product costs. By the ABC cost hierarchy, ABC provides a structure within which cost behavior can be analyzed in a more sophisticated manner than that undertaken with the more conventional split into fixed and variable categories (Cooper and Kaplan 1998:90f.). This analysis also emphasizes the level at which decisions must be made if they are to influence costs. It thus not only provides a basis for helping management understand cost behavior but also assists them in identifying the implications of their decisions and focusing upon the potential results of a “what-if” analysis of the situation which confronts them.

ABC focuses on resource consumption not spending. Thus, a major conceptual advance in ABC is the ABC system should not assign all organizational expenses to cost objects (see Cooper and Kaplan 1992). Thus, the activity-based system can measure the costs of using resources, not the cost of supplying resources. This leads to accurate product costing and reveals why operational improvements often do not lead to lower spending. In fact, through focusing on resource consumption, measuring unused capacity may be one of ABC’s
important contributions to some companies, for example, Sanyo Electric in Japan successfully used ABC to find non-value capacity (Sakurai 1996:98.)

9.1.1.4. Construction of an Activity-Based Costing System

The discussion so far has provided a broad overview of ABC. Drury (2000:342) argued that the development of an ABC system involves four major steps:

1. Identifying the major activities that take place in an organization;
2. Assigning costs to cost pools/cost centres for each activity;
3. Determining the cost driver for each major activity;
4. Assigning the cost of activities to cost objects.

The first two steps relate to the first stage, and the final two steps to the second stage, of the two-stage allocation process shown in figure 9.2. These steps are normally organized by ABC project team. This team will require various types of expertise and usually involves not only management accountants but also representation from many departments and sections. In addition, outside consultants may be involved in the ABC system designing process.

Step 1: Activity identification

The focus of ABC is activities, thus, identifying activities is the logical first step in designing an activity-based costing system (Cooper and Kaplan 1998:85 and Hansen and Mowen 2000:447). This step is fundamental to ABC as it determines to a large extend the structure and the scope of the system. It is also beneficial in that it forces the accountants to determine what is actually happening in relevant areas of the business and hence ensure the costing system is built on reality (Innes et al. 1994:30 and Blocher et al. 1999:97).

Activities are composed of the aggregation of units of work or tasks and are described by verbs associated with tasks (Cooper and Kaplan 1998:85 and Drury 2000:342). For example, purchasing of materials might be identified as a separate activity. This activity consists of the aggregation of many different tasks, such as receiving a purchase request, identifying suppliers, preparing purchase orders, mailing purchase orders and performing follow-ups. Activity identification includes finding out what is done with the resources committed in the overhead area of an organization. This must be approached in a systematic method to ensure that all relevant activities are represented or described accurately (Innes et al. 1994:31).
Activities are identified by carrying out an activity analysis. Activity analysis includes gathering data from existing documents and records, and using survey, questionnaires, observation, and ongoing interviews of key personnel. ABC project team members typically ask each key employee or manager questions such as these (Blocher et al. 1999:97 and MacArthur 2000:399):

- What work or activities do you do?
- How much time do you spend performing the activities?
- What resources are required to perform the activities?
- Which operational data best reflect the performance of the activities?
- What value does the activity have for the organization?

Based on the gathered data by the means such as interviews, questionnaires, existing documents and records, surveys, and observation, an activity dictionary can be prepared. An activity dictionary lists and defines the activities in an organization along with desired attributes (Cooper and Kaplan 1998:85 and Hansen and Mowen 2000:447). Activity attributes are non-financial and financial information items that describe individual activities. The attributes selected depend on the purpose being served. For example, the activity attributes for product-costing purpose include tasks that describe the activity, types of resources consumed by the activity, amount (percentage) of time spent on an activity by workers, cost objects that consume the activity, and a measure of activity consumption (activity drivers) (Hansen and Mowen 2000:447). Activities are the building blocks for product costing, cost management, and continuous improvement.

Many detailed tasks are likely to be identified in the first instance, but after further examinations, the main activities will emerge. The activities chosen should be at a reasonable level of aggregation based on costs versus benefits criteria (Drury 2000:343). In some of the early ABC systems hundreds of separate activity cost centers were established but recent studies suggest that between twenty and thirty activity centers tend to be the norm (Drury 2000:343). The final choice of activities must be a matter of judgment but it is likely to be influenced by factors such as the total cost of the activity center (it must be of significance to justify separate treatment) and the ability of a single driver to provide a satisfactory determinant of the cost of the activity (Innes et al. 1994:33 and Drury 2000:343). Where the latter is not possible further decomposition of the activity will be necessary.
Step 2: Assigning costs to activity cost centers

Once activities are identified and described, the next task is determining how much it costs to perform each activity. This requires identification of the resources being consumed by each activity. Activities consume resources such as labor, materials, energy, and capital. Although the company’s general ledger is a good starting point to find information about the cost of resources used to perform activities, most general ledger systems report the costs of different resources such as indirect labor, electricity, equipment, and supplies, but do not report the cost of activities performed (Cokins 1999:38 and Hansen and Mowen 2000:450). Thus ABC is needed to obtain this information.

Activities drive the cost of resources used. The cost of the resources can be assigned to activities by direct tracing that requires measuring the actual usage of resources by activities (Hansen and Mowen 2000:450). For example, power used to operate a machine can be traced directly to that machine’s operation by observing meter usage. If the resource is shared by several activities, then the assignment is driver tracing and the drivers are called resource drivers (Blocher et al. 1999:98 and Hansen and Mowen 2000:450). Resource drivers are used to assign resource costs to activities. An important criterion for choosing a good resource driver is the cause-effect relationship (Drury 2000:343). Interviews, survey forms, questionnaires, and timekeeping systems are examples of tools that can be used to collect data on resource drivers. Typical resource drivers include (1) meters for utilities, (2) the number of employees for payroll-related activities, (3) the number of setups for a machine setup activity, (4) the number of moves for a materials-handling activity, (5) machine-hours for a machine running activity, (6) square feet for a janitorial cleaning activity (Blocher et al. 1999:98).

ABC system restates the general ledger costs and reveals how the resources are being consumed (Cooper and Kaplan 1998:86 and Cokins 2001:6). In an ABC system, costs are reported by activity. The reassignment of resource costs to individual activities contributes to the creation of an ABC database for the organization. The focus on activity and activity cost analysis by ABC provides a novel perspective on cost incurrence within an organization (Cokins 1999:38). Moreover, it is one that facilitates managerial assessment of spending not only from enhanced visibility which it brings to overhead area but also from the new intra-organization and time comparisons which it permits (Cokins 2001:5). In fact, some organizations have simply used ABC methodology to obtain information about activities and
their costs for cost management and have not proceeded to the subsequent steps that link activity costs to output (Hansen and Mowen 2000 and Cokins 2001).

**Step 3: Selecting appropriate cost drivers for assigning the cost of activities to cost objects**

In order to assign the costs attached to each activity cost center to products or other cost objects, a cost driver must be selected for each activity center (Cooper and Kaplan 1998:95 and Drury 2000:343). Cost drivers used at this stage are called activity cost drivers. Several factors must be borne in mind when selecting a suitable cost driver. First, it should provide a good explanation of costs in each activity cost pool. Second, a cost driver should be easily measurable, the data should be relatively easy to obtain and be identifiable with products (Maher 1997:240 and Drury 2000:343). The costs of measurement should therefore be taken into account (Cooper and Kaplan 1998:95).

ABC system designers can choose from three types of activity cost drivers: transaction, duration, and intensity (or direct charging) (Cooper and Kaplan 1998:95). Transaction drivers, such as the number of setups, receipts, and products supported, count how often an activity is performed (Drury 2000:343). Transaction drivers are the least expensive type of cost driver but they are also likely to be the least accurate because they assume that the same quantity of resources is required every time an activity is performed (Cooper and Kaplan 1998:96). However, if the variation in the amount of resources required by individual cost objects is not great, transaction drivers will provide a reasonably accurate measurement of activity resources consumed (Drury 2000:344). If this condition does not apply then duration cost drivers should be used.

Duration drivers represent the amount of time required to perform an activity (Cooper and Kaplan 1998:96 and Hansen and Mowen 2000:452). Examples of duration drivers include set-up hours and inspection hours. For example, if one product requires a short set-up time and another requires a long time then using set-up hours as the cost driver will more accurately measure activity resource consumption than the transaction driver (number of set-ups) which assumes that an equal amount of activity resources are consumed by both products. Using the number of set-ups will result in the product that requires a long set-up time being undercosted whereas the product that requires a short set-up will be overcosted (Cooper and Kaplan
This problem can be overcome by using set-up hours as the cost driver, but this will increase the measurement costs.

Intensity drivers directly charge for the resources used each time an activity is performed (Cooper and Kaplan 1998:97 and Drury 2000:344). Whereas duration drivers establish an average hourly rate for performing an activity, intensity drivers involve direct charging based on the actual activity resources committed to a product. For example, if activities require unskilled and skilled personnel, a duration driver would establish an average hourly rate to be assigned to products whereas an intensity driver would record the actual or estimated time for each type of personnel and assign the specific resources directly to the products. Intensity drivers are the most accurate activity cost drivers but are the most expensive to implement. Thus, Cooper and Kaplan (1998:97) stated that they should be used only when the resources associated with performing an activity are both expensive and variable each time that the activity is performed.

Kaplan and Cooper (1998:98) illustrate how duration and intensity drivers can be simulated by using a weighted index approach. This involves asking individuals to estimate the relative difficulty of performing a task for different types of customers or products. An appropriate numerical scale is used such that standard low complexity products/customers are awarded low scores, medium complexity products/customers are awarded medium scores and highly complex products/customers attract high scores. The aim is to capture the variation in demands for an activity by products or customers without an over-expensive measurement system.

In most situations data will not initially be available relating to the past costs of activities or potential cost driver volumes. To ascertain potential cost drivers, interviews will be required with the personnel involved with the specific activities. The interviews will seek to ascertain what causes the particular activity to consume resources and incur costs. The final choice of a cost driver is likely to be based on managerial judgment after taking into account the factors outlined above.
Step 4: Assigning the cost of activities to cost objects

The step 1 and 2 for building an ABC model identify the activities being performed and the cost of performing those activities (Cooper and Kaplan 1998:94). Why is the organization performing activities in first place? The answer, of course, is that the organization needs activities to design, build, and deliver products and services to its customers. Therefore, before any assignment is made, the ABC project team must identify all the organization’s products, services, and customers (Cooper and Kaplan 1998:94 and Hansen and Mowen 2000:452). The ABC project team should ask themselves whether the activities or processes are worth doing. Is their organization getting paid adequately for performing these activities? Answering that question requires that activity costs be linked to products, services, and customers who are the ultimate beneficiaries of the organization’s activities. Addressing this issue leads to naturally to the fourth and final step in building an ABC model. Thus, the final step involves applying the cost driver rates to cost objects such as products, services, and customers. Therefore the cost driver must be measurable in a way that enables it to be identified with individual cost object (Drury 2000:345). The ease and cost of obtaining data on cost driver consumption by cost objects is therefore a factor that must be considered during the third step when an appropriate cost driver is being selected.

Finally, this section provides an outline of how an ABC system would be constructed and used. In fact, there is no standard ABC system, only a standard framework within which a number of judgments are made in order to produce the type of system that suits the context of the adoption organization (Cooper and Kaplan 1998:110). For example, the selection of activities (nature and number), the basis of attachment of costs to activities, the choice of cost drivers and the means by which a cost driver is treated at the point of association with cost objects are all potential sources of variation (see e.g. Innes et al. 1994, Turney 1996, Cooper and Kaplan 1998, and Cokins 2001). Therefore, the design of ABC system involves a range of aspects where tailoring the ABC system to suit its situation and purpose is necessary. When the design is appropriate, the ABC system will provide a more logical means of generating product costs that reflect resource consumption in a more meaningful way than traditional approach. The potential of ABC to generate information about resources, activities, and cost objects is different from that produced by the conventional means has been demonstrated in several published cases (see e.g. Cooper and Kaplan 1999).
9.1.1.5. Activity Based Management - the Concept and Objectives

To achieve continuous improvement, management needs accurate and timely information about the work done (activities) and the objects of that work (e.g. products, services and customers). That is what ABC is all about. But gaining more accurate cost information through ABC is only half the battle (Turney 1996:139, Oliver 2000:236 and Kinney et al. 2006:156). The real key to success is to use ABC information to identify appropriate strategies, improve product design, and remove waste from operating activities (Turney 1996:139).

Activity-based management (ABM) complements ABC by using ABC information in the analyses of processes to identify inefficiencies and non-value added activities (Turney 1996:140, Cooper and Kaplan 1998:4 and Blocher et al. 1999:104). ABM and ABC are made for each other (Turney 1996:140 and Cooper and Kaplan 1998:4). It is recognized that costs cannot be management. Rather, one manages activities that in turn cause costs (Hansen and Mowen 2000:551). The fundamental principle that all ABM approaches have in common is that they focus on managing processes (that consist of activities) rather than costs per se. The foundation to this new thinking is based on what is called the “two-dimension” ABC/ABM model (Hansen and Mowen 2000:551).

The two-dimensional ABC/ABM takes two alternative views or dimensions of the activities performed in an organization – cost view and process view, as illustrated in figure 9.3. This diagram, developed by Turney, was first presented to the CAM-I, and thus is commonly referred to as the “CAM-I Cross” (Cokins 1996:54). The vertical dimension of the model depicts the cost assignment view. The cost assignment viewpoint is comprised of three building blocks: resources, activities, and cost objects. From the cost assignment viewpoint, the system uses two-stage cost allocation to assign the costs or resources to the significant activities of an organization. Activities are then assigned to a cost object that uses the activities such as a product or customer. The cost assignment view provides a better understanding of why resources are used. It supplies the information that can help identify which activities consume the most resources and where cost reduction opportunities may exist. Turney (1996:81) and Hansen and Mowen (2000:551) argued that the cost assignment view is useful for product costing, strategic cost management, critical decisions analyzing (e.g. pricing, product mix, sourcing and product design decisions) and determining priorities for improvement efforts.
The horizontal part of the ABC/ABM model according to (Turney 1996) contains the process view. Turney (1996:110), Oliver (2000:236) and Hansen and Mowen (2000:551) argued that the emergence of a process view could extend ABC beyond product costing to process improvement. The emphasis now is on the activities themselves, the processes by which work is accomplished in the organization. As shown in the figure 9.3, three main building blocks comprise the process view: cost drivers, activities, and performance measures. The left-hand side of the model depicts activity analysis, which is the detailed identification and description of the activities conducted in the enterprise. Activity analysis entails the identification not only of the activities, but also of their root causes, the events that trigger activities, and the linkages among activities. The right-hand side of the model depicts the evaluation of activities through performance measures. Typical performance measures include activity efficiency, time required to complete an activity, and quality of work.

Turney (1996:85) stated that the process view reflects the need of organizations for information about events that influence the performance of activities - what causes work and how well is it done. Organizations can use this type of information to help reducing costs and improving performance and value received by customers. According to the process view of
this model, Dierks and Cokins (2001:35) defined ABM as “a discipline that focuses on the management of activities within business processes as the route to continuously improve both the value received by the customer and the profit earned in providing that value.” From this definition, ABM aims directly at two basic goals. The first goal is to improve the value received by customers and the second goals is to improve profits by providing this value. These goals are reached by focusing on management of activities (Turney 1996:140).

Thus, ABM seeks to meet customer wants profitably. It is not enough for an organization to tell its stockholders that its products have the highest quality in industry or customers consistently rate this organization highest in customer satisfaction. The organization must also provide an adequate return on stockholder investment. In this case, Turney (1996:141) stated that there is really no conflict, where in the long term, the profitability of an organization is important to its customers because the customers would like to be sure of doing business with their organization in the future (which they won’t be if the organization is unprofitable).

To support this, ABM adheres to the belief that managing activities is the route to profitably improving customer value (Turney 1996, Hansen and Mowen 2000 and Langfield-Smith et al. 2003). Each activity within the business processes contributes in its own way to this overall goal. Each activity makes a measurable contribution to its customers – be it quality, timeliness, reliable delivery, or low cost. It is important to realize that managing activities is not a custodial task (Turney 1996:142). Rather it is a process of relentless and continuous improvement of all aspects of the business. Turney (1996:142) stated that this includes a continual search for opportunities to improve through determining what activities should be performed? And how should those activities be carried out? By this way, AMB can improve strategic position and capability of an organization through deploying resources to activities that yield the highest strategic benefits and improving what matters to the customers. In order to achieve the objectives of ABM system, there are three steps or components: activity analysis, cost driver analysis, and performance analysis. Theses steps or components that form the ABM framework will be discussed in the section 9.1.1.6.
9.1.1.6. Framework for the Design of an ABM System

ABM has two basic elements, it identifies the activities performed in an organization, and it determines their cost and performance in term of both time and quality. The two basic elements produce three components or steps: analysis activity to identify opportunities for improvements; analysis cost driver to determine the factors that are the root causes of activity costs; and performance measurement analysis, the purpose of which is to determine performance and its appropriate measures (Turney 1996:145, Blocher et al. 1999:104 and Hansen and Mowen 2000:552). The figure 9.4 shows these three components or steps that form ABM framework. It is recognized that some of these steps consider the basis for ABC. However, it is possible to analyze activity costs and to use ABM without becoming involved in activity-based product costing. Innes et al. (1994:70), stated that some organization use ABM without the related product costing.

![Figure 9.4 Framework for the design of an ABM system](Based on information from Turney 1996:145)

Creating a cost management system for ABM begins with a foundation. The foundation of an ABM cost management system is built on information about activities. Brimson (1992:72) summarized the ABM framework where he argued that costs are best managed by analyzing activities, eliminating non-value added activities, managing the factors that drive cost, continuously improving value added activities and streamlining management. It is important to know that cost management means profit improvement and not just cost reduction. However, Innes et al. (1994:114) argued that most ABM system still neglect the opportunities for identifying areas for increased costs to improve profit.
The decisions about ABM system require a multidisciplinary team. In addition, Turney (1996), Hansen and Mowen (2000) argued that the strategic planning of the organization must be an integral part of the system choice. Decisions about the system will be influenced by management’s view of responsibility accounting. At this point, management should view responsibility accounting from an activity based management viewpoint (Hansen and Mowen 2000:548). Activity-based responsibility accounting represents a significant change in how responsibility is assigned, measured, and evaluated. The activity-based system added a process perspective to the financial perspective of the traditional responsibility accounting system (Innes et al 1994:104 and Hansen and Mowen 2000:548). The activity-based system also altered the financial perspective by changing the point of view from that of cost control by maintaining the status quo to that of cost reduction by continuous learning and change. Hansen and Mowen (2000:548) stated that responsibility accounting system from an activity based management viewpoint changed from a one-dimension system to a two-dimension system and from a control system to a learning and cost management system (for more information see Hansen and Mowen 2000).

The three components of ABM - activity analysis, cost driver analysis, and performance measurement analysis combine to create a powerful tool for cost management in organizations. As shown in the figure 9.4, we will examine activity analysis, the heart of ABC and ABM, followed by a view of cost drivers analysis. We will then examine performance measure analysis - the choice of performance measures to be produced by the system is an initial planning step in implementation of ABC and ABM systems.

9.1.1.6.1. Analysis of Activities

The heart of ABC and ABM is activity analysis. Understanding why activity is done, and how well it is done, is the key to managing costs. This can also strengthen strategic position, as many organizations can testify (Turney 1996:145). Activity analysis should produce four outcomes: (1) what activities are performed, (2) how many people perform the activities, (3) the time and resources required to perform the activities, and (4) an assessment of the value of the activities to the organization, including a recommendation to select and keep only those that add value (Hansen and Mowen 2000:552). The steps 1-3 have been described in section 9.1.1.4. Those steps were critical for assigning costs. The step 4, determining the value-added
content of activities, is concerned with cost reduction rather than cost assignment. Thus, this may be considered the most important part of activity analysis.

A more common method of analyzing activities is to classify them as value added or non-value added. In the context of this method, Turney (1996:145) stated that the analyses of activities involve: identification of value-added and non-value-added activities; analysis of critical activities; comparison of the performance of those activities with that of benchmarked; and examination of the links between activities.

- **Identify value-added and non-value-added activities**

Once activities are specified and the cost of each activity is calculated, the next step is to identify value-added and non-value-added activities. This judgment should be made within the context of company-wide and well understood definitions for the terms (Cooper and Kaplan 1998:157). Because of increased competition, many organizations are attempting to eliminate non-value-added activities because they add unnecessary cost and impede performance; organizations are also striving to optimize value-added activities (Turney 1996:145 and Hansen and Mowen 2000:553). Thus, ABM focuses on identifying activities that can be eliminated and making sure that needed activities are carried out efficiently.

Making non-value-added cost visible is one of the major benefits of ABM, but also the most difficult to achieve (Keys and Lefevre 1995). Also, defining what is value added versus what is non-value added can be problematic. Definition of a value-added and non-value-added activity is often confused and misunderstood (Cooper and Kaplan 1998:158). Some think that non-value-added activity means waste, to others it might mean the cost of quality and to others it might mean everything other than the labor (e.g. Innes et al. 1994, Turney 1996, Drury 2000 and Hansen and Mowen 2000). The reporting of non-value-added activities and costs can quickly become a people’s issue because no one wants to be labelled as performing non-value-added activities, e.g. labelling can easily be considered a threat to job security. Therefore, ABM should focus on the activities, not on the people who perform the activities.

Clarity and understanding between value-added and non-value-added activities are achieved when people understand and accept the reasons why an activity is classified as non-value added or value added (Cooper and Kaplan 1998:159 and Hansen and Mowen 2000:553). Most people perform their value-added analysis by simply designating an activity value added or
non-value added. This level of analysis is insufficient because every value-added activity includes non-value-added steps or tasks. A more thorough analysis should be undertaken to identify the potential for improvement in value added activities. Machine setup, moving, waiting, inspection, and stock holding are examples for non-value-added activities (Hansen and Mowen 2000:554). Rework is one of the non-value-added activities that can be found in any industry. Nevertheless, this activity is a value-added activity for an operator who performs rework on a job because he/she increases the value of a product by rework. Therefore, all aspects of an organization should be considered while identifying value added and non-value-added activities.

- **Analysis of critical activities**

Some organizations can have a large number of activities. It is not possible to analyze all of them at once due to limited time and resources. The key is then to focus on the most critical activities that will add value to customers or help the effective operation of the business. Moreover, these are the activities that provide the significant opportunities for improvement. The Pareto analysis can be used to determine the critical activities (Turney 1996:146). This analysis should be carried out separately for both the value-added and non-value-added activities. The activities can be ranked in descending order of cost and the cumulative percentage of the cost of all the activities can be calculated. Then, it can be found that 20% of the activities causes 80% of the total cost, and those activities are worth analyzing.

- **Compare activities with benchmarking**

All activities should be compared with similar activities in another company or within the organization that performs the best in class. Benchmarking should be carried out for both value-added and non-value-added activities (Turney 1996:146). Comparing an activity with a benchmarked of good practice helps to determine the scope for further improvement. The activities should be measured based on factors, e.g. quality, lead-time, flexibility, cost, and customer satisfaction (Turney 1996:146). Then, each activity should be rated against an identified best practice.

A company with a number of different departments can improve the efficiency and effectiveness of each activity by comparing similar activities of different departments. Obtaining information from other companies is quite difficult. Therefore, benchmarking
within the company or with the best practice is mostly used in real-life situations. For example, on-time delivery of customer orders is an essential activity and it can be performed manually. The best practice, however, uses electronic data interchange (EDI) that costs less per transaction, has a lower error rate and provides a faster service. This clearly shows that there is room for improvement over manual order taking (Turney 1996:147).

- **Examination of the links between activities**

In any organization, activities work together in a chain to meet common goals. The links of this chain must be constructed to minimize time and duplication of work. Also an organization should focus on the links between activities in order to highlight areas of strategic strength or weakness and competitive opportunity or threat (Porter 1998a). The product design process for example can show the importance of the links between activities. In the traditional approach, design activities are performed serially. Product designers prepare the product specifications without consulting production. When the design is finished, production tries to manufacture the product (often with difficulty). This approach is repetitive, time consuming, and costly (Turney 1996:147). In contrast, concurrent engineering approach is better than the traditional approach of product design and development. In this approach, activities are performed concurrently. Product design, manufacturing, marketing, and procurement work together toward a common goal. Such approach leads to less repetition and duplication, and better quality products. Also, studying product or transaction flows can lead to minimize time and duplication of work where the work should proceed in an uninterrupted, continuous flow.

**9.1.1.6.2. Cost Driver Analysis**

Managing activities requires an understanding of what causes activity costs. Activity analysis is the first step to improvement. The second step is to look for the root causes of activity costs (cost drivers). Cost driver analysis is the examination, quantification, and explanation of the effects of cost drivers (Dierks and Cokins 2001:37). The purpose of cost driver analysis is to search the root causes of activity costs (Blocher et al. 1999:104). The results of such analyses are often used by management in continuous improvement programs to help reduce throughput times, improve quality and reduce cost.
Cost driver analysis takes activities as a starting point and assesses which factors change the costs of activities (Turney 1996:148). Every activity has inputs and outputs. Activity inputs are the resources consumed by the activity in producing its outputs. Activity output is the result or product of an activity. The output measure effectively is a measure of demands placed on an activity and is what have been calling activity cost driver. As the demands for an activity change, the cost of the activity can change. However, output measures may not and usually do not correspond to the root causes of activity costs (Hansen and Mowen 2000:552).

Thus, the cost driver analysis is the effort expended to identify those factors that are the root causes. For example, an analysis may reveal that the root cause of the cost of moving materials is plant layout. Once the root cause is known, then action can be taken to improve the activity. Specially, reorganization plant layout can reduce the cost of moving materials. Often, the root cause of the cost of an activity is also the root cause of other related activities (Hansen and Mowen 2000:552). For example, the costs of inspection purchased parts and reordering may both be caused by poor supplier quality. By implementing total quality management and a supplier evaluation program, both activities and procurement process itself may be improved. For more information about the types of cost drivers (operational, executional, structural) and cost driver analysis see section 6.2.1.

9.1.1.6.3. Performance Measurement Analysis

As shown in the figure 9.4, the performance measurement is part of ABM but it also wider than just ABM. In an ABM system, performance measures include both financial and non-financial measures, and are designed to influence the behaviour of cost management (Innes et al. 1994:103, Turney 1996:88 and Gupta and Galloway 2003:137). A fundamental issue is that a single performance measure will not reflect all the aspects of a company. Managers may require multiple performance measures even from individuals (Innes et al. 1994:103). Generally, activities involve groups of employees, and the performance measures therefore usually relate to the group rather than the individual and to the process as well as the output or result.

The ABM system uses cost drivers of a company’s activities as a basis for changing the performance measurement system. In particular, some companies are concentrated on non-financial operational performance measures to monitor the improvements in their business
processes (Innes et al. 1994:104). It is important to appreciate those performance measures that not only attempt to measure the performance, but also control and evaluate the performance, and motivate the people. The behavioral impact of performance measures is one of the most significant aspects of ABM (Innes et al. 1994:105).

Kaplan (1991:1-7) suggested that in competitive business environment, the focus has shifted from controlling operations to providing timely information to employees and managers to advance their continuous improvement efforts … physical and operational measurements have begun to play a much more important role than purely financial measurements. Cost drivers, e.g. the number of purchase orders or the number of engineering changes, are used as a part of the performance measurement system. Some companies use physical measures, but others monitor the unit cost per driver, e.g. the cost of a purchase order. Performance measures should be selected carefully and tailored to the individual processes or organization. Each company must consider the activities which are critical to its business success. Greene and Flentov (1991) suggested certain general guidelines for selecting performance measures which could also be applied to non-activity performance indicators:

- The performance measures chosen should assist in monitoring the progress of controlling activity costs. These include throughput time, and the number of engineering changes and production schedule changes.
- The performance measures selected should be reviewed periodically. As the business and the internal and external environments of a business change, performance measures may have to also change accordingly.
- Everyone should be able to understand the performance measures. These not only must be clearly defined, but also the relationship to the company’s strategic objectives must be explained.
- The performance indicators relevant for one individual or group should not be too many.
- Daily operations should be managed on the basis of these key measures.
- The evaluation of employees should be linked to the performance indicators selected.
Turney (1996:88) summarized the essence of activity performance indicators which include measurements of: efficiency of the activity, time required to complete the activity, and quality of the work done. Efficiency focuses on the relationship of activity inputs to activity outputs. For example, one way to improve activity efficiency is to produce the same activity output with lower cost for the inputs used. Quality is concerned with doing the activity right the first time it is performed. If the activity output is defective, then the activity may need to be repeated, causing unnecessary cost and reduction in efficiency. The time required to perform an activity is also critical. Longer times usually mean more resource consumption and less ability to respond to customer demands. Time measures of performance tend to be non-financial, whereas efficiency and quality measures can be financial as well as non-financial.

The emphasis of activity performance measures should be on the input and output aspects of the activity (Oliver 2000:251). The selection of performance indicators is a critical process and the success of this process depends upon a sound analysis of the critical activities for that particular business. The operational non-financial activity-based performance measures are an important part of the ABM system but they are not only part of the overall picture and must be integrated with the activity-based strategic measures (Innes et al. 1994:110). All the performance measures should be linked to achieve the overall objectives of the organization. Nanni et al. (1991:K5-9) stated that performance measures at each level should logically lead to performance at the next level up, but that fact does not mean that they should be simply some measures chopped more finely. For example a time-based competitive strategy may mean that middle managers use JIT and concentrate on operational performance measures such as meeting production schedules, minimizing throughout time, achieving zero defects and making on-time deliveries (Innes et al. 1994:110).

The activity approach can help with the choice of strategic measures based on the analysis of key activities and cost driver analysis. Once the critical success factors have been identified for an organization, the related key activities provide the basis for strategic performance measures. For example, quality, time and cost consider an important measures for external customers. Some of these performance measures could have been derived outside ABM system. However, Brimson (1991:75) argued that activities integrate financial and non-financial performance measures. Porter (1998a) and Shank and Govindarajan (1993) have developed ABM and strategic performance measures in their written on strategic cost
management and value chain. The advantage of value chain approach is that it considers all critical activities including those outside the company itself. The operational and strategic performance measures should be integrated into a coherent whole. The use of activity-based performance measures makes such integration easier to achieve. Innes and Mitchell (1991:27) indicated that in some companies, ABM is the third side of the triangular approach to improving performance along with Just-In-Time and Total Quality Management.

9.1.1.7. Activity-Based Costing and Management - Cost Management Applications

Activity-based costing focuses on overhead, a major element of cost that is both changing in composition and growing rapidly in many contemporary organizations. It is also a type of cost for which traditional approach has proved unreliable. Many ABC researchers (see e.g. Innes and Mitchell 1991, Turney 1996, Cooper and Kaplan 1998, 1999 and Cokins 2001) argued that ABC offers a means of improving the accuracy with which overhead resource consumption is linked to specific cost objects such as products or customers. In so doing it requires that visibility be brought to the overhead area by generating the type of information that promotes effective cost management in variety of ways.

Some studies (e.g. Innes et al. 1994, Turney 1996, Drury 2000 and Gupta and Galloway 2003) argued that while the need to improve product costing provided the initial impetus to the development of ABC, it soon became apparent that ABC/ABM had a number of other highly significant uses in the broader area of cost management. Indeed the potential offered by these applications may well exceed the original product costing advantages. ABC/ABM can be used for a range of cost management applications. For example, they include cost reduction, activity-based budgeting, product planning and design, process improvement, and quality management and control (Turney 1996:187f., Drury 2000:355 and Gupta and Galloway 2003:134).

9.1.1.7.1. Reduction Cost - the Activity-Based Way

Competitive conditions dictate that companies must deliver products the customers want, on time, and at the lowest possible cost. That means that an organization must continually strive for cost improvement. Attempts to cut cost without restructuring work is putting the cart before the horse and are doomed to failure. Many companies attest to cutting costs “the
traditional accounting approach”, but few achieve lasting savings. In some cases costs have gone up, while employees complain about stress and work loads (Turney 1996:151).

In contrast, the heart of ABC and ABM is the activity. Cost management focuses on the performance of each activity and its resulting use of resources. Managing activities better is the key to permanent cost reduction. Reducing cost is only one of several focal points of ABM. Improving quality, flexibility, and service - the importance of which vary from one business to another - is also central to ABM. Cost reduction is best achieved by changing the way activities are used or performed, then redeploying resources freed by the improvement. In this context, Turney (1996:152) and Hansen and Mowen (2000:554) argued that there are five steps or guidelines show how to reduce cost - the activity-based way:

- **Reduce the time or effort required to perform an activity.**
  A key element of improvement is to reduce the time and effort needed to perform an activity. This reduction can come from a process or a product improvement (Turney 1996:152 and Hansen and Mowen 2000:555). For example, the time to set up a machine can be reduced by improved training, eliminating conflicts in employee assignments, placing tools and dies in convenient location, and changes in the product design. For example, a reduction of 90% in setup time is not unusual (Turney 1996:152). Reduction in time and effort may come not from the activity in question, but may be from the preceding activity. For example, the defect rate of parts received by a machining activity is a cost driver for that activity. Improving quality in the preceding activity reduces the quantity of this cost driver and hence the overall efforts required by the machining process.

- **Eliminate unnecessary activities**
  Some activities are candidates for elimination because they are not valued by customers or not essential to running the organization (Hansen and Mowen 2000:554). It is possible, e.g. to eliminate material handling activities through changes to the process or products, e.g. reducing the number of components, using Group Technology (GT) cells (Frazier and Spriggs1996: 86) or even by outsourcing. There are a number of different options to eliminate any unnecessary activities. In any organization, steps should be taken to ensure that all incoming materials and parts are fit for use. The parts can then be delivered directly to the shop floor as needed. For instance, changes can be requested in the vendor’s production
process to improve quality, flexibility and increase the responsiveness (Turney 1996 and Hansen and Mowen 2000:554). The parts that cause quality problems can be eliminated by instilling the responsibility of delivering quality products onto suppliers. Once these changes have been made, all the activities of a storeroom can be eliminated. Activities, e.g. material handling and inspection will be reduced automatically. Eliminating these activities will reduce the overall cost and the cost of products that no longer use these activities.

- Select low-cost activities
Designers of products and processes often have choices among competing activities. This offers a means for reducing cost by picking the lowest cost activity (Miller 1996:70 and Turney 1996:154). A designer of a product may be able to specify the type of activity required for the assembly of a product. Depending on the design of components, several automatic assembly lines can be used for the assembly of a product instead of manual assembly of a product. Each of these activities has a different set of resources associated with it. Manual assembly is a direct labor activity. An automatic assembly, however, requires equipment, software, skilled workers, and additional process engineering and training. Because these activities have different costs, the selection of an activity has an important impact on the cost (Turney 1996:155). The process designer faces similar choices. For example, a part designed for machine insertion might also be inserted manually. A process designer may choose to have the part inserted manually because a reduction in the batch size makes it uneconomical to program and setup an insertion machine.

- Sharing of activities wherever possible
If a customer has unique needs, it is necessary to perform activities specific to that customer. However, if customers have common needs, it is wasteful not to serve those needs with the same activities. For example, product designers can use the common parts in new product designs. A common part is one that is used in several products to perform the same function (e.g. a gasket used in several car models). The only parts that need to be unique are those that add product-differentiating functions as valued by the customers (Turney 1996:155). The activities associated with the common parts, e.g. part number maintenance, scheduling and vendor relations, are shared by all products that use them. This sharing increases the volume of parts produced each time an activity is carried out, thus reducing the cost per part (Hansen and Mowen 2000:555). The process designer can also cut costs by grouping of products into work cells. This is possible when products have similar designs (members of a
product family) and when the manufacturing process is sufficiently flexible to handle any differences in parts. The cost can be decreased because the products in the cell share activities, e.g. supervision, testing, training, scheduling, material handling, storage and documentation.

- **Redeploy unused resources**

  In the final analysis, cost can only reduced if resources are redeployed (Turney 1996:156). In the fact, reducing the workload of an activity does not, by itself, reduce the equipment or number of people dedicated to that activity. There must be a conscious management decision to deal with the freed resources. This can be done by growing the business to take up the slack, redeploying the resources to other activities, or removing them from the company. ABC focuses on resource consumption not spending (Cooper and Kaplan 1992). Thus ABC can be used to determine the type and amount of unused resources. Resource plans based on the ABC information then become the basis for redeployment.

These efforts are as likely to improve quality, as they are to reduce cost. ABM and quality management go hand-in-hand in any improvement program.

**9.1.1.7.2. Activity-Based Budgeting**

Activities cause costs by consuming resources, however, the amount of resources consumed depends on the demand for the activity’s output. The demand for an activity, in turn, depends on the cost objects that consume the activity. Thus, Cooper and Kaplan (1998:303) described Activity-Based Budgeting (ABB) as “ABC in reverse”. The need for ABB is motivated by the observation that the traditional budgeting process in organizations is a negotiation between managers and senior executives over some small percentage change relative to last year’s budget and that it rarely revisits issues such as productivity and the effective use of resources. With ABB, managers are induced to consider what resources are actually needed (Turney 1996:177).

Once an organization has an ABC system in place, it can use ABC information in its budgeting process. To build ABB, Cooper and Kaplan (1998:303) argued that the following steps are needed: (1) managers develop an estimate of the production and sales volume for the next period; (2) they forecast demand for activities within the organization; (3) they then
calculate the demand for resources stemming from those required activities; (4) the next step is to determine the actual resource supply based on spending patterns and the activity capacity. The activity capacity may differ from estimated production volume because some resources are lumpy (i.e., you might only need 1.2 trucks but you have to purchase two because you can’t buy a fraction of a truck). The major emphasis for activity-based budgeting is estimating the workload (demand) for each activity and then budgeting the resources required to sustain this workload (Turney 1996:177). The workload for each activity must be set to support the sales and production activities expected for the coming period.

ABB also begins with the sales and production budgets. Direct costs (e.g. material and labor) budgets are also compatible with an ABC framework because these costs are directly traceable to the objects. The major differences between traditional and activity-based budgeting are found within the overhead and selling and administration expense categories (Hansen and Mowen 2000:562). In the traditional approach, budgets within these categories are typically detailed by cost elements. These cost elements are classified as variable or fixed, using production or sales output measures as the basis for determining cost behavior.

Furthermore, the traditional budgets of such categories are usually constructed by budgeting for a cost item within a department (function) and then rolling these items up into the master overhead budget (Hansen and Mowen 2000:562). For example, the cost of supervision in the traditional overhead budget is the sum of all the supervision costs of the various departments. ABB, on the other hand, identifies the overhead, selling, and administration activities and then builds a budget for each activity, based on the resources needed to provide the required activity output levels (Cooper and Kaplan 1998:303f.). Costs are classified as variable or fixed with respect to the activity output measure.

Thus, the cost behavior of each activity is defined with respect to its output measure (which is often different from the production-based drivers used in the traditional budgeting approach). Knowing the output measure provides significant insight for controlling activity. In the framework of ABC and ABB, managing costs translates into managing activities (Turney 1996:177, Cooper and Kaplan 1998:311 and Hansen and Mowen 2000:563). For example, by redesigning products so that they use common components, the number of purchase orders can be decreased. By decreasing the number of purchase orders demanded, flexible resources
demand is reduced; furthermore, decreasing the number of purchase orders demanded also reduces the activity capacity needed. Thus, activity costs will decrease.

Cooper and Kaplan (1998:312) indicated that implementation of ABB in the practice is not simple. Managers must state more details about how production and sales demands will be met clearly and exactly, about the underlying efficiency of all organizational activities, and about the spending and supply pattern of individual resources. However, if ABB is performed successfully, managers will have greater control over their cost structure especially overhead costs.

9.1.1.7.3. Product Planning and Design

An important ABC/ABM application is guiding product designs for lower costs (Turney 1996:195). In the company that manufactures more than one product or offers many models of a single product, cost management becomes more difficult. Because product complexity results in high overhead costs incurred for such activities as supervision, quality control, inspection, machine and tool maintenance, and production control (Cooper and Kaplan 1999). Traditional costing systems that are based on volume-cost drivers do not provide a clear picture of the true allocation of resources. Thus, Banker et al. (1991:270) argued that product costs become distorted, leading to a biased analysis of design for manufacturability, product profitability, outsourcing, and make or buy decisions. Without ABC/M information such as a true picture of accurate costs for each product, it is extremely difficult to evaluate whether or not a product is contributing to the profitability of the firm. And, of course, if evaluating an entire product is difficult, then evaluating specific design characteristics becomes impossible (Gupta and Galloway 2003:134).

Product design should be a group process with input from marketing, finance and operations. Unfortunately, each of these groups tends to look at design from their individual perspectives. ABC assists the process of synthesizing these different perspectives by identifying specific cost drivers (Gupta and Galloway 2003:134). In addition, Innes et al. (1994:64) argued that in the product design and development stage, a high proportion of costs become committed and thus an awareness of cost drivers and their significance can allow the designer to have a maximum impact on the cost. Cost drivers represent quantitative measures of the activities (e.g. set up processes, obtain supplies, ensuring quality), which create a need for resource and
so cause cost. With awareness of cost drivers, designers can plan to create products which will not only meet market requirements but which will be economical in terms of the demands they place on the company’s resources (Innes et al 1994:64). This can be done by designing a product which has a need for fewer activities or for less costly activities (e.g. fewer set-ups or shorter set-up). According to Innes et al. (1994:64), the case of Tektronix, a USA manufacturer of high tech electronic equipment, is one which illustrates the potential for ABC to influence design.

The implementation of ABC/M provides an opportunity for clearer communication between functional areas on issues of product design. An engineer in Hewlett Packard’s Roseville Network Division described the impact on their design process as follows: “We created a lot of tighter relationships among accounting, research and development, manufacturing, and marketing. We were all learning about the business. We have broken the back of the cost system design problem and are now refining it and our intuitions about the economics of product design. Overall, the whole experience forced us to understand our design process” (Cooper and Turney, 1990:296).

9.1.1.7.4. Process Improvement

The core of traditional cost systems, cost allocation based on the direct labor content of a particular activity, is becoming increasingly meaningless as the direct labor content of most processes is reduced or even eliminated (Cooper and Kaplan 1991:131). In the competitive environment, success and profitability rely on more cost containment. Today’s cost management systems must take account of such non-financial factors such as quality, flexibility, and time to market. ABC challenges manufacturing and financial teams to identify, desegregate, and analyze the underlying activities that drive overhead costs (Turney 1996, Cooper and Kaplan 1998 and Cokins 2001). Since the early 1980s, many organizations have implemented information systems to help manage activities within processes and subprocesses. The development of activity-based costing and activity-based management systems facilitated this transition. The focus has shifted to managing activities within the context of processes and subprocesses.

ABC/M are process-oriented approaches that give support for resources allocating and process improvement (Emblemsvåg and Bras 2001:65f.). Since it is impossible to understand
the resource needs of a product or set of customers without examining the process. Many companies have discovered that they can use the accurate cost information provided by ABC not only to determine which products or customers are profitable or unprofitable, but also to improve a given process (Cooper and Kaplan 1999). Davenport (1993:143) argued that improvement opportunities in the context of ABC/M arise in two ways: (1) the process includes analysis of cost drivers and non-value-adding activities, and (2) the information produced can be used by employees and management to measure continuous improvement, particularly when the primary objective of innovation initiative is cost reduction.

However, Davenport (1993) indicated that few companies that have used ABC/M in process management context have achieved radical improvements; incremental improvement is more common. Level of improvement may be a function of project scope. ABC/M systems require analysis down to the lowest level of activity within a company. Changes at this level, unless they lead to broad product-line restructuring, are likely to produce incremental change at best. Cooper and Kaplan (1999) point out that it is impossible to control expenses at the macro level of the company, yet it is there that the opportunity for innovation is greatest.

Cost management systems are a major component of performance management in most corporations, and process performance measurement is a requirement for the ongoing management of an innovated process. ABC/M may provide a model for process performance-measurement systems that need to be developed for new process (Innes et al. 1994 and Turney 1996). For example ABC/M systems include financial and non-information performance measures (see section 9.1.1.6) and feedback for continuous improvement, which are important aspects of process performance measurement.

Understanding and improving processes in the ABC/M systems context include also two phases (Turney 1996, Cooper and Kaplan 1999 and Gupta and Galloway 2003). In the first, the activities to be performed are identified and analyzed. Some types of process models such as a work flow diagram can be used to process structure. The second phase involves determining how much it costs to perform each activity. This requires identification of the resources being consumed by each activity. This step includes analysis of cost drivers such as machine setup. Outputs of cost attribution steps include a cost building diagram that shows the cost and time associated with each activity over the entire process. In the context of
ABC/M systems, opportunities for process improvement arise out of detailed analysis of current process operations, and problems are documented during the course of understanding process activities. This level of the careful and detailed examination of activities within processes and subprocesses gives rise to opportunities for improving processes.

Clearly, the benefits of understanding and analyzing processes and their related costs and value can lead to untapped opportunities to make significant improvements and enhance competitiveness. For example, Western Zirconium, a 1988 Baldrige Award recipient that supplies its parent firm, the Commercial Nuclear Division of Westinghouse, examined its production processes with an ABC perspective and achieved dramatic results. “Mapping existing work flow demonstrated that the work-in-process traveled over two miles during a 45-day time span and quickly showed that improvements could be made by rearranging the manufacturing floor to cluster the work more efficiently and eliminate unnecessary movement of in-process production. In addition, control systems that measured performance on overhead absorption and labor efficiency were found to foster inventory buildup, which is counterproductive to achieving total cost competitiveness” (Schneider 1992:23). Western Zirconium used ABC/M to focus on cost drivers and value-added processes. As a result, a number of advantages were reported. For example, work-in-process inventory was reduced from $12.3 million to $4.2 million. First-time product acceptance increased from 34% to 92%. Elapsed production time was reduced from 45 days to 10 days (Schneider 1992:23).

9.1.1.7.5. Quality Management and Control

A major trend in many companies is the focus on continuous improvement of quality -quality products, quality systems, quality improvements (Gupta and Galloway 2003:135). The attitude of the world-class company has often been summarized as ‘improve quality, and all else will follow.’ The idea that costs will take care of themselves if managers focus only on improving quality and reducing lead time makes one wonder how Baldrige Award winners could encounter severe financial difficulties (Kaplan 1992:60). But all projects cannot be pursued simultaneously because resources are limited. How can a firm determine what priority to give to the quality improvement and cost reduction plans it identifies?

The ABC/M system can play an important role in the prioritization and cost justification of quality improvement projects (Turney 1996:197 and Gupta and Galloway 2003:135). Activity
analysis is a part of ABC/M system, thus, it can provide information that allows a firm to determine what impact each project would have, and therefore a means to determine which ones to pursue first. Without this insight into prioritization, a firm can pursue several low impact improvement projects at great cost and little gain, while overlooking other projects that might have a tremendous impact. Nutrilite Products, Inc., a food supplement business, gained ‘focus and direction’ for their process improvement efforts when they adopted ABC/M and found practical applications of information in the area of pricing and product abandonment decisions (Gupta and Galloway 2003:135).

ABC/M information can also play a role in quantifying the costs of quality (Turney 1996:197 and Gupta and Galloway 2003:135). There are four categories: (1) prevention (i.e. costs of activities performed to prevent errors from occurring); (2) appraisal (i.e. costs of inspection such as determining if the product conforms to standards); (3) internal failure (i.e. the costs of correcting errors before they reach the final customer, such as scrap, rework and change orders); and (4) external failure (i.e. costs associated with errors that reach the final customer, such as correcting the error, handling complaints, and customer ill will resulting from the error). Many of these quality costs can be categorized as non-value added costs that would not have been identified with traditional cost systems (Schneider 1992:23).

Quality improvement and cost reduction go hand-in-hand (Turney 1996:197). An example of how ABC/M helped operations managers to improve quality can be seen with a large telecommunication company (Gupta and Galloway 2003:135). After performing an activity analysis of all positions at the company, it was determined that approximately 30% of personnel times were spent on reworks. This activity has not been detected on the customary reports using traditional accounting data and was never questioned. Afterwards the causes were traced and eliminated. The company then found itself with the availability of almost one-fourth of the shop’s workers (Johnson 1993). ABC/M simplifies the determination of quality costs by revealing such activities and their costs, which can be used in detecting and correcting activities. Finally, Turney (1996:154) argued that ABC/M system fits well with any quality improvement program. It encourages the actions that improve quality, and directs attention to quality improvements with greatest cost reduction potential.
9.1.1.8. Implementation of ABC/M

9.1.1.8.1. Factors Influencing Success in Implementation ABC/M

Although there have been many positive studies on the benefits and applications of ABC/M systems from the 1990s, there have been many companies experienced difficulties in implementing and maintaining ABC/M systems (Shields 1995 and Thorne and Gurd 1999). In the early 1990s the challenges of implementing ABC/M systems were believed to be primarily technical variables such as defining the scope of the model, identifying activities, selecting cost drivers, and analyzing ABC costs (see e.g. Innes and Mitchell 1991, Cooper et al. 1992, Cooper and Kaplan 1999, Turney 1996). In fact, ABC/M systems exist in social settings in which the successful implementation of ABC/M systems is affected by several variables. Thus, many studies (Shields 1995, Anderson 1995, McGowan and Klammer 1997, Krumwiede and Roth 1997, Krumwiede 1998a, Innes and Mitchell 1998 and Brown et al. 2004) report that the successful implementation of ABC/M systems is affected by several variables, such as behavioural, organizational, technological, environmental or contextual variables.

The study by Anderson (1995) developed a framework for evaluating ABC/M implementation and hypotheses about factors that influence implementation in General Motors Corporation. Anderson (1995:6) examined the factors that may influence adoption and implementation stages using a framework of five broad categories proposed by Kwon and Zmud (1987): individual characteristics (disposition toward change, education, job tenure, and role involvement with the IT solution.), organizational factors (the degree of centralized of decision-making, the degree of functional specialization, and the existence of informal communication networks), technological factors (complexity experienced by users, its compatibility with existing organizational structures and systems, and the technical improvement relative to existing practices), task characteristics (task uncertainty, task variety, and worker autonomy and responsibility) and environmental factors (heterogeneity of external demands on the organization, the uncertainty caused by external turbulence, and external communication networks). Anderson's (1995) study included that success factors differ and vary in importance during the several stages of ABC/M implementation.

Brown et al. (2004:330) stated that the implementation process of ABC/M systems might differ from organization to organization. They examined the factors (technological and
organizational) that have influence on the adoption and implementation of ABC/M systems in Australian firms. Brown et al. (2004:353) included that a set of four organizational factors (top management support, internal champion support, organizational size, and use of consultants) and three technological factors (level of overhead, product complexity and diversity, and relative advantage) have a conceptual prima facie relevance to movement through the ABC/M systems adoption and impact on the success of ABC/M systems.

Whereas the study by Shields (1995), based on Shields and Young’s (1989) theoretical framework, discussed the relationship between behavioral, organizational, and technical factors that are associated with the success of implementation of ABC/M systems. Shields (1995:150) argued that factors influencing the success of implementing ABC/M systems involve behavioral and organizational variables, as opposed to technical factors. These factors include top management support, linkage of the ABC/M systems to competitive strategies, linkage of the ABC/M systems to performance evaluation and compensation, sufficient internal resources, training in designing and implementing ABC/M systems and non-accounting ownership, which is the commitment of non-accountants to use ABC information. In the literature of ABC/M, many studies supported Shields’ (1995) study. For example, Norris (1997) and Krumwiede and Roth (1997) agreed with Shields’ (1995) study in that the successful implementation of ABC/M is associated more with behavioral and organizational variables than with technical variables.

Based on a survey of U.S. manufacturing firms, Krumwiede (1998a) examined how contextual factors such as the potential for cost distortion or size of firms, and organizational factors such as top management support, training or non-accounting ownership, affect each stage of the ABC/M implementation process. The degree of importance of these factors varies according to the stage of implementation. A company’s potential for cost distortions (a contextual factor) is a highly important factor in its decision to adopt and implement an ABC system, and top management support, non-accounting ownership and implementation training (organizational factors) can lead to reaching the highest stage of implementation of ABC. Krumwiede (1998a:268f.) concluded that firms considering or implementing the ABC system should take organizational and contextual factors into account.
According to O’Guin (1991), the success of ABC/ABM systems depends on four crucial factors: top management support, comprehension by employees, accessibility to the ABC/M systems, and to the system ownership by internal people. Similarly, Argyris and Kaplan (1994:83) argued that an education and sponsorship process is essential, but it is not enough for the implementation of an innovation like ABC because organizational members usually create the organizational defensive routines, which is the protection of themselves from embarrassment or threat, when an organization implements an innovative initiative. Overcoming these barriers is creating internal commitment. Turney (1996:210) also stated that initial steps needed to succeed in implementing ABC/M systems are to generate interest in ABC/M at all levels of the company, to remove any barriers to adopt ABC/M and to obtain management’s commitment to support the implementation of ABC/M.

An ABC/M best practices model was developed in order to determine how successful firms implement and operate ABC/M systems (Swenson 1998). The company’s environment (internal and external) has influences on ABC/M systems. The external environment is determined by competitors, customers and suppliers, while the culture, management requirements, and technology determine the internal environment. ABC/M methodology, technology, and applications, as well as its level of integration with other initiatives and its acceptance by management are influenced by a firm’s internal environment, which eventually determines the success of ABC/M.

ABC/M systems continue to gain acceptance as a tool useful for managing costs, improving the value received by customer and the profits by providing this value (Turney 1996, Hansen and Mowen 2000 and Langfield-Smith et al. 2003). The greater use of information technologies, mass customization, and globalization has increased competitive pressures and has created a greater need for cost management techniques. Many organizations have realized that one cost system is not enough and that traditional methods need to be supplemented with cost management techniques (Cooper and Kaplan 1998 and 1999). ABC/M systems can provide information to support specific management decisions such as outsourcing, budgeting, reengineering and determining customer profitability. Future directions for ABC/M systems include further expansion throughout the firm, integration with the financial management systems, development of customer profitability analysis capabilities and the costing of activities spanning the entire supply chain.
9.1.1.8.2. Stages of the Implementation Process of ABC/M

The general steps involved in ABC/M implementation can be expressed in number of different ways and performed in different sequences. In the literature of ABC, many implementation models have been developed (Miller 2000: 416). Choosing a model is a matter of personal preference and a matter of adapting general models to specific situation. Most models yield similar end results. Miller (2000: 416) stated that the main difference in the models of ABC/M implementation is in the area of responsibility for action the vision of how ABC/M systems fit the organization. Some view ABC/M as a management information system to support improvement initiatives and to improve decision-making. Others view ABC/M as methodology for improving decision making and driving and supporting continuous improvement (Miller 2000).

Although ABC/M installation may have some problems, the enhanced knowledge and grasp about the business makes it worth the effort (Glad 1993: 32). Krumwiede and Roth (1997: 5) stated that many companies adopting ABC/M may not use it successfully since they do not recognize the behavioural, organizational and political aspects of each stage in the implementation. Krumwiede and Roth (1997) claimed that ABC is an information technology (IT) innovation, which provides information for managers to make their decisions, as opposed to a pure technical innovation. Accordingly, managers need to comprehend the stages of the IT implementation process to implement ABC successfully. According to Cooper and Zmud (1990: 124), the IT implementation process is categorized as six sequential stages: initiation; adoption; adaptation; acceptance; routinization; and infusion. Krumwiede and Roth (1997) adapted Cooper and Zmud’s (1990) IT stage model, based on the organizational change, to the implementation of ABC. They describe each stage of the implementation process of ABC as shown in the figure 9.5.

1. The initiation stage: occurs when there is pressure to change an existing cost system, which arises from organizational need, technological innovation or external competitive threats, and a search for solutions (Krumwiede and Roth 1997: 6). There must be good reasons for a firm to desire a better costing system and a sense of urgency to go through the effort and expense of making change. ABC/M systems have ability to reduce product cost distortions, improve decisions, and provide information which can be used to manage activities and support cost reduction efforts However, if companies do not perceive that their costs are
significantly or their decisions could be materially affected by more accurate cost information, they will generally not progress much past the initiation stage (Krumwiede and Roth 1997 and Cooper and Kaplan 1998).

2. **Adoption stage**: when agreement is reached that ABC is a possible solution for company’s costing needs, the next step is getting approval and resources for implementing the system (Krumwiede and Roth 1997:6). A decision to invest the required resources must be approved from top management thus the powerful champion’s support is necessary in this stage. Krumwiede and Roth (1997) stated that many ABC proposals fail to progress beyond the adoption stage because key individuals believe the system will be more complex and less effective than other more technical innovations. This problem can be overcome by showing that the system is worthwhile. Also, ABC pilot projects that can be tackled quickly and require minimum resources should be identified. (Krumwiede and Roth 1997:9 and Miller 2000:414).

3. **Adaptation (analysis) stage**: ABC is developed and installed. That is, the implementation team analyzes the resource costs and links them to activities. Then, team members cooperate
to identify cost drivers and to trace these activities to cost objects. Krumwiede and Roth (1997:10) argued that the following factors are necessary in this stage:

- Clearly define objectives and scope of ABC/M from start and link to strategic focus.
- Form cross-functional implementation team consisting of knowledgeable members assigned full-time (if possible) to project.
- Provide training for team members through visiting other firms or by engaging consultants.
- Enhance commitment and cooperation among departments to provide data about activities and cost drives

4. Acceptance stage: involves organizational members’ commitment to use activity based costing. Acceptance occurs when individuals perceive that the ABC information is beneficial and worth the investment. However, they may resist using ABC/M systems because they fear to lost their jobs, funding, or status because of ABC results. Thus, the education and training of managers and employees about the value of the ABC system will eliminate their resistance and create their internal commitment. Krumwiede and Roth (1997:10) stated that information should be provided to management and users to show that the system meets the required objectives. These information should focus on (1) explaining why the traditional costing methods were inadequate, (2) discussing how ABC cost information is collected and reported, (3) explaining why the ABC model is better than the old cost allocation methods, and (4) highlighting how ABC information will lead to better decision and improvements.

5. Action (Routinization) stage: occurs when ABC is used as a part of normal activities in an organization. In this stage, ABC is accepted and used by the persons outside the accounting/finance function for decision-making. Reporting all costs in financial reports and providing budgets based on activities will encourage managers to use ABC information in their decision-making. Lack of the ‘routinization’ stage may be attributed to changes in the external environment after the ‘adaptation’ or ‘adoption’ stages (Krumwiede and Roth 1997:11). That is, ABC may no longer reach a company’s needs when the company encounters the crisis or industry revolution. It is possible that a company may go back to the ‘adaptation’ stage to redesign the ABC system in consonance with the altered objectives of the company in the changed environment.
6. **Infusion stage:** ABC is harmoniously integrated with other organizational systems and the organizational effectiveness increases by virtue of using ABC. For ABC, the ‘infusion’ stage refers to the activity-based management (ABM), which means using activity information of management to improve profits and competitive advantages. ABM is achieved when non-value-added activities are identified and eliminated and ABC performance evaluation is used for continuous improvement or reengineering. Thus, cost reduction or process improvement is an essential part of the strategic focus. Linkage of the implementation of ABC to major competitive strategies and to performance evaluation will support achievement of ABM.

9.1.1.9. **Evaluation of ABC/M**

Many studies (e.g. Innes and Mitchell 1995 and 1998, Turney 1996, Cooper and Kaplan 1998 and 1999, Cokins 1996 and 2001 and Gupta and Galloway 2003) assure that ABC/M systems have been increasingly introduced and applied to various types of organization and become more popular due to their benefits and their advantages over the traditional approaches. Unlike activity-based product costing, the benefits from ABC/M systems are not limited to organizations with particular cost and product structures. ABC/M systems offer the organizations the opportunity to simultaneously manage costs better and improve customer value (Turney 1996 and Cokins 2001).

Turney (1996), Cooper and Kaplan (1998), and Cokins (2001) claimed that ABC/M systems provide many significant advantages over traditional costing approaches such as enhanced product cost accuracy, more comprehensive cost information for performance measurement, more relevant data for management’s decision-making, more potential for sensitivity analysis, and providing a model prospect on value-adding organizational transactions and activities. Booth and Giacobbe (1997:1-6), who studied activity-based costing in Australian manufacturing firms, concluded that the major advantages that users of ABC/M received from the implementation of ABC/M were more precise profit analyses, more accurate costing, better allocation of overhead, improved cost control and cost management.

Moreover, other studies and results of surveys (Innes and Mitchell 1991, Cooper et al. 1992, Swenson 1995, Krumwiede 1998b, Innes et al. 2000, and Gupta and Galloway 2003) included that ABC information is utilized to support decision-making process in many areas such as performance measurement, product design, process improvement, market segments and
customer mix. It is also used to advocate for strategic decisions, such as customer profitability and pricing and product mix (Cooper and Kaplan 1998). ABC/M systems generate not only cost information but also non-financial information that are about events that influence the performance of activities (Turney 1996:77f.). This type of information can be used for supporting performance improvement and improving customer value. ABC/M systems assist identifying value and non-value added activities that can be reduced or eliminated to improve business performance.

Innes et al. (1994:102) and Cooper and Kaplan (1998:214f.) argued that one major contribution of ABC/M is at the design stage. ABC information can lead product designers to make decisions on trade-offs between minimizing cost and desired performance and it provides the cost information of diverse designs that product designers can compare (Cooper and Turney 1990). In addition, Innes et al. (1994) and Cooper and Kaplan (1998) argued that using product-costing techniques at the design stage can be combined with target costing since product costs can determine the mix of products to manufacture and to sell and can evaluate profitability by product group or customer type. Moreover, many studies (e.g. Turney 1996, Norris 1997, Cooper and Kaplan 1998, Emblemsvåg and Bras 2001, Oliver 2000 and Gupta and Galloway 2003) argued that ABC/M systems complements other organizational improvement initiatives such reengineering, the theory of constraints, economic value added, product life cycle costing, total quality management, and so on.

ABC/M systems help improving visibility of activities and cost transparency (Turney 1996:145f. and Hansen and Mowen 2000:552f.). ABC/M systems improve the visibility of activities in an organization and lead to higher efficiency and profitability. Cost transparency helps identify high-cost activities that can be redesigned, creates a great understanding between service department and operational units, and assists buyer/supplier interfaces to be more efficient. In ABC/M systems, improving costs tracing through identifying activities and cost drivers allows an organization to follow policies to have a transparent financial management because costs can be traced down to the level that is clear to individuals who want to know how an organization utilizes the resources (Turney 1996, Cooper and Kaplan 1998 and Hansen and Mowen 2000).
Cooper and Kaplan (1998), Turney (1996) and Innes and Mitchell (1998) also argued that ABC information is useful for managers in budgeting and performance measurement as activity-based budgets prepare objectives for each activity and assess future resource needs (Turney 1996:175 and Cooper and Kaplan 1998:303). Moreover, activity based budgets provide the links between the activities, the organizational acts and the resources consumed, and show the differences between resource consumption and resource provision. As a result, activity-based budgets improve operational control and performance measurement (Turney 1996 and Cooper and Kaplan 1998).

Many studies (e.g. Innes et al. 1994:114, Turney 1996:152 and Hansen and Mowen 2000:554) explained that the key areas of ABC/M benefits are cost control and cost reduction, as well as improved profitability. Another important benefits of AB/M are that ABC/M systems get rid of the distortions of information in the traditional cost system and non-value-added activities, which do not add to the customer’s satisfaction with the product. In addition, ABC/M are process-oriented approaches (Emblemsvåg and Bras 2001:65), thus, ABC/M systems assist management to understand, analyze and improve business processes. Turney (1996:145f.) stated that the analysis of the business processes by using activity analysis guides management to process improvement, including elimination of non-value-added activities, decreasing time to perform activity, selecting the low-cost activity and sharing activities and then the process improvement leads to cost reductions, one of the most important benefits of ABC/M.

In the more competitive environment of a turbulent economy, the importance of cost management systems such as ABC/M increases because cost advantage is the essential component of differentiation strategies in competition (Johnson and Kaplan 1991:220). Blocher et al. (1999:111) also claim that the ABC/M systems is a cost planning system that provides information for managers to plan not only differentiation strategies, but also low-cost strategies since ABC/M systems determine the core activities, help analyze systems and policies that drive costs, identify ways to improve processes to reduce costs, and can help managers identify value-enhancement opportunities.

Although ABC/M systems declare a lot of benefits and advantages over conventional cost systems, ABC/M systems also have some limitations that cause difficulties for
implementation and application of ABC/M to organizations. ABC is not for every firm, and the previous benefits of ABC/M do not come without costs. Implementing ABC/M is costly and time-consuming because stringent change management is required organization-wide and business processes need to be so aligned as to facilitate data capture at every level of activity (Blocher et al. 1999:101 and Hilton et al. 2001:418). In general, ABC is recommended when one or more of the following situations occur: the products are complex and vary and require many different processes and inputs, overhead costs are relatively high and company operates in competitive industries (Cooper and Kaplan 1998:100, Oliver 2000:137 and Jackson et al. 2006:115). As with any course of action, the implementation of ABC/M is justified if the costs of installing and operating the system are more than offset by the long-term benefits.

The activity-based costing model relies on a number of critical assumptions. Perhaps the most important of these assumptions is that the causal relationship - cost drivers are not always clearly determinable. Innes and Mitchell (1990) say that for a cost driver to be usable the associated cost must be caused by an activity measurable in quantitative terms and which in turn can be related through this measure to production output. They argue that it is doubtful that an ABC system can completely avoid the problem of cost commonality. Cooper and Kaplan (1998) accept that costs cannot be traced with total accuracy but claim that it is better to be “Basically correct” with ABC than to be “Precisely wrong” using outdated allocation techniques.

Some people believe that ABC/M systems are more complex than conventional systems (Turney 1996:214). In ABC/M, to provide the more detailed analyses of cost structures, much more analytical work needs to be performed (Krumwiede 1998b:34). Greater sophistication in the cost management process will not come without increased inputs. Careful planning of ABC/M systems, however, can eliminate much unnecessary work (Turney 1996:215 and Hilton et al. 2001:419). In fact, when complex cost system is to be developed and when the organization does not have the necessary resources or expertise to manage such system, the cost system may easily be discredited because of unreliable information produced.

The ABC model needs to be updated often to present relevant cost information even if the logic of the model is correct (Turney 1996:295). This is an important but often neglected issue. If basic information is gathered at a single point in time with no system for a continuous
registration and update of information, the entire ABC model will run the risk of being based on irrelevant data. In order to function properly, the product costing needs to be an integrated part of the accounting system and the information about activities, including resources drivers, cost drivers and performance measures need to be updated every time when product variations or production processes change (Turney 1996:296).

Cobb et al. (1992) found that difficulties extracted from a study based on the answers of several companies after one year of using ABC/M included the amount of work involved, difficulties in collecting accurate data, difficulties in identifying and selecting activities or cost drives, and the fact that cost management was difficult because several activities cross department boundaries. Additionally, implementation is very time consuming, requiring not only gathering and processing of data, but also interpreting the results. Krumwiede (1998b:34) stated that ABC implementations can be difficult and may take several years before some organizations can reach the usage stage. In addition, many adopters of ABC have cited that during the implementation of ABC they faced reservations from employees or managers regarding the usefulness of the new system. Landry et al. (1997:29f.) identified many factors that can cause some implementations to fail such as too many cost drivers, lack of follow-through, too much emphasis on consensus, and improper administration. Palmer and Vied (1998:33) found that some organizations encounter difficulties integrating ABC with reporting and performance measurement systems.

Finally, Innes et al. (1994:122) indicated that one of the limitations of ABC/M is its concentration on an internal focus within an organization - ignore the external market - but such a limitation is lessened by techniques such as target costing which will be discussed in the next section. Even though all of the former problems have been overcome with the development of ABC methodology and the increase in using ABC models by companies in different manufacturing and service industries, it is always necessary to be aware of these problems when developing such a model. ABC/M are only techniques and, as with all techniques, it is important to be aware of their limitations. Despite such limitations ABC/M can play a very important role in many organizations. Furthermore, it is possible to combine the activity-based approach with other techniques such as target costing and life cycle costing.
9.1.2. Target Costing

9.1.2.1. Origins and Development of Target Costing

During the last decades, target costing has received increasing attention as a powerful method for strategic cost management. According to Cooper and Slagmulder (1997b:2) and Shank and Fisher (1999:73), target costing is not a new development, but has been in use since at least the mid 1960s. In addition, there is subjective evidence of its use by Henry Ford, when developing the Model T. However, there is a general agreement confirmed by many studies (e.g. Sakurai 1989, Monden and Hamada 1991, Kato 1993, Horvath 1993a, Ansari et al. 1997b, Cooper and Slagmulder 1997a, Monden 2000) that target costing originated in Japan. For example, Toyota was using target costing as early as 1963, and in 1966 Nissan utilized a cost management program for new car development similar to today’s target costing (Monden 1995:6 and Sakurai 1996:40).

In the 1960s, mass production of standardized products formed the major type of production in Japanese companies. In this low variety/large lot production environment, Sakurai (1996:38) argued that cost management focused on the production phase and thus standard costing was common. But, in the late 1960s and 1970s many environmental changes occurred and paid more attention to the idea of influencing and reducing product costs as early as possible during the planning and development stages of a product (Sakurai 1996:39, Ansari et al. 1997b:5 and Kim et al. 1999:4). For example, increasing incomes enhanced the standard of living of the society. Customers became more sophisticated than before and expected newer, better and more differentiated products that could satisfy their preferences. In addition, the competition grew fiercer and the profits weakened (Feil et al.2004:12). These two factors pushed many Japanese firms to introduce the strategy of differentiation. Sakurai (1996:39) stated that companies had to produce a large variety of products with distinct features to respond to the diverse demand.

Another change - and perhaps even more important - was product life cycles became shorter as customers searched constantly for newer and better products (Sakurai 1996:39). These changes have naturally increased the importance of cost management in the planning and design stages. This is because every characteristic of a product (cost, quality, functionality) may be changed easily in the planning and design stages. After the production phase begins it is more difficult and much more expensive to introduce any changes in the product.
Furthermore, the pre-production stages determine the cost structure and it is proved that the large portion of product cost is predetermined already at the design stage and thus the possibilities to reduce costs in further product life cycle phases are obviously limited.

In order to face the environmental changes, Japanese companies invented “genka kikaku” - a new method of cost planning at the design stage, before the beginning of manufacturing phase. The concept of “genka kikaku” emerged in Japan in 1960s, but its essential features (e.g. cost planning and value analysis) originated much earlier in others counties. For example, cost planning at the design stage had been recognized as early as the beginning of the last century at Ford in the United States and in the development of the Volkswagen Beetle in Germany in the 1930s (Feil et al.2004:10) At Volkswagen, in order to meet the price goal of DM 990, alternative technical solutions were weighed on the basis of cost considerations (Rösler 1996).

Moreover, Ansari et al. (1997b:3) assured that target costing originated in Japan in the 1960 but Japanese companies took a simple idea called value engineering and transformed it into a dynamic cost reduction and profit planning system. However, this does not minimize the achievement because target costing goes well beyond value engineering and cost reduction. The Japanese term “genka kikaku” was translated to English as “target costing” and this translation has been generally accepted in the western world. In 1995 the Japanese Cost Society recognized the term “target costing” as a mistranslation and recommended to use rather the term “target cost management” (Feil et al. 2004:10).

In the 1970s target costing was widely adopted in Japanese companies primarily assembly-oriented industries (Sakurai 1996:38). However, during 20 years the approach evolved rather slowly as the enterprises responded to particular environmental changes (Kim et al. 1999:4 and Feil et al. 2004:12). Three important events in the early 1990s contributed to the significant changes in target costing: the bursting of the economic bubble, the appreciation of the Japanese yen against the U.S. dollar and the long recession in Japan (Kim et al. 1999:4f. and Feil et al.2004:12). These events aggravated the competitive position of Japanese corporations and prompted them to improve their target costing systems.
Target costing remained a secret for years. Western companies recognized target costing as a key factor for the strong competitive position of Japanese companies only in the late 1980s and since have been implementing it in order to enhance their cost management and, thus, increase their competitiveness (Kato 1993, Ansari et al. 1997b, Cooper and Slagmulder 1997a, Monden 2000). For example, target costing has spread to Germany (e.g. Horvath 1993b and Seidenschwarz 1993), the United States, and other Western countries (e.g. Hiromoto 1988, Sakurai 1989, Kato 1993, Bhimani and Okano 1995, Ansari et al. 1997b Cooper and Slagmulder 1997a). Consequently, some variations of target costing have been developed and are being used in different countries. Since target costing, like many other management practices and philosophies, is environment-specific, it is not surprising to see these variations in practice.

9.1.2.2. Definition and Nature of Target Costing

To provide a jigsaw definition of target costing is difficult because the Japanese companies where the system had been greatly used as profit planning and cost management vary and each one has its own unique approach to defining it. Sakurai (1989:41) stated that “…target costing can be defined as a cost management tool for reducing the overall cost of a product over its entire life cycle with the help of production, engineering, R&D, marketing and accounting departments.” This concept of target costing by Sakurai (1989) gives emphasis to two of the essential features of target costing: the close cooperation of different company departments and the use of life cycle costing. Kato et al. (1995:39) argued that target costing is not only a technique of setting cost targets but it is also future oriented, focuses designs’ attention on the cost implications of design decisions, and helps managers evaluate the profitability of a product before it is produced. In addition, Kato et al. (1995:39) agreed with Sakurai (1989) that target costing is an integrated mechanism linking different functional company departments into a coherent system.

Brausch (1994:45) described target costing as “a strategic management tool that seeks to reduce a product’s cost over its lifetime.” This definition focuses also on reducing the overall cost of a product over its entire life cycle. In addition, Brausch (1994:45) argued that target costing presumes: interaction between cost accounting and the rest of the firm, a well-executed long-range profit planning, and a commitment to continuous cost reduction. Kato (1993:36) added that “target costing is a part of a comprehensive strategic profit management
According to Horvath (1993a:2) the purpose of target costing is to ensure that the products reach given life cycle profitability targets. Horvath (1993a:3) stated also that “target costing is built on a comprehensive set of cost planning, cost management and cost control instruments which are aimed primarily at the early stages of product and process design in order to influence product cost structures resulting from market-derived requirements”. Thus, this definition implies that target costing ensures cost management in early product design and development and it is driven by market price and desired profits. Some also stress these aspects of target costing for example Lee et al. (1994:183) argued that target costing is “a market-driven system of cost reduction, focused on managing costs at the development and design stages of a product.” Fisher (1995:50) described target costing as “a systematic process for reducing product costs that begins in the product planning stage.”

Many authors (e.g. Horvath 1993a, Kato 1993 and Everaert 1999) emphasize the use of target costing in the new product development. Everaert (1999 35) stresses the application of target costing in new product development process by providing the following definition: “target costing is the process of determining the target cost for future products early in the new product development process and of supporting the attainment of this target cost during the new product development process, by providing target costing information to motivate design engineers to realize downstream cost management of future products in order to secure product profitability of the new product when being launched.” Shank and Fisher (1999:74) argued that target costing may be easily applied early in the product life cycle of new products but however it can also be applied to existing products. Furthermore, Monden (2000:100) stated that the successful application of target costing is possible also in case of introducing full or minor changes in the existing products.

Cooper (1995a:135) claimed that target costing is “a structured approach to determine the cost at which a proposed product with specified functionality and quality must be produced in order to generate the desired level of profitability at the product’s anticipated sales price”. He emphasizes also the market orientation of the target costing expressed by the fact that in the target costing process the product sales price is not fixed by the company itself but externally
determined on the market and thus the final profitability of the firm depends on the reached level of costs. This is mentioned also by Tanaka et al. (1993:38f.) who define target costing as the process established to set and support the attainment of cost levels, usually, but not exclusively, expressed as product costs, which will contribute effectively to the achievement of an organization’s planned financial performance. Many studies (e.g. Hiromoto 1988, Horvath 1993a, Ansari et al. 1997b and Everaert 1999 35) emphasize market orientation of target costing.

Other researchers see target costing as an instrument of strategic cost management. For example, Shank and Fisher (1999:73ff.) argued that target costing should be understood as a process of determining a long-term goal (future product cost) at the product design stage and the achievement of this goal at the manufacturing stage (throughout the life cycle). Bonzemba and Okona (1998:3-4) defined target costing as a strategic cost management approach which is an “open system” which links external and internal factors from the inception…The activities to optimize the key success factors (cost, quality, innovation, and time) of a product are carried out mainly at the development and design phases, involving a multi-functional team of a company’s participating functions as well as other members of value-chain, mainly the suppliers.

Strategic dimension of target costing is also emphasized by Sakurai (1996:37) who described target costing as “a comprehensive means of strategic cost management focusing on total life cycle cost reduction. To achieve life cycle cost reduction, target costing integrates production and marketing functions with engineering as the core discipline.” Freeman (1998b:14) claimed also that target costing is “a management method that allows firms to provide customers with products that they want, when they want them, at a price they can afford, and still earn adequate financial returns.” Target costing is strategic in nature and, if done properly, it can create a culture of excellence in an organization that provides continuing strategic advantage. Target costing is more than a narrow focus on improving operating efficiencies or meeting cost budgets.

Ansari et al. (1997b:20) see target costing, by nature, is a strategic process. They define target costing by enumerating its most important elements. According to Ansari et al. (1997b:11) target costing is a profit planning and cost management system that is market-oriented, customer-focused, design-centred and cross-functional. The process of target costing begins at
the earliest stages of product development and is applied throughout the product life cycle by actively involving the entire value chain. Ansari et al. (1997b:21) argued that the link between an organization’s competitive strategy and the use of target costing exists primarily due to one factor; target costing provides the means for achieving the company’s goals of satisfying market-demand at an acceptable level of profitability. Also, target costing is a time-saving procedure and thus a valuable aspect in today’s competitive business environment where time is precious.

Taking the presented definitions into consideration we can observe that the authors provide different definitions of target costing. Nevertheless there is rather a high degree of agreement upon the nature of this approach. The characteristics (or key principles) of target costing, that distinguish it from traditional approaches to cost management, are:

- market orientation and customer focus,
- strategic dimension,
- price-led costing,
- life cycle cost reduction,
- cross-functional teams,
- value chain involvement,
- focus on design of products and processes,
- continuous improvement according to “kaizen” philosophy.

Based on the presented definitions and different meanings of target costing we can define target costing as follows: Target costing is a comprehensive instrument of strategic cost management during the whole product life cycle in order to achieve the required profit level while the product meets the levels of quality, delivery timing, and price required by the market. The essence of target costing is the cost planning and projection at the product design stage and continuous cost reduction during the product life cycle by using cross-functional teams and by involving the entire value chain.

9.1.2.3. Key Principles and Objectives of Target Costing

9.1.2.3.1. Target Costing - Key Principles

Different studies contrast the target costing approach to what they call the traditional western approach or traditional cost management approach (e.g. Worthy 1991, Horvath 1993a,
Seidenschwarz 1993, Ansari et al. 1997b and Götze 2004). According to Worthy (1991:49) western companies more often design the product, then calculate the cost, and finally try to figure out whether it will sell. If the cost is too high, the product goes back to the drawing board for redesign or if no additional time is available the company launches the product and settles for a smaller profit. The figure 9.6 shows the differences between the traditional western approach and the target cost approach.

Fisher (1995:52) explained that under the traditional western approach cost reduction activities can only start late in the product development process, whereas companies using a target costing system start with cost reduction from the concept generation phase, hence long before a prototype of the product even exists. Therefore, Cooper (1995a:91) called target costing a “feedforward” system, whereas the traditional system is a feedback system. In addition, Brausch (1994:49) argued that the single largest change in firms, implementing target costing is to stop reporting what products should cost, but instead report what products will cost. This proactive concentration on a future product’s cost allows to prevent costs rather than to reduce them after the fact.

![Diagram](image-url)  
Figure 9.6 Traditional western method versus the target costing approach  
(Worthy 1991:49)
According to the systems theory concept, Ansari et al. (1997b:16) argued that the differences between traditional and target costing approaches to profit and cost management reflect the different intellectual foundations on which each is built. They explained that traditional cost management systems were designed as closed systems that strive to keep costs within acceptable limits. These systems ignore the external environment and therefore do not orient a company toward changing markets, processes, and technologies. In addition, traditional cost management systems do not anticipate cost problem or move the company down a continuous path of improvement and customer responsiveness. While target costing represents an open systems approach that is externally focused (Ansari et al. 1997b:17). It is responsive to customer needs and competitive threats. Profits are planned and costs are managed when committed and not when incurred.

Target costing is a strategic profit and cost management process. According to Ansari et al. (1997b:10), target costing involves six key features or principles that provide the conceptual foundations for it and represent a way of thinking about cost management that is quite different from traditional approaches to cost management and profit planning. The first principle is **Price-led costing**. Market prices are used to determine allowable or target costs. Target costs are calculated using a formula similar to the following: market price - required profit margin = target cost. The second principle is **Customer focus**. Target costing is a market-driven technique (Sakurai 1996:45). In target costing, customer requirements for quality, cost, and time are simultaneously incorporated in product and process decisions and guide cost analysis (Ansari et al. 2003:12). The value (to the customer) of any features and functionality built into the product must be greater than the cost of providing those features and functionality.

The target costing approach considers the design of products and processes key to cost management (Sakurai 1996:45 and Weber 1999:36). Thus, the third principle of target costing is **Focus on the design**. There are many implications of this orientation for example target costing approach manages costs before they are incurred rather than afterward (Cooper 1995a:91 and Ansari et al. 1997b:12). The majority of the costs are committed at the product design and development stage, while most of the costs are incurred at the production stage. This is why the target costing process focuses on design. Target costing starts in the product design stage and aims to influence the future costs of product (Ewert and Ernst 1999:24).
Furthermore, Target costing approach encourages all participating functions of the company to examine designs, so product or engineering changes are made before the product goes into production. This can reduce costs and time to market by eliminating expensive and time-consuming changes needed later. Finally, target costing encourages simultaneous engineering of products and processes rather than sequential engineering (Ansari et al. 1997b:14). This reduces development time and cost by allowing problems to be solved earlier in the process.

The fourth principle of target costing is **Cross-functional involvement**. Target costing is essentially a multi-functional activity (Horvath 1993a:5). It uses cross-functional teams, with members representing design and manufacturing engineering, purchasing, manufacturing, cost accounting, sale and marketing, and customer service. These cross-functional teams also include outside participants, such as suppliers, customers, dealers, distributors, service providers, and recyclers (Ansari 1997b:14). The teams which cut across the organization and work together from the concept stage to production release or beyond, is charged with effecting the product development and target costing assignment (Weber 1999:39). Done well, the result can be new and modified products that are developed and produced quickly, satisfy the marketplace, and yield the desired profits.

The fifth principle of target costing is **Value-chain involvement**. The relevant expected costs include all costs that can be identified across the value chain, which refers to the various functions that add value in the process of providing products and services to customers. Target costing thereby looks at the entire gamut of costs proactively in the design stage. This is why “cross-functional teams” - comprised of representatives from all members of the value chain - are essential throughout the target costing process from the very beginning. This close collaboration with all members of the value chain (e.g. suppliers, dealers, distributors, and service providers) diffuses cost reduction efforts throughout the value chain and extends the cost reduction process beyond the walls of the company to create what some refer to as the “extended enterprise” (Ansari et al. 1997b:80).

The sixth principle of target costing is **Life cycle orientation**. Target costing entails life-cycle costing, meaning that “all the costs of owning a product over its life, such as purchase price, operating costs, maintenance and repairs, and disposition costs” are considered (Ansari et al.1997b:15). This means that the company looks beyond its own costs by also considering
the customer’s post-purchase costs of use and final disposition of the product. Minimizing total costs from the customer’s viewpoint provides a competitive advantage. For example, the efficiency and durability of the product affects the customer’s operating cost. Product disposal and recycling have increasing cost implications for customers.

Companies differ in their perceptions of what to do with target costing. This in turn affects the principles or characteristics of target costing as strategic cost management-instrument (Sakurai 1996:45). Many companies adhere to one or more principles of target costing and mistakenly assume they have adopted the entire process (Ansari et al. 1997b:18). This is mistake. Successful target costing means being faithful to the intellectual and practical principles of target costing. A pick and choose approach to these principles is unlikely to lead to effective target costing.

9.1.2.3.2. Objectives of Target Costing

In the literature, target casting is positioned as a comprehensive means of strategic cost management that enables management to use proactive cost planning, cost management and cost reduction practices whereby costs are planned and managed out of a product and business early in the design and development cycle, rather than during the latter stages of product development and production (Sakurai 1996:37, Ansari et al. 1997b:20, Freeman 1998b:14, Bonzemba and Okona 1998:3 and Ewert and Ernst 1999:24). Target costing obviously applies to new products (Horvath 1993a, Kato 1993 and Everaert 1999), but can also be applied to product modifications or succeeding generations of products. It might also be used for existing products, but costs are more difficult to reduce once a product is in production (Shank and Fisher 1999 and Monden 2000).

The costs most typically emphasized in the target costing process are those most directly affected by it: materials costs, purchased part costs, conversion costs (such as labor and identifiable overhead expenses), tooling costs, development expenses, and depreciation (Monden 1995:98 and Sakurai 1996:52). However, because target costing is a comprehensive cost planning, management, and reduction process, as well as a specific technique, all costs and assets that may be affected by early product planning decisions should be considered (Sakurai 1989:41, Horvath 1993a:3, Brausch 1994:45 and Ansari et al. 1997b:15). This would include more indirect overhead expenses through the production stage and beyond, such as
service costs, and assets, such as inventory. Target costing is intended to get managers thinking ahead and comprehensively about the cost and other implications of the decisions they made.

Monden (1995:12) and Sakurai (1996:44) argued that the main objectives of target costing are to reduce total life cycle costs so that the required profit level can be ensured while the products meet the levels of quality, delivery timing, and price required by the market. In addition to strategic cost management, many Japanese companies use target costing for strategic profit planning (Sakurai 1996:44). Strategic profit planning means formulating strategic profit plans by integrating marketing information with engineering and production factors. Moreover, Monden (1995:12) stated that one of the objectives of target costing is to motivate all company members to achieve the target profit during new product development by making target costing a company wide profit management activity. The company requires a non-conflicting and rational system for consensus building and decision-making. Monden (1995:13) argued that the necessary components for a system, like target costing, are the ability to enlist the cooperation of many employees and the ability to raise efficiency by devising cost savings with shorter lead times.

The ultimate objective for the use of target costing is to help businesses to sustain competitive positions. Target costing is closely linked to a company’s competitive strategy (Ansari et al. 1997b:21). Competitive strategy defines the goals that a company must attain to satisfy market demands and remain profitable. Target costing provides the means by which the company achieves these goals. It does so by integrating the strategic variables of market trends, customer needs, technology advances, and quality requirements into the product development cycle that meets a customer’s price, quality, and time expectations.

In today’s competitive global market, effective costing of products and services is considered as an essential and crucial organization’s strategy (Porter 1998a). Having the best products and services without competitive prices will not allow any global businesses to survive in the long term. In such markets, competing on the basis of satisfying the customers and also providing value is the best approach to gain market share and increase revenue. Target costing takes place within the strategic planning and product development cycles of a company
Thus, target costing during product development cycle plays a key role to achieve these dual objectives.

The initial emphasis of target costing may be cost planning, management, and reduction. However, the product development process is characterized by multiple, and possibly conflicting goals, such as realizing low cost, high quality, customer satisfaction, and timely introducing the product to the market (Cooper 1995a and 1996a, McMann and Nanni 1995 and Tani et al. 1994). A well-designed target costing system integrates all three of the strategic triangle: quality, cost, and time (Ansari et al. 1997b). Target costing as a comprehensive approach of strategic profit and cost management contributes to realizing these different goals by having cross-functional teams make explicit tradeoffs between them. Its market orientation forces the teams to consider explicitly the value of product characteristics in the eyes of the customers, and the price that they are willing to pay for it (Ansari et al. 1997b:11ff.). Using of some of the underlying tools (such as value engineering) can actually manage these tradeoffs in the design of products. For the Japanese situation, target costing is argued to be used to secure that no unprofitable products are brought to the market and that the optimal tradeoff between cost, functionality, and quality is realized (Cooper 1995a:109).

These multiple different objectives of target costing which are expected to be achieved in the product development process lead to the question for which objectives companies perceive the use of target costing has a beneficial influence on their competitive position. The consciousness of expected objective and benefits encourages companies to adopt target costing, and after adoption, to what extent are these objectives actually realized when using target costing? Some studies in the literature offer some empirical evidence on these questions. For example, based on a study of Japanese manufacturing firms, Tani et al. (1994:70f.) found that cost reduction was the most important goal when target cost management was implemented, then followed by realizing quality, satisfying customer needs and timely introducing new products. Also, Horvath and Tani (1997) found in a multiple case study among 10 German users of target costing practices that cost reduction was the main purpose of target cost adoption, followed by market oriented product development, lead time reduction for product development (time-to-market), and high quality.
Finally, target costing is as much a significant business philosophy as it is a process to plan, manage, and reduce costs. It emphasizes understanding the markets and competition; it focuses on customer requirements in terms of quality, functions, and delivery, as well as price; it recognizes the necessity to balance the trade-offs across the organization, and establishes teams to address them early in the development cycle; and it has, at its core, the fundamental objective to make money, to be able to reinvest, grow, and increase value.

9.1.2.4. Target Costing Process Steps

Just as there is no a general accepted definition of target costing, there is no single target costing process. Each company has evolved its own organizations and practices. Consequently, some variations of target costing have been developed and are being used in different countries. Target costing, like many other business management practices and philosophies that has its specific environment, thus, it is expected to find variations in the target costing process in Japan or western companies.

The target costing process is closely linked to the strategic planning and product development cycle of a company (Ansari et al. 1997b:21). This linkage forms the foundation of the target costing process. The strategic planning process defines the goals that a company must attain to satisfy market demands and remain profitable. While the product development cycle provides the other context for target costing. Target costing manages cost and profit during the product development cycle stages (Kato 1993, Monden 1995, and Sakurai 1996). The opportunity to use product design as a vehicle for cost management typically applies only to new product (Horvath 1993a, Kato 1993, Ansari 1997b and Everaert 1999). However, target costing can be used for existing products when these products or their manufacturing processes are being rapidly redesigned (Ansari 1997b, Shank and Fisher 1999 and Monden 2000).

Target costing plays a key role during the product planning, concept, and design stages of the development cycle. Once production begins, target costing assumes that a backseat and continuous improvement (kaizen costing) takes over the cost management role. According to Ansari (1997b:21f.) the product development can be described as a continuous cycle divided into four phases (see figure 9.7):
• Product strategy and profit planning: the development cycle starts with the strategic planning at the company level. The result of this phase is plans of a business, product, and profit that spell out the particular market segments a company intends to sell in and the products it intends to produce for this chosen niche. Also, these plans spell out the planned market shares and required profit margins from the various products.

• Product concept and feasibility: the next step in the product development cycle is to translate product and profit plans into specific concepts. Product concepts are developed using customer input and competitive intelligence. Product feasibility is determined by making preliminary life cycle cost estimates, evaluating the technology needed, computing the required investment, and estimating the available capacity.

• Product design and development: once a product concept is accepted and its feasibility tested, it goes into full-fledged design and development. Detailed specifications for manufacture and assembly are developed at this step. Manufacturing processes are concurrently designed and suppliers are called in to provide design and process improvement ideas.

• Production and logistics: the start of full-fledged production and distribution marks the culmination of the product development cycle. Service and support plans are achieved. Market results and customer responses are monitored to provide information for continuous improvement or redesign of the existing or next generation products.

Figure 9.7 Target costing process within the strategic planning and product development cycle (modified from Ansari et al. 1997b:24)
Taken as a whole the four phases involve the determination of a target cost with the cycle being repeated in order to ensure attainment of the target cost. Thus, the target costing process occurs in two key phases that correspond to the product development cycle. Ansari et al. (1997b:23) called them the establishment phase and the attainment phase. The figure 9.7 shows the two phases of the target costing process in relation to the product development cycle and strategic planning. The establishment phase occurs during the product planning and concept development stages of the product development cycle and involves setting a target cost. While the attainment phase occurs during the design development and production stages of target costing and involves achieving the target cost. In literature, many studies (e.g. Horvath 1993a, Cooper 1995a, Cooper and Slagmulder 1997a, Ansari 1997b and Monden 2000) introduced many steps to establish and attain target costs. Nevertheless, all companies share a series of general steps that will be explained in the next sections.

9.1.2.4.1. Establishing the Target Price

Establishing the target price is the starting point in the target costing process. This implies that the target price is decided during product planning, when the characteristics of the future product are determined (Ansari et al. 1997b:32). The target price is critical in driving the target costing process. In the target costing process, the target price has to be realistic, and consequently, the process of setting the target price is very thorough at most companies (Cooper and Slagmulder 1997a:94). Cost considerations play a minor role, at best, in determining the target price under target costing. Setting price of the product under target costing runs counter the well-known belief that managers need to consider the cost of the product in price setting.

Kotler (2003) explains the price setting process from a traditional point of view: The cost of the future product sets a floor to the price, the competitor’s prices and prices of substitutes provide an orienting point, while customer’s assessment of product features establishes the ceiling price. Traditionally, companies resolve the pricing issue by selecting a pricing method that includes one or more of these three elements. It is clear that target costing contrasts with cost-based pricing methods such as markup pricing (cost-plus pricing) and target-return pricing, since cost issues are not considered as essential under target costing.
Target costing uses product features (physical or aesthetic attributes desired by the customer) to identify a target market price. Driven by the market, and by expected relationships between supply, demand, and price sensitivity for the product, the determination of the target market price incorporates several factors. For example, Kato (1993:38) explains that the selling price of existing products or the price level of competitor’s offerings typically provide an initial starting point for firms using target costing. At the heart of the target-price-setting process is the concept of perceived value. Customers can be expected to pay more for a new product than its predecessor, but only if its perceived value is greater (Cooper and Slagmulder 1999:25). Understanding what attributes lead to specific value, and therefore price, is an essential part of setting a market price that yields optimal return for the organization’s efforts. These objectives can be achieved by applying several tools and techniques such as quality function deployment, analytic hierarchy process, customer voice analysis, and relationship matrix (see e.g. Ansari et al 1997b and Terninko 1997).

To illustrate the factors of the perceived value by consumers and the price level of competitor in the price setting process, Cooper and Slagmulder (1999:25-26) introduced two cases Toyota and Topcon (ophthalmic instruments). In the case of Toyota, the sales divisions usually suggest retail prices and sales targets. The principle they use to set retail price of the vehicle is the perceived value by consumers. While in the case of Topcon, a manufacturing of ophthalmic instruments and other advanced optics and precision equipments, setting prices is not only based on the perceived value by consumers but also on the price level of competitor.

Apart from the perceived value by consumers and the price level of competitor products, Kato (1993:38) mentions other factors to consider when setting the target price, such as the product concept, the characteristics of the anticipated consumers, the product-life cycle, the expected sales quantity and competitors’ strategies. Similarly, Ansari et al. (1997b:32) found that Japanese companies use four key determinants in setting a product’s price in a target cost environment:

- Consumer need, want or taste. This may refer to the physical and aesthetic features and related functions of the product that will influence the price.
- Satisfactory price. This is the price consumers are willing to pay for desired functions and features.
• Competitive analysis of product prices, features, and functions offered by the competition influence a firm’s own prices.
• Market share goal relating to the size of the market a company wants to attain. Research has shown that, most Japanese companies used this strategy to establish long-term projects. They set prices that give them a lead over their competitors.

The figure 9.8 shows the role of these four determinants in setting target prices. It suggests a recursive relationship between these determinants, the product’s features, and the final market price. This process may be iterated several times and revised before a final product price is set. Ansari et al. (1997b:33) stated that this process varies by whether the prices are being set for brand new products or new versions of existing products.

Cooper and Slagmulder (1997a:94f.) introduced an illustration of these four elements that are used to set the target price. They found that “Nissan determines the target price of a new car by considering a number of internal and external factors. The internal factors included the position of the model in the product matrix and the strategic and profitability objectives of top management for that model. The external factors include the corporation’s image and level of customer loyalty in the model’s niche, the expected quality level and functionality of the model compared to competitive offerings, the model’s expected market share, and the expected price of competitive models.”

Ansari et al. (1997b:34) argued that a new product that has no history in the marketplace typically is more challenging to price. For such products, there is no prior base from which to
gauge customer requirements or evaluate competitive offerings. The most helpful strategy here is to do intensive market research, studying competitors’ products and techniques etc, and to assess those factors that will help the producer to set price for new product. Ansari et al. (1997b:34) stated that strategic and competitive factors, rather than customer requirements, play an important role in pricing new product.

However, setting prices when the product is going to the market for the second time might be less challenging. Setting price when the product has been in the market for some time is easier because the producer can assess the performance of that product in the market in relation to that of the competitors (Ansari et al. 1997b:34). Feedback on quality, functionality, new technology, new designs, environmental changes etc., will help the producers to adjust and restructure the pricing system. The fact that there is some historic information about the performance of the last product makes it easier to draft a price plan. Ansari et al. (1997b:34f.) introduced three methods that are used in practice for setting prices for existing products. The three methods are: A function based adjustment method: Here adding or subtracting the value of the function added or taken off from an existing product sets prices. Physical attributes-based adjustment method: This relates to how prices are set influenced by the physical attributes attached to the product. Competitor based adjustment method: Here the firm sets price with an eye on the competitors’ prices and their product attributes.

Finally, setting target prices is a complex process requiring careful analysis of many factors such as customer requirements, acceptable price, competitive offerings, desired market share, etc. Given the importance of the target selling price to the target costing process, it is expected that companies are very careful to ensure the most realistic possible target selling price.

9.1.2.4.2. Establishing the Target Profit Margin

In the target costing process, after the target price is set, the focus shifts to the early establishment of the target profit margin during the product planning. Kato (1993:40) and Monden and Hamada (1991:19) stated that the total target profit for a future product should be derived from the long and medium profit plans for the whole company, reflecting management and business strategies over a period of three to five years. These target profits should then be decomposed into target profits for each product over its expected life cycle.
Many factors should be estimated such as market size, market share, and sale volume in order to set target profit.

In competitive business environment, it is quite difficult task to imagine a future product portfolio, however, without doing this it is impossible to decompose the total target profit into targets for each product (Kato 1993:40). Furthermore, Kato (1993) stated that the procedures to compute target profits should be scientific, rational and agreed, otherwise managers will not accept their responsibility for achieving the target profit. In companies that adopt target costing, Kato et al. (1995:40) found that the profit allocation to the various products is difficult task and consumes a lot of management time and effort before top management announces the final allocations.

Cooper and Slagmulder (1997a:100) stress also that the objective in establishing target profit margins is to ensure achievement of the company's long-term profit plan. Usually, the management in charge of the product line is responsible for achieving the overall profit target. For example, Sony, Japan's leading manufacturer of consumer electronics uses an iterative process to set the target profit margin for each product. The starting point is the group profit margin identified by each group's profit plan. Once the annual group profit target is set, each group is responsible for its own profitability. Cooper and Slagmulder (1997a:100) argued that there are two considerations in setting target profit margins. Theses considerations are to ensure that the margins are realistic and that they are sufficient to offset the life-cycle costs of the products.

To set realistic target profit margins, Cooper and Slagmulder (1997a:100) introduced two ways. The first method starts with the actual profit margin of the predecessor product and then adjusts for changes in market conditions. Nissan adopts this approach when it uses computer simulations to identify the relationship between selling price and profits. From this historical relationship, it identifies the target profit margins of new products, based predominantly on their target selling prices. The aim of this careful analysis is to set realistic profit margins that will enable it to achieve its long-term profit plans.

The second method starts with the target profit margin of the entire profit line (or other grouping of products) and raises or lowers the target profit margin for individual products depending on the realities of the marketplace. Cooper and Slagmulder (1997a:102) introduced
Sony case as an example for this approach. They concluded that setting the target profit margin in this way is realistic and makes the target costs reflect the relative competitive position of the company. Where the target profit margin is set based on the historical profit levels, the relative strength of competitive offerings, and the profit objective captured in the long-term profit plan.

The target profit margins should be sufficient to offset the life-cycle costs of the products. If product launch or discontinuance requires large up-front investments or if a product's selling prices or costs are expected to change significantly during its life, the company has to adjust the target profit margin accordingly. The purpose of such adjustments is to ensure that the company accounts for all costs and savings when determining the target profit margin so that the expected profitability of the product across its life is adequate (Cooper and Slagmulder 1997a:102). Without such adjustments, the company risks either launching products that do not earn an adequate return or not launching products that will earn an adequate return over their lives.

Horvath (1993a:62) described another method to establish the target profit margin. He argued that as the target price is derived from the market in a first step, the application of a certain return on sales (ROS) seems to be the best way to specify the target profit. According to Horvath (1993a:62), return on sales is set by management, based on long-term profit planning and depending on factors like corporate strategy, business sector and competitive situation. Similarly, Ansari et al. (1997b:36) argued that setting target profits is a function of both business level plans and product level plans. At the business level, target profit is determined by considering the profit requirements for the business as a whole. Ansari et al. (1997b:36) stated that the way to achieve that is to determine the product mix (it comes from a firm’s multiyear product plan) the firm intends to produce and establish a required profit from this product mix (it comes from applying a target return on the sales (ROS) percent to the sale revenue from the product mix). The Figure 9.9 shows these relationships.

The target profit rate is usually determined by the financial returns (e.g. the return on assets (ROA)) that a firm must earn to remain viable. The required target profit (a business level profit) is the result of profit simulations and represents an assignment of profit needed from all products in a firm’s product line. The business plan is combined with individual profit plan
for each product. These plans represent a product manager’s expectations for his or her product. Ansari et al. (1997b:36) stated that the product manager should consider the projected market size, targeted market shares, and the competitive market price to develop a projected sale volume. The planned profit at the product level can be obtained by applying the return on sales targets from the profit plan to the projected sales level. The two profits, required and planned, are compared to set a final target profit for the product as shown in the figure 9.9. Finally, Ansari et al (1997b:37) found that the required profit and the planned profit are based on estimates of lifetime sales from the product. The profit targets may change as the product goes through its development cycle, and the final target may vary over the product’s life cycle. Furthermore, individual product profit plans may include subsidies from products that may command a monopoly share of their markets.

![Figure 9.9 Setting target profit (Ansari et al. 1997b:37)](image)

**9.1.2.4.3. Determining the Current Cost and Target Cost**

If the proposed product is a modification of an existing product, a firm has a cost basis from which it can determine what the potential costs of the proposed new product might be if the new product’s specifications and method of manufacture are similar. The next step in the target costing process, then, is to determine what the new product’s costs would be, using
existing product specifications and manufacturing processes. This is frequently called the “engineered cost.” Sakurai (1989) uses the terms “drifting cost” and “current cost.” Kato et al. (1995:41) define the current cost as the best estimate of the future product’s cost. When new product development starts, this best estimate is based on the actual cost of the current product, considering cost-down and cost-up factors. Ansari et al. (1997b:44) explain that this current cost is also called the drifting cost, since it drifts toward the target cost through successive design iterations during product development cycle, as shown in the figure 9.10.

![Figure 9.10 Calculating the drifting cost towards achieving the target cost](Cooper and Slagmulder 1997a:120)

Similarly, Cooper and Slagmulder (1997a:109) argued that the current cost of the new product is determined by adding the current manufacturing costs of each major function of the new model. For the current cost to be meaningful, the major functions that the company uses in product construction have to be very similar to those that it will eventually use in the new product. Cooper and Slagmulder (1997a:109) assumed that no cost-reduction activities or ideas are undertaken during new product development or during the manufacturing of current products. While Kato (1993:41) explained that various ideas for cost reduction might have emerged from small group activities, product reviews and so on, during the product development process or during the manufacturing of current products, but that could not yet be applied to the current products. Taken these cost reductions into account, the as-if cost is calculated. Hence, the as-if cost represents the cost of making the future product if the company had implemented all available cost-reduction activities. As shown in the figure 9.10, the as-if cost represents in fact a real cost reduction, however, Kato (1993:41) found that it
was unlikely for the Japanese companies he studied, to be sufficient to realize the medium-term profit target, given the market determined sales price.

The process of establishing target cost is not to be taken lightly. It is, in fact, the cornerstone of the target costing and needs to be carefully performed to arrive at meaningful targets. The difference between the target price and the target profit margin is the allowable cost that the company can commit to the product in question. As mentioned before, the target sales price is set based on market information and the target profit margin is strategically determined by top management. The allowable cost represents the cost at which the product must be manufactured in order to gain the target profit margin, when sold at the target sales price. However, Sakurai (1989:43) clarifies that this allowable cost might not be achievable on the short run and forms in fact the long-term most strictly cost objective. Also, Cooper and Slagmulder (1997a:106) argue that the allowable cost does not represent the capabilities of the firm and the suppliers; therefore the allowable cost is often unachievable in the short term.

In the literature, some views of the relationship between the target price, target profit margin, allowable costs, current costs, and cost reduction objectives. Horvath (1993a) summarized these relationships in three views as shown in the figure 9.11. In the first example, the difference between the target price and the target profit margin is called the target cost. The current cost is reduced to achieve the target cost using value engineering and kaizen costing techniques. In the second example, the difference between target price and the target profit is called the allowable cost. The difference between the current cost and the allowable cost is actually called the target cost. The third example is very similar to the second, but suggests that value engineering is the primary technique utilized during the design stage of the process; kaizen costing is used during the production stage. Although the difference between these views may seem minor, and perhaps confusing, some leading Japanese companies use them to clearly establish what is allowable (e.g., highest amount permitted) and the target improvement required to reach the allowable cost. As cost improvements are realized, the current cost “drifts” toward the allowable cost. The target cost needed to be realized becomes smaller.
Determining target cost is very significant because it is tied to the company’s strategic policy (Sakurai 1996:51). In the literature, different methods are described to set the final target cost. According to Tanaka et al. (1993:42), Kato (1993:38) and Sakurai (1996:51), three basic methods are used for setting target costs - the deductive method (also called the subtraction or top-down method), the adding-up or bottom-up method (also called the engineering method), and the integrated or combination method.

According to the deductive method, the target cost is determined by subtracting the target profit from the projected sales price. Thus, the target cost is set at the level of the allowable cost as shown in the figure 9.12. Target cost is an estimated total cost for insuring target profit after considering the sale price of competitors and other factors (Sakurai 1996:51). This method is most commonly described in the literature and is also called the subtraction or top-down method, since the target costs are more or less imposed to the new product development.
team. It is also called profit-planning method because it enables managers to tie target costing to their mid-term or long-term profit plans (Kato 1993:38). However, Tanaka et al. (1993:42) found that this method works backwards from the market price to derive the target cost, thus, the result is rigorous target cost that may be difficult to achieve using the current level of technology.

![Figure 9.12 Target cost computation, following the Top-down Method (Kato et al. 1995:41)](image)

The target cost can also be determined by what is called the adding-up or engineering method. This method accumulates all costs based on the current methods (Sakurai 1996:51). It determines target cost by considering the present level of technology, production facilities, delivery time, production volume, and others based on the company’s technological level (Tanaka et al 1993:42 and Sakurai 1996:51). This method is also called a bottom-up method because the target cost is set by operating engineers using engineering methods – not by top management (Sakurai 1996:51). Also, Tanaka et al (1993) stated that the target cost can be normally quite achieved because it is basically an extension of what already happening within the company. However, the engineering method is very inward looking and ignores the market situation.

Kato (1993:38) argued that though the adding-up method is based on the feasibility test of the proposed value engineering improvements, it is difficult to provide a logical connection with the profit and business plans. Furthermore, he stated that innovative ideas for cost reduction seldom emerge with this method. For Kato (1993:38) it is clear that the deductive method is superior to the adding-up method. The third method is the integrated or combination method.
It combines the deductive method (which is based on the market) and the adding-up method (which is based on existing technology and capabilities) to set target costs (Tanaka et al. 1993:47 and Sakurai 1996:51). The basic idea in this method is that the integrated target cost should provide a reconciliation of the two methods and give a resultant target that is set for a long-term point of view (Tanaka et al 1993:47). All three methods are used in Japanese companies. However, Sakurai (1996:52) stated that the combination method is preferred because it leads to the best results.

Determining the level of the final target cost is an important issue. Cooper and Slagmulder (1997a:111) argued that if the target cost is set consistently too low (i.e. too difficult to attain), the work force will be subjected to excessive cost reduction objectives, risking burnout. The discipline of target costing might then be lost, as target costs will frequently be exceeded. On the other hand, if the target cost is set at a level that is too easy to achieve, the firm will lose competitiveness because new products will have excessively high cost levels.

Once the target cost is set, filling the gap between the current cost and the target cost is then the major focus for design engineers. This difference between the current cost and the target cost is also called the target cost-reduction objective. Indeed, design engineers need to find ways to reduce the cost of the future product with this amount in order to attain the target cost. Filling the gap between the target cost and the allowable cost is then the objective of the kaizen costing process, during manufacturing. This difference between the target cost and the allowable cost is also called the kaizen cost-reduction objective. Cooper and Slagmulder (1997a:110) call it the strategic cost-reduction challenge.

Cooper and Slagmulder (1997a:110) stated that the strategic cost-reduction challenge determines the profit shortfall that will happen because the designers are unable to achieve the allowable cost and signals that the company is not as efficient as demanded by competitive conditions. They also explained that in a company with a well-established and mature target costing system, the strategic cost-reduction challenge will be small or nonexistent and intense pressure will be brought on the design team to reduce it to zero. Furthermore, for the most efficient companies, the achievable cost reduction for a product might exceed the cost-reduction objective. Such companies do not face a strategic cost-reduction challenge and can achieve competitive advantage over their competitors.
Finally, when setting target costs, some factors must be taken into consideration such as the scope of target cost and the costs included in target cost, and the calculation basis for the target cost (Tanaka et al. 1993:40). Most of the studies and surveys (e.g. Tanaka 1989:51, Tani et al. 1994:73, Cooper 1994:39ff. and Fisher 1995:55) found that the scope of target cost is the costs of manufacturing activities. However, these studies and surveys indicated also that the companies set a target cost for the design activity, the distribution activity, logistic activities and the user activity of the new product. Thus, the scope of target cost can include different parts of the product life cycle.

For the calculation basis for the target cost and the costs included in the target costs, Sakurai (1996:52) argued that the basis of full absorption costs is the most common in the calculation of the target cost. He stated that target costing is an effective tool for reducing direct costs as well as indirect costs. Cooper & Slagmulder (1997a:79) found the general focus on the direct costs, while some firms also used so-called rules of thumb to manage the indirect costs, such as reduction of the number of different materials used in a product, reduction of the number of parts across the product line. In their study, Tani et al. (1994:73) concluded that 99% of Japanese companies using target costing include direct material and labor costs in the target cost. Respectively 81% and 83% of the respondent companies using the target costing includes manufacturing overhead costs and depreciation of new equipment in the target cost. Thus, full absorption cost is the most common cost category used in target costing.

9.1.2.4.4. Disaggregating the Target Cost to Components and Functions

The above discussion of the target costing process implies that the target cost is set at a very general level - product level. This is normally the case at the stage of establishing the target cost. When the efforts begin to achieve the target costs, however, it is usually necessary to subdivide it and assign it to functions of the product, blocks of components and even to individual cost items. Different ways to breakdown target cost are described in literature, of which the function-oriented allocation and the component allocation method are the best known. The figure 9.13 shows the hierarchical decomposition of the target cost for the PC example.
Each product has certain functions that combine to achieve its main purpose. In the function-oriented method, such functions can be grouped into function areas and the target cost can be assigned to these function areas. Tanaka et al. (1993:50) argued that the main reason for assigning the target cost to function areas is to give designers more freedom and significant opportunities for achieving the target cost through using alternative design approaches. They also stated that the main criterion for division of the target cost to functions is the value of a specific function as perceived by the customer.

The function-oriented method is especially appropriate when customers’ wants and needs have been assessed, including the relative value they put on different functions, and when costs have to be reduced significantly. Cooper and Slagmulder (1997a:143) argued that most of the companies set different cost-reduction objectives for each major function. According to Tanaka (1989:60) and Tanaka et al. (1993:50), the steps involved in assigning the target cost to function areas include defining and classifying the product’s functions, evaluating the importance of the functions and assigning the target costs to each function based on the relative importance of each function.

Tanaka et al. (1993:52) argued that although the preferred method of evaluating the function areas is from customers’ viewpoint, setting target costs for functions based solely on the customers’ viewpoint may overlook certain factors such as technical considerations, meeting
safety and other regulations. Also, they indicated that although the customers’ evaluation should remain dominant, it is often modified to take into account the manufacturer’s evaluation before finalizing the target cost for each functional area.

The second method is to allocate the target costs to major component blocks (for automobiles, this would mean the platform, engine, power train, and accessory package, for example), then to their respective subassemblies, and ultimately to individual components. The procedures of setting target costs for components according to Tanaka et al. (1993:53) include grouping the components of the product into various blocks, evaluating the importance of each block of components based on historical cost information and the team’s experience of similar products and assigning the target cost to each block of components based on this evaluation.

Tanaka et al. (1993:53) stated that if a target cost is assigned to blocks of components at an early stage in the planning and design process, this generally eliminates new or radical ideas for design of the product. Cooper and Slagmulder (1997a:150) explained that target costs for components can be set only when the product design has reached the stage at which specific components can be identified. Tanaka (1989:52) clarified that the component method is usually applied to new products that are similar in design to previously manufactured products, since the component method is based on historical cost information. For complex, innovative and large scale products, the functional allocation method is more suitable, since it allows designers as much freedom as possible in using their creative talents to design new or revised products within the target cost guideline.

Furthermore, Kato et al. (1995:56) stated that allocating target costs to product characteristics directly satisfy customer requirements, although they found that Toyota and Matsushita, two large Japanese companies, only used the component method. On the contrary, Tanaka (1989:53), Tani et al. (1994:75) and Tanaka et al. (1993:49) found that large Japanese companies using target costing, tend to assign target costs frequently according to the degree of importance of the functional areas, regardless of the historical cost of the components. However, the component method can be combined with functional approach by assigning the target cost to function areas and then assigning each function area to component blocks. But the major difficulty with combined method is determining the relationships between the function areas and the component blocks.
The extent to which target cost is subdivided depends basically on the degree of complexity and novelty of product design. If the product is simple and requires only low-level technological expertise, it may be appropriate to subordinate the target cost to lower level function areas and to components blocks. In this context, other methods such as the assignment to cost items (materials, labor, overhead) and to designers (large group of designers, then smaller group of designers, and finally individual designers), are illustrated by Tanaka et al. (1993:54f.). However, they warn that the more the target cost is subdivided, the greater the restrictions placed on the designers and the less likely that new ideas will emerge.

9.1.2.4.5 Realizing the Target Cost

Once the target cost has been established and decomposed into functions and components, the goal is to close the gap between the current cost and the allowable cost, in order to develop and produce a new product that attains the target cost while meeting all customer requirements (Ansari et al. 1997b:43). In the literature, many studies (e.g. Horvath 1993a, Monden 1995, Cooper and Slagmulder 1997a and Ansari et al.1997b) argued that the key objectives at this stage of the target costing process include: optimize the relationship between materials, parts, and manufacturing processes, minimize costs, focus design efforts on market-driven variables for quality and cost of ownership, link product development with customer desires and to achieving a sustainable competitive advantage, link the product development process so that it assures product quality, and estimate the cost prior to implementation.

Closing the gap through cost reduction is central to the target costing process (Ansari et al. 1997b:42ff. and Cooper and Slagmulder 1997a:126). This is accomplished through cross-functional target costing teams, which analyze the product’s design, raw material requirements, and manufacturing processes to search for cost savings opportunities. The team’s participation early in concept design and development will greatly affect product lifecycle costs. The cross-functional teams employ a variety of management tools and initiatives to help them achieve their objectives.

In the Japanese company model, which is beginning to be emulated by some western companies, the cross-functional teams usually have overall responsibility for the product planning/target costing effort (Cooper and Slagmulder 1997a:130). The emphasis on the team recognizes the high degree of interdependence between marketing and product planning,
design and development, and process technology and manufacturing. A decision at one stage virtually always affects others. The management accountant needs to be involved to provide rapid feedback on the cost implications of the various alternatives and decisions. Making decisions together and taking into consideration the various interrelationships results in both faster and more balanced decisions to attain target cost. The creation of the team is the whole essence of concurrent engineering, which has become popular in many companies in the last few years (Tatikonda and Tatikonda 1994:23). Concurrent engineering is the idea of having product development and manufacturing simultaneously involved in the product development. Traditional processes are more sequential. The target costing team extends the idea of concurrency further - out toward the marketplace, to key suppliers, and to include cost management.

Consistent with the creation of a cross-functional team and the concept of concurrency is the realization that decisions made early in the design process drive product and process costs and, ultimately, the life cycle cost of the product itself (Worthy 1991:49, Kato et al.1995:39, Horvath 1993a:3, Ansari et al 1997b:147). Early product design will influence material choices, number of components, buy versus make decisions, tooling and capital investment requirements, and, ultimately, manufacturing process costs. If design engineers make such decisions in the absence of procurement, process engineers, manufacturing managers, or management accountants, then they risk making decisions without fully appreciating their impact.

It has been estimated that, in many situations, the concept and design phases of the cycle effectively commit a very high percentage of the products’ total costs, even though few costs may have actually been incurred. Costs are actually planned into a product - or, more significantly, managed out - early in the development cycle. It is much more difficult to take significant costs out of a product once it has reached production without major redesign and time delay. Reducing costs through the product design stage is the most critical step in attaining target costs (Ansari et al 1997b:147). The key to achieving desired reductions lies in the answer to one specific question: How does the design of this product affect all costs associated with the product from its inception to its final disposal? Identifying all costs, whether incurred in distribution, selling, warehousing, service, support, or recycling, is
essential as all of these cost elements, which are generated by the different functions, are affected by the design chosen.

Target Costing has been described, as being a largely quantitative process, whereby there are many tools and techniques (e.g. conjoint analysis, quality function deployment, value engineering, cost tables, etc.) that can be used in setting and attaining it. It makes no sense to try to define each of these tools since they are numerous. I have just mentioned and identified them to underscore the fact that they are the most used. However, the fundamental mechanism Japanese manufacturers use to achieve target cost or to reduce costs before production begins, nevertheless, is value engineering (VE) (Monden 1995:217). To Horvath (1993a:19), value engineering is the most important method in the process of attaining the target cost for companies using target costing. Monden and Hamada (1991:18) explained that value engineering was first developed in the USA by GE to reduce the purchased parts costs, however without being linked to target profits or target costs.

Basically, VE starts from given requirements concerning functions and features of the product and tries to find the best technical solution for realizing those requirements under cost considerations. Cooper and Slagmulder (1997a:131) argued that the application of VE begins with the conceptualization of the product and continues through the design until the product is released to manufacturing. Even then the process continues, but under the name value analysis (VA). Ansari et al. (1997b:129) and Cooper and Slagmulder (1997a:132) agree that the difference between the VE and VA is not in the approach taken but in the point at which they occur in the life cycle of the product. VE occurs at the design and development stages for a new product, while VA typically occurs after production has started. Monden (1995:217f.) and Ansari et al. (1997b:129) stated that VE and VA are organized efforts directed at analyzing the functions of products, processes, and services to achieve these functions at the lowest overall cost with no reduction in required performance, reliability, maintainability, quality, safety, recyclability and usability.

VE is used by organizations to increase product functionality and quality while at the same time reducing costs. The scope of VE includes design costs reduction, process improvements and working with suppliers. However, Cooper (1995a:165) stresses that the objective of VE programs in target costing is not to minimize the cost of products but to achieve a specified
level of cost reduction that has been established by the target costing system. The output of VE is a series of improvement plans that raise the value of the target product (Monden 1995:222). Emphasizing functionality and meeting customer requirements within the allowable cost parameters, VE goes beyond the particular styles or configurations of current products to consider the functions that lie at the heart of the product in order to come up with innovative ways to achieve desired functionality with less cost or effort.

Thus, VE is a method or tool for reengineering the functions or purposes of a product or service in order to improve its quality or value and achieve customer satisfaction with the lowest cost. In target costing, VE is one of the keys to effective new product development. Different terms are used, depending on the stage at which the VE activities are performed. According to Sakurai (1996:55), VE activities can be divided into three categories: zero-look VE, first-look VE, and second-look VE (see figure 9.14).

Kato (1993:42) and Sakurai (1996:55) stated that Zero-look VE is used at the product planning stage. This stage opens the door to innovative ideas – to the great benefit of the company. Sakurai (1996:55) indicates to zero-look VE as marketing VE. First-look VE is applied to the development and design stages (Tanaka et al. 1993:58). Here, VE focuses on the shopfloor and the efficiency of manufacturing activities. First-look VE actions are closely related to manufacturability. It is best apply VE at the zero-look stage because pre-production is the most efficient point to reduce costs (Sakurai 1996:56). There is less room for cost
reduction later regardless of whether the process is manufacturing, software design, or office practices design. Many Japanese companies practice zero-look and first-look VE in relation to target costing (Cooper and Slagmulder 1997a:134). Second-look VE is applied to the manufacturing stage. At this point there is less room for improvement because the cost structure has been determined and only incremental improvements in process are possible. Thus, second-look VE is often practiced as a part of kaizen costing (Sakurai 1996:56).

According to Ansari et al. (1997b:129) VE typically is conducted in four stages: feature to function analysis, creative thinking and problem solving, analysis, and idea development. Feature to function analysis is the first stage in VE. In this stage, the functions of the product are identified, described, classified as to their worth, and arrayed by the cost of providing them. The purpose of functional analysis is to determine what function an item performs, what costs, and what it is worth to a customer. Value is typically expressed as degree of importance to a customer, which is determined by the contribution of a function to a product’s feature. Cost is expressed as percentage of total cost devoted to each function. The ratio of degree of importance to percent of cost is called the value index. Functions or components with a value index of less than one are typically prime candidates for value engineering. Functions or component with high value are candidates for enhancement.

The second stage of VE is generating cost reduction ideas for functions or components that have a low value index, which requires creative thinking and brainstorming (Ansari et al.1997b:131). The purpose is to ask what can be reduced, eliminated, combined, substituted, rearranged, or enhanced to provide the same level of functionality from a function or component at less cost. Analysis of the most promising cost reduction ideas is the third stage in VE. Ideas that are most likely to reduce cost are identified for further study. Selected ideas must be technically feasible and acceptable to a customer. Finally, those ideas that meet this test are further developed and incorporated into the product or process design and cataloged in a VE ideas database so they are available for further design efforts (Ansari et al.1997b:131).

Ideally, a company will release the design of the new product for manufacturing when it is satisfied that the estimated achievable cost is equal to the allowable cost. If this not the case, a company has one option: get cost saving from continuous improvement. Thus, the final stage in attaining the target cost is to continue to make product and process improvements that will
reduce costs beyond the point where it is possible through design alone. It includes eliminating waste (scrap, rework, etc.), improving production yield (i.e., getting more production from raw materials), and other such measures. Japanese companies refer to these activities as **kaizen costing** (Ansari et al. 1997b:28). To Monden and Hamada 1991, Horvath 1993a, Monden 1995, Ansari et al. 1997b and Cooper and Slagmulder 1997a), kaizen costing is an important method in the process of attaining the target cost for companies using target costing.

Kaizen costing is a technique that supports the cost reduction process in the manufacturing phase of the existing model of product (Cooper and Slagmulder 1997a:56). The Japanese word "Kaizen" in Kaizen costing may be a somewhat different concept from the English word "improvement." "Kaizen" refers to continuous accumulations of small betterment activities rather than innovative improvement (Monden and Hamada 1991:17). Therefore, "Kaizen costing" includes cost reduction in the manufacturing stage of existing products. Innovative improvement based on new technological innovations is usually introduced in the developing and designing stage (see e.g. Imai 1986).

According to Cooper and Slagmulder (2004:47), there are two types of kaizen costing, product-specific and general. Product-specific kaizen costing is applied under two condition, first when a product is launched above its target cost and second, when an existing product’s profitability is threatened by price reductions. In both cases, cross-functional teams should find ways to reduce costs without altering product functionality. Cooper and Slagmulder (2004:47) stated that general kaizen costing does not focus on individual product but on making the company’s production processes more efficient. In general kaizen costing, management sets cost-reduction goals for production processes and empowers the workforce to find ways to achieve them. General kaizen costing can be particularly effective when it addresses manufacturing processes that are used across several product generations. In such cases, savings achieved during the manufacturing cycle of a particular product could continue long after its withdrawal from the market.

Target costing and Kaizen costing, when linked together, constitute the total cost management system of Japanese companies (Monden and Hamada 1991:17). Kaizen costing is integrated part of the Japanese cost management system, which is directly linked to target costing.
Kaizen costing focuses on decreasing costs in the production phase, whereas target costing is designed to help reach product cost goal determined by the market (see figure 9.15). Horváth and Lamla (1996:335f.) describe the connection between both concepts as follows: Kaizen costing means the complete utilization of cost reduction potentials. This utilization is realized by matching, little by little, innovative leaps that are initiated by target costing with continuous improvement.

![Diagram of Process to production and Cost Management Activity](image)

**Figure 9.15 Target Costing and Kaizen costing (Horváth and Lamla 1996:336)**

However (as shown in Figure 9.15), these two concepts cannot be viewed separately. They need to be seen as the basic elements of cost management. Monden and Hamada (1991) write that target costing and kaizen costing should be inseparable. Both approaches serve the overall goal of orienting a company toward the demands of the market. Yet they differ regarding the application in the various process components of product development and the respective periods of operation. Kaizen is an instrument for realizing a short-term profit goal, whereas target costing is focused on realizing long-term profits. The most important similarity is probably their focus on feed-forward control as opposed to the Western feedback control.

**9.1.2.4.6. Monitoring and Repeating the Target Costing Process**

The target costing process is developed and implemented through multiple stages as discussed in the pervious sections. Cooper and Slagmulder (1997a:186f.) introduced many factors that influences multiple stages of the target costing process such as the competition and competitors behavior, the product strategy, nature and degree of supplier relations, nature and
degree of customer requirements change, etc. Thus, many studies (e.g. Horvath 1993a, Monden 1995, Cooper and Slagmulder 1997a and Ansari et al. 1997b) argued that for the target costing process to work effectively, it is necessary to trace and define many issues such as: how well the objectives of target costing process are being achieved. Are the customers’ requirements being satisfied? Are competitors behaving as expected? If not, what are the implications of their actions? Is the target price still valid? If not, what is the impact on allowable and target cost objectives?

Target costing systems are market driven. A target cost cannot be attained by sacrificing the features customers want, lowering the performance or reliability of a product, or by delaying its introduction in the marketplace. Thus, customer satisfaction considers as a key indicator of the success of target costing (Cooper and Slagmulder 1997a:169f. and Ansari et al. 2003:12). This may require getting feedback from existing and potential customers via surveys, focus groups, and other means. Customer satisfaction surveys should be more frequently done to assess the company product’s standing against competition and to improve on it. In addition, competition and competitors behavior consider an important indicator of the success and benefits of target costing (Cooper and Slagmulder 1997a:169)

The degree and nature of supplier relations play an important role in the success and benefits of target costing. According to Cooper and Slagmulder (1997a:181) three aspects of the supplier-based strategy have significant influence on the success and benefits of target costing. These aspects include the degree of horizontal integration that captures the percentage of the total cost of the company’s products that are sourced externally, the power over suppliers that helps establish the ability of the company to legislate selling prices to its suppliers, and the nature of supplier relations that deals with the degree of cooperation the company can expect from its suppliers and in particular the amount of design and cost information sharing. The suppliers form an important source of cost saving and improvement thus the company should be quite aware of the importance of suppliers and supplier relationship management in the target costing process.

The allowable and target cost figures are aggregated numbers, and may be disaggregated along traditional lines - primary building blocks, subassemblies – or along functional dimensions, ultimately to underlying components (Tanaka et al. 1993 and Ansari et al. 1997b)

In the monitoring target costing process, as the cross-functional team works together, it is
important to track the gains and shortfalls against the target reductions and allowable costs. Tanaka et al. (1993:48f) argued that some companies maintain detailed status boards, aggregating where they stand against major building block or function targets, broken down to individual components. In this way, the team knows at all times where it stands against the objectives and where additional opportunities must be found.

In the monitoring target costing process, maintaining an accurate assessment of current costs is also important, because they serve both as the foundation for the target cost determination, and as a report on how well the allowable costs are being achieved (Kato et al.1995:41, Ansari et al.1997b:56 and Cooper and Slagmulder 1997a:109) For those companies whose cost accounting systems use methodologies that spread large pools of costs across a number of products relatively evenly, or in other ways fail to relate costs to the products that cause them, activity-based costing (ABC) can be particularly effective for both assigning costs to products more accurately, and then tracking actual costs (Sakurai 1996:106 and Ansari et al. 1997b:118). As the definition of the costs to be included in target costing becomes more comprehensive, including shared manufacturing and non-manufacturing costs, the application and benefits to be derived from ABC become greater. The relationship between ABC and target costing will be discussed in the context of the strategic cost management framework in the section 9.1.2.6.

Some authors have suggested that target costing is a static process; once the target cost has been established, it does not change. The study by The Society of Management Accountants of Canada (1999:12) revealed that leading Japanese companies consider target costing to be much more dynamic. Their view is that a product whose price is declining will reach a point where costs can no longer be reduced through kaizen costing. That is the trigger for a new generation product with significantly different characteristics, which can result in a significantly lower allowable cost and, as a result, new profit opportunities. As that new-generation product enters production, kaizen costing techniques are subsequently applied.

According to the study by The Society of Management Accountants of Canada (1999:12), the figure 9.16 which is derived from similar charts from NEC, demonstrates the relationship of product prices over time; the significant cost reductions that can be achieved from one generation of product to the next by using target costing practices; and the continuing (but less
significant) cost reductions that can be realized via kaizen costing. As the effect of kaizen costing begins to flatten, a next generation product is developed, target costed, and introduced. The figure 9.16 shows that Design Cost “A” represents the cost that has been achieved from the target costing process. As time passes, kaizen-costing results in further cost reductions. As the potential for additional cost savings dissipates, a new generation of product, “B,” is developed using target costing to achieve a significant drop in cost. Then, kaizen costing takes effect again, taking further costs out of the second-generation product.

![Figure 9.16 Relating target costing and kaizen costing across two generations of products](image)

In summary, the target costing process consists of four principal stages: first, the establishment of the target cost; second, the team-oriented, value engineering-based cost-reduction efforts during the concept and design stages; third, the application of kaizen costing during the production stage; and finally, the introduction of the next generation product when few additional cost improvements can be achieved. Target costing seeks to anticipate costs before they are incurred, continually improve product and process designs, externally focus the organization on customer requirements and competitive threats, and systematically link an organization to its suppliers, dealers, customers, and recyclers in a cohesive, integrated profit and cost planning system. Target costing is the means to achieve competitive advantage through active management of the unavoidable trade-offs and constraints faced by any organization providing goods and services to the market. Emphasizing proactive, rather than reactive, cost containment, target costing ensures short- and long-term profitability and
success by putting customer needs and functionality first, using them to drive the design, development, manufacture, and provision of products. Target costing redefines the competitive playing field - a challenge that cannot be avoided, only enjoined.

9.1.2.5. Success Factors for Target Costing Implementation

It is important to stress that target costing is not a costing system like full costing, direct costing or activity-based costing (Everaert 1999:34). It is rather a cost management system or even a management system. Target costing can be understood as an open system (Bonzemba and Okona 1998:3), composed of a large number of relations between company functional departments and all the value chain, in which the most important is the analysis and reaction to the environmental changes. This approach considers a more complex set of interactions in explaining system behavior, takes corrective action before actual outcome occur, and recognizes the importance of the need to move to higher standards over time (Ansari et al 1997b:17). Using this approach the organization is able to satisfy the customer needs and wants, and to compete successfully with other enterprises.

The concept of target costing may seem easy to understand and implement. However, the straightforwardness of target costing should not lead to an assumption that implementing target costing process will inevitably lead to the desired results. The key to the success of target costing is the adoption of its underlying philosophy throughout a company (Ansari et al 1997b:17). According to Kato (1993:42), target costing is a combination of many techniques, all reinforced by the target costing philosophy. In Western literature, this aspect may be ignored because of the predominant focus on the processes and techniques of target costing. (Feil et al.2004:16).

Taylor (1997:100ff.) introduced the case of Toyota as an example that shows the importance of management philosophy. For years Toyota in the United States has been offering seminars open to the public, including competitors. In these seminars, the Toyota Production System (TPS) is introduced in detail. Toyota’s approach is three-fold: techniques, systems and philosophy. Even though Toyota’s techniques and systems are explained in great detail and can be copied by competitors, none of them have been able to reach the same degree of efficiency as Toyota (Taylor 1997). As Taylor (1997) stated that adopting TPS means acquiring a different mind set. The philosophy of target costing implementation considers an
important issue. Many factors enabled Japanese companies that adopted target costing to implement it successfully. Thus, it is important to understand Japanese business and cultural factors that help Japanese companies develop and implement target costing successfully (Feil et al. 2004:17ff.). These factors are shown in the figure 9.17.

![Holistic Approach Diagram](image)

**Figure 9.17 The elements of Japanese target costing**

*(Based on information from Feil et al. 2004:17ff.)*

**Top Management Leadership:** Top management support considers an important factor for the implementation of successful target costing. Hasegawa (1994:8) stated that the ability to align all employees with the mindset of the company’s leadership is an important factor for achieving the desired results of target costing. Considering the cross-functional nature of target costing, it is not surprising to see that a top-down approach is a must for the successful implementation of target costing (Kim et al. 1999:11 and Feil et al. 2004:17). In many companies in Japan, top management is strongly behind the initiative of target costing (Sakurai 1996:51). Ansari et al. (1997b:109) and Kim et al. (1999:11) also stated that in Japanese companies, top management is actively involved and supports the target costing efforts. At Toyota, target costing is closely tied to the strategic thrust of the corporation, and progress is closely watched by top management. According to Ansari et al. (1997b:109), Arthur Andersen’s survey of best practices showed that top management performs six important functions relative to target costing:

- Deploy target costing companywide as part of hoshin (policy) deployment - many Japanese companies use hoshin planning or policy deployment as a means of connecting daily activities to strategic goals in general and target costing in particular.
• Support the target cost process by providing resources for training, cost tables, procurement database, and other items.
• Review, approve, and clarify targets.
• Assist with making trade-offs between quality, cost, and time.
• Review strategic supplier plans and establish make or buy policies that recognize market conditions and core competencies.
• Review strategic capacity and investment plans.

Target costing is adopted by many companies in western countries and United States. However, most top management, for example, in the United States, is not actively involved in implementing the target costing process. Ansari et al. (1997b:109) concluded that this may be partly due to the misconception that target costing or design to cost is a finance or engineering function. They said, “it is particularly ironic to see that many companies that have adopted cost competitiveness as a key strategy have yet to integrate target costing as part of this strategic thrust”. Finally, the successful implementation of target costing requires that top management should be actively involved and support the target costing efforts. In addition, target costing should be closely tied to the strategic thrust of the company.

**Team-Orienta...**

The team-orientation is part of the Japanese management philosophy (Albach, 1990). Confucianism, which advocates harmony among members, plays a major role. Another important aspect is the sense of security that individuals have in a group (Feil et al. 2004:17).
In Japan the group always comes before the individual (Alston 1989:165). In the eyes of the Japanese, a task’s complexity cannot be resolved through an individual’s decision. This is also manifested in Japanese communication and decision-making processes. Decisions are made in a group setting. Even though the group leader is the one who ultimately decides, a group’s members are expected to accept the decision as their own (Martin et al. 1992).

The team-orientation of employees is another crucial success factor for target costing process. This team-orientation is a basic part of the Japanese cost management programs. Many studies (e.g. Tanaka et al. 1993, Monden 1995, Ansari et al. 1997b, Cooper and Slagmulder 1997a and Feil et al. 2004) agreed that Japanese companies use the teams in their operations and this team orientation is the critical variable in the success of the target costing process in Japanese companies. Ansari et al. (1997b:98ff.) and Cooper and Slagmulder 1997a:130ff.) argued that the success of Japanese target costing approach is highly dependent upon the right organizational context. A committed, motivated, and managerially aware workforce is critical for success. Because the typical Japanese organizational context consists of cross-functional, self-guided teams that are responsible for achieving specific objectives, the way in which these teams are motivated determines the success of the target costing process. In addition, since successful target costing process must trade off between critical success factors (quality, cost, and time), the team-orientation considers critical.

Commitment to work is one of the factors that influences not only target costing process but also the success of Japanese companies. Over the last twenty years, many studies have emerged about work in Japan. Mouer and Hirosuke (2005:5) argued that much of the literature on Japanese management assumed that the Japanese worker’s commitment to work and to his place of work had been integral to the superior performance of the Japanese economy. They stated that commitment to work was seen as overriding the adverse conditions that many workers had to put up with, including long hours and excessive regimentation. Also, Streib and Ellers (1994) argued that the sense of duty the Japanese feel toward their employer is indicated by a survey that showed that about 80% of Japanese workers believe that their work comes before family. This sense of duty is visible in the readiness of Japanese employees to work long hours and their willingness to have short vacations (Martin et al., 1992). It was commonly argued that Japanese management had worked with and fostered a cultural paradigm that was quite different from the one found in most Western countries.
(Mouer and Hirosuke 2005:5). The assumption was that Japanese culture resulted in workers and managers sharing similar values, which underpinned Japanese work practices and an unusually strong commitment to doing work.

**Mutual trust** between the value chain members has a key role in target costing process (Ansari et al. 1997b:79ff.). For example, if the supplier gives reliable cost information to the main contractor, target-costing efforts can be focused on reasonable and most effective ways (Cooper 1995a:141). In Japanese companies, mutual trust between managers and employees as well as supplier is a critical element in building effective work relationships and implementing target costing process (Ansari et al.1997b, Cooper and Slagmulder 1997a and Feil et al. 2004). Management in Japan is centered on human beings, as Hasegawa (1997) has shown in his study. The main focus is the building of mutual trust between managers and employees as well as suppliers. This mutual trust is supported by explicitly employing factors such as autonomy, participation, cooperation, and elasticity (Ansari et al. 1997b and Hasegawa 1997). The best example of a trust-building measure is the lifetime employment that is common in Japan (Alston 1989:225f). Without well-established mutual trust, employees would not demonstrate life-long loyalty to their company, and top management would not guarantee life-long employment to the employees.

**Management Accounting:** In the structure of Japanese management accounting the behavioral viewpoint can be found (Feil et al. 2004:17). In addition, Japanese management accounting is designed not so much to produce precise information for strategic decisions as to make employees act in accordance with the company’s strategy and to make them think strategically (Hiromoto 1988:22 and Sakurai and Scarbrough 1997:2f.). This goal is pursued by extensive use of non-financial measures and a strict market orientation. Further, Japanese companies make sure that financial information provided by “controlling departments” is communicated quickly and completely among employees, and that employees understand how their own unit’s performance is reflected in the company’s financial results (Hiromoto 1988). Japanese controllers are well-versed in both the practices of cost management and the needs of their internal customers (Alston 1989). Japanese cost accounting also differs significantly from Western cost management (see e.g. Sakurai and Scarbrough 1997 and Monden 2000). Cost reduction has been a major issue and consequently, product costing (e.g., to get more accurate product costs using activity-based costing) plays a less important role in cost accounting. All of these factors are consistent with the target costing philosophy.
**Education:** Companies in Japan are also constantly striving to develop their employees through education, extensive training, and job rotations (Kim et al. 1999:11 and Feil et al. 2004:18). Integral thinking and understanding of other units within a company is made possible by emphasizing a comprehensive education (Alston 1989:203f.). Target costing is characterized by an all-embracing viewpoint that reflects the Japanese process orientation. In addition, there is a special department or unit called target costing department or unit that is responsible for managing the target costing process in some Japanese companies such as at Nippon Denso Corporation (Sakurai 1996:57 and Ansari et al. 1997b:106). Learning in Japan is based on “learning-by-doing.” This leads to continuous change and the realization of the impact one’s actions have on one’s environment (Buggert and Wielpütz 1995).

**Keiretsu:** The Japanese economy is characterized by the existence of a strategic network called a “keiretsu.” (Seidenschwarz 1993:42 and Feil et al. 2004:18) A keiretsu is created among legally separate companies but based on close financial ties or common traditions; there is strong cooperation among the companies (Cooper and Slagmulder 1997a:357). This cooperation integrates suppliers into the target costing process, which is an essential element of the implementation of successful target costing (Ansari et al. 1997b:95). Finally, **information network** is one of the factors that influences not only target costing process but also the success of Japanese companies. Japanese companies have an excellent information network with customers and suppliers, which makes it possible for them to apply a “hands-at-the-market” research method. Seidenschwarz (1993:50) defines this term as a market research method that is characterized by an intensive backflow of information to the product developers on the customer perceptions regarding products currently in the market. This shows that Japanese companies are furnished with information by not only formal market research, but also through intensive cooperation with suppliers and buyers.

**9.1.2.6 Integrating Target Costing and ABC/M in the Context of SCM-Framework**

The holistic overview of strategic cost management is to take a broad focus to include each stage of the product life cycle and to provide accurate product cost information to determine the accurate profit of this product (Kajüter 2002:39). In the context of the suggested framework for strategic cost management, thus, the holistic overview requires integrating the instruments of strategic cost management in order to achieve the desired objectives of the
suggested framework. This section will focus mainly on the target costing and activity based costing and management.

While target costing is a technique that predetermines an ideal product cost to maximize profits across that product’s life cycle, activity-based costing is typically applied to products already in production (Cokins 2002:13). Target costing and ABC/M are used for completely different purposes as Table 9.1 shows. ABC focuses on support costs such as manufacturing overhead, marketing costs, and other corporate overhead in an attempt to assign them to products by trying the assignment more tightly to the activities that lead to spending (Turney 1996, Sakurai 1996, Cooper and Kaplan 1998 and Cokins 2001). Target costing likewise deals with support costs. However, in most companies its main focus historically has been to reduce direct costs (Sakurai 1996:52 and Cooper & Slagmulder 1997a:79). ABC provides cost information that can be used for product costing, cost management, and other management purposes. ABC/M are better techniques for overhead cost management and can improve a company’s performance measurement systems. On the other hand, target costing is a goal-oriented decision technique, or process. Its major focus is to manage the design of products for manufacture. Target costing provides the decision environment in which any relevant information (including ABC information) can be used (Sakurai 1996:107).

<table>
<thead>
<tr>
<th>Tools</th>
<th>Main Purpose</th>
<th>Cost Elements</th>
<th>Emphasis</th>
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</tr>
<tr>
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<tr>
<td>Target costing</td>
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<td>Cost reduction</td>
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Table 9.1 Relationship of ABC, ABM, and target costing (Sakurai 1996:124)

The main goal of ABC is to provide information for variety of purposes, most commonly product profitability analysis for pricing or product mix decisions (Cooper and Kaplan 1998:160ff.). ABC/M are also useful techniques for continuous improvement in that identifying and costing activities can provide powerful information for cost reduction. In fact, ABC provides information for process improvement. The ABC project must have a top-down
commitment to succeed. In contrast to ABC, target costing has little to do with the product costing system. Target costing is a process for strategic cost management. For target costing to be useful for cost reduction, target costing must have a bottom-up commitment to succeed (Sakurai 1996:108). ABC/M systems provide cost information and non-financial information to managers for improving the use of current and anticipated resources (Turney 1996:77f.). While target costing is a tool for changing the nature and magnitude of currently available resources.

Although target costing and ABC/M are used for completely different purposes, there is integration between them as shown in the Figure 9.18. Activity-based costing and management are useful for target costing. Organizations that have successfully implemented target costing, such as Texas Instruments and Toyota, note the importance of cost information in cost reduction initiatives in order to close any remaining gaps between the current cost and the allowable cost (Ansari et al. 1997b and Cooper & Slagmulder 1997a). Key objectives at this stage include: providing improved product cost information, providing improved performance monitoring, and improving understanding of the true cost structure. A useful tool for this cost reduction effort is activity-based costing and management.

Figure 9.18 Integrating target cost and ABC/M (Cokins 2002:14)
The figure 9.18 shows the integration between ABC/M and target costing. The interaction of reductions in direct costs that remain the primary focus of target costing and the cuts in, or improvement of, indirect costs and activities under ABC/M creates an ongoing basis for improvement and development of a competitive cost and profit profile for existing and new products. As shown in the figure 9.18, the start of production signals the beginning of the cost maintenance phase, which emphasizes the stabilization of or continuous improvement in product- and component-level costs. The objective at this stage is to pursue cost reductions relentlessly at every stage of manufacturing to close any remaining gaps between the current cost and the allowable cost.

Achieving cost reduction objectives requires information that identifies the causes of current cost and the potential impact of attacking these cost drivers. ABC/M can be used to increase the understanding of cost items such as manufacturing overhead, marketing, distribution, service and support, and general business overhead. Innes et al. (1994:123), Horváth et al. (1998b:23) and Cokins (2002:13) argued that target costing and ABC/M can be used in combination with each other. Target costing can be used to set the target cost, and after this has been compared with the existing actual cost, ABC/M can be used to reduce the actual cost to meet the required target cost. Target costing is a particularly powerful technique at initial design stage for new product. ABC/M can play a part in the cost management of overhead costs of a new product. To achieve the target cost it is therefore important to manage the overhead costs as well as the materials and labor costs, and ABC/M allow such management of the overheads (Innes et al. 1994, Horváth et al. 1998b and Cokins 2002).

Cokins (2002:14) argued that ABC information is applicable without question during the mature phase of the product’s life cycle, where the work is recurring. Some of ABC information, however, is also useful during the design and development phases. ABC/M are valuable target costing tools because they focus attention on how product design leads to the consumption of various activities and therefore, increases overall costs (Innes et al. 1994:102 and Cokins 2002:16). For instance, material handling is related to the number of unique parts purchased, which is a function of design complexity. Where ABC/M provide inputs to a decision technique for improving the use of current and anticipated resources, target costing applies this information to change the nature and amount of currently available resources.
Ansari et al. (1997b:118f.) argued also that modern cost management methods such as ABC, provide useful data for parts cost, process cost, overhead costs, and other support costs related to a product during the design and development phases. This is the feed-forward link from ABC to new products, and is sometimes referred to as “same-as expect-for” (Cokins 2002:16). The target costing process needs a different type of cost data. Target costing requires underrating design drivers. The type of cost data that target costing needs is significantly different from what most organizations collect routinely. Many organizations continue to have traditional cost systems geared to inventory valuation and financial reporting. The cost information of these systems is geared to production needs. Success of the target costing process depends greatly on the quality cost information an organization collect.

Ansari et al. (1997b:118f.) stated three types of cost data that need to be collected are feature/cost data, attribute/cost data, and function/cost data. Thus, cost systems must collect data on how costs are driven by features, attributes, and functions. Applying ABC for costing the components, processes, and features can provide useful data for parts costs, process costs, and other costs related to a product during the design and development phases.

Some studies (e.g. Innes et al. 1994, Institute of Management Accountants 1998, Horváth et al.1998b and Cokins 2002) stated that at almost every turn, target costing can utilize information available in ABC/M systems to choose the least expensive alternative between designs with equivalent functionality, identify current actual costs, analyze the causes of that cost, and find ways to reduce overall indirect costs by changing the ways products are designed, developed, manufactured, and sold. The study by Institute of Management Accountants (IMA 1998), concluded that using ABC/M in the target costing process provides the following benefits:

- Quantification of costs, both value-added and non-value-added, by activity, cost element, component, and product;
- Identification and estimation of the costs to meet specific customer functionality and quality requirements;
- Analysis of the costs of complexity;
- Measurement of the impact of QFD, DFMA, and VE initiatives on current and projected costs;
- Enhanced ability to take action to reduce overhead costs;
- Support of cost of quality and related analysis, which reflect trade-offs made by
the organization to hit cost targets;

- Sensitivity analysis, which incorporates the underlying behavior of cost and the cost of idle or unused capacity to increase the accuracy of target cost estimates;

and

- Creation of cross-functional, process-oriented costing tools that support brainstorming, concurrent engineering, and kaizen costing efforts.

The study by Institute of Management Accountants (IMA 1998) stated that ABC/M systems were important techniques that supported the target costing process at Caterpillar. In this case, ABC/M systems are applied on a prospective basis to estimate product and process costs. During the early stages of product development, ABC is used to estimate product cost at a general level. This is useful for preliminary evaluation of product feasibility. As product and process definition become more precise, predictive ABM process cost models are applied to estimate the costs of particular functions and components using particular processes. This has been particularly valuable to engineers as they work to reduce product and process cost, improve utilization of current machines and equipment, and eliminate waste and process variation. Finally, target costing combined with ABC/M results in the holistic approach of strategic cost management.

9.1.2.7. Evaluation of Target Costing

In literature, many studies (e.g. Horvath 1993a, Kato 1993, Cooper 1995a, Monden 1995 and 2000, Kato et al. 1995, Sakurai 1996, Ansari et al. 1997b and Cooper and Slagmulder 1997a) assured that the target costing approach has been increasingly introduced and applied to many organizations such as Toyota, Nissan, Sony, Matsushita, Nippon Denso, Canon, NEC, and Olympus and become more popular due to their benefits and their advantages over the conventional western and the cost-plus approach. According to Cooper (1995a:162) the target costing approach outperforms the conventional western and the cost-plus approaches because it provides a specified cost reduction target for everyone in the firm to work toward. In addition, the target costing approach creates a tremendous pressure for cost reduction by providing numeral objectives and the commitment to attain them.

Target costing is future-oriented (Kato et al. 1995:39). It focuses on what products will cost. This proactive concentration on a future product’s cost allows to prevent costs rather than to
reduce them after the fact. In addition, the use of target costing ensures profitability on the short and long term. Worthy (1991:51) explained that products that show up as low-margin or unprofitable are quickly dropped. Similarly, ideas for new products whose profitability projections fail to clear certain hurdle rates usually wither away on the accountant’s spreadsheet. Cooper and Chew (1996:96) and Kato et al. (1995:40) also assured the importance of target costing in ensuring profitability. They stated that if a company cannot meet the target, it cannot launch the product. Target costing supports the management to set the goals of the product (e.g. cost, time, and quality) based on market research and the company’s strategy early in the product development process (Ansari et al. 1997b). Furthermore, target costing enables the management to balance between the different goals of the product.

Target costing can orient the company toward the customer and the marketplace (Horvath 1993a and Ansari et al 1997b). Customer requirements are incorporated in product and process decisions and guide the target costing process. Cooper and Chew (1996:88) explained that target costing drives a product development strategy that focuses the design team on the ultimate customer and on the real opportunity in the market. They call it “commitment to the customers”. If targets cannot be met, the company cannot simply raise the price and launch the product. Cooper and Chew (1995:97) stated that such discipline may be painful to the people who work on a project, but it sends an important message to the organization as a whole: that customers come first and that if the company doesn't create value for them, a competitor will.

Target costing is best performed in cross-functional teams, often with suppliers as team members. Thus, it helps improve supplier relationships by providing an avenue for earlier supplier involvement, clarifying true cost goals, and supporting supplier alliances (Cooper 1995a:141, Ansari et al 1997b:79ff.). Target costing facilitates teamwork by creating a common language and providing a common goal, the target cost, for cross-functional team members to work toward (Weber 1999:39). Target costing also contributes to the new product and new service development effort by maintaining cost visibility, creating a true understanding of the costs of over specifying and using nonstandard materials, understanding cost drivers, and increasing knowledge of supply chain cost structure (Seuring 2002:144ff.). Target costing also assists in internal improvements by creating a benchmark for cost
performance, supporting team involvement, and supply management and supplier involvement in new product and new service development, and for creating greater cost accountability internally and with suppliers.

Target costing approach focuses on the design of products and processes as a key to cost management (Sakurai 1996:45 and Weber 1999:36). By focus on the design, target costing approach manages costs before they are incurred rather than afterward. Target costing starts in the product design stage and aims to influence the future costs of product. Tanaka (1993:10) argued that designers must know how design affects such things as material consumption, yield, machining methods, and line time. By setting a target cost for a future product, all members of the design team consider the impact on the cost while deciding on design alternatives. Cooper (1995a:138) stated that the use of a target costing system prevents design engineers saying: “If we just add this feature, the product will be so much better and only cost a little more.” In addition, the target costing approach ensures simultaneous engineering of products and processes rather than sequential engineering (Ansari et al. 1997b:14). By this way, the cost and time of product development can be reduced through solving the problems earlier in this stage.

Target costing provides the design engineers with a clear, quantitative cost objective. Cooper (1995a:136) argued that target costing differs from the traditional western and cost-plus approaches found in many companies in that the desired cost to manufacture is specified. According to Cooper (1995a), under the traditional western approach the product’s expected profit margin, not its cost, is the dependent variable. Under this approach, the profit margin is determined by subtracting its estimated cost from its anticipated sales price. In this case, the product’s cost is expected, not target, because the product is designed to achieve its functionality and then its cost is determined. Under the cost-plus approach, the product’s expected sales price becomes the dependent variable. This means that the sales price is determined by adding the desired profit margin to the expected cost of the product. Under both approaches product designers have no specified cost objective to achieve. Instead, they are expected to minimize the cost of the product as they design it.

In addition to all the above benefits, in the literature, many studies introduced other benefits and advantages of the target costing approach. All the studies agree that the obvious primary
benefits of target costing are: having the right products, having competitive prices, and making a profit. However, it is not surprising that there are subsidiary benefits of target costing such as: orienting the company toward the marketplace, strategic linking of R&D with the needs of customers, facilitating and supporting cost management in the early design phases of a product, enabling firms to actively manage costs by providing cost targets that can be periodically reviewed, helping the company meet its financial goals, motivating employees through the use of market-based requirements rather than abstract company goals.

Although the target costing approach declares a lot of benefits and advantages over conventional cost management systems, the use of target costing can lead to some undesirable consequences. Most of the undesirable consequences of the target costing approach are behavior-oriented. For example, Kato et al. (1995:50) and Ansari et al. (1997b:169) found that in some companies, overemphasis on design led to longer development times and delayed the product from reaching the market on time. This disadvantage of target costing can be avoided by setting simultaneous targets for quality, cost, and time. The target costing process must make trade-offs between all three targets and not just cost.

In the target costing process, Kato (1993: 42) explained that too much time pressure and long working hours creates job tension and results in management fatigue. Similarly, Kato et al. (1995:50) and Ansari et al. (1997b:169) found that a constant pressure to meet target costs can cause employee burnout and frustration. Also Monden and Hamada (1991:29) concluded that target costing may force unreasonable demands on employees. However, there are some ways to reduce the likelihood of such types of adverse consequences of the target costing process. Ansari et al. (1997b:169f.) argued that ways such as using employee participation in setting targets, creating and managing slack, and focusing on continuous improvement and not radical changes are useful ways to avoid or reduce employee burnout and frustration and motivate and keep behaviors on a desired path.

One of the adverse consequences of target costing is the possible misuse of the technique. Producers might make use of target costing to squeeze the profit margins of suppliers, thereby getting materials at the lowest cost possible. This overemphasis on cost cuts often-blind producer to the real essence of target costing. In this context, Sakurai (1995:28) argued that one of the adverse consequences of target costing is the excessive demands it puts on
subcontractors. Kato et al. (1995:50) stated that as major customers like Toyota pass their cost-reduction demands down to suppliers, the suppliers push their suppliers and employees to do more, some of whom are already doing all they can handle. Worthy (1991:50) called it the battle of intense negotiation between the company and its outside suppliers. To Kato (1993:42) this excessive demand goes hand in hand with a restricted autonomy of the suppliers.

Some studies stated that the overemphasis on the customer and its requirements in the target costing process might lead to market confusion, with too many products, too many options. For example, Kato et al. (1995:50) found that constant attention to the desires of customers causes extreme market segmentation and leads to customer confusion by the large number of different products. Kato (1993:42) argued that the promotion of giddy and capricious buying attitudes of consumers is one of the severe dysfunctional aspects of target costing. Similarly, Ansari et al. (1997b:170) found that the uncritically attention to customer requirements cause “feature creep.” That is additional feature are added on without regard to cost and product models proliferate causing market confusion. However, management accountants can help avoid this by making certain that engineers are aware of the costs of new features and that marketing does not just produce a customer “wish list” (Ansari et al. 1997b:170). In the target costing process, design team and marketing members should be guided to consider cost trade-offs so that features are added only when customers are willing to pay for them.

The use of target costing might cause organizational conflict. One aspect of the organizational conflict is the difficulty to subdivide total target cost and assign it to the individual components (Fisher 1995:58). Worthy (1991:49) called it the battle among departments, because deciding on the component-level target cost means deciding on the effort the different departments will need to do in reducing costs. Ansari et al. (1997b:170) and Kato et al. (1995:49) argued that the traditional focus of target costing is product design while other costs such as marketing or overhead are either exempt from cost targets or are treated as fixed by prior decisions and part of the legacy of the existing cost system. Thus, organizational conflict might also arise when design engineers feel that other parts of the organization are getting a free ride while they try to squeeze every penny out of a product. Ansari et al. (1997b:170) stated that such conflict can be avoided by setting targets for all costs and not just manufacturing costs. In addition, the target costing philosophy can be applied to manage fixed
or legacy costs as well. The philosophy of target costing means that costs are driven by the way products and processes are designed. This philosophy can be adopted to manage all costs by looking at the design of these support functions and processes. However, ABC/M can employ the same design orientation to manage the cost of functions and processes.

Whatever the above-mentioned undesirable consequences of the target costing are, target costing has still been attractive more than most other modern cost management techniques. Obviously, there is no any management method without some weakness or undesirable consequences. However, most studies see that the undesirable consequences of target costing are easy to correct compared with other cost management methods. This makes target costing still attractive despite the abovementioned undesirable consequences.

9.1.3. Life Cycle Costing

9.1.3.1. The Concept of Life Cycle Costing

The history of life cycle costing (LCC) dates back to the 1960s when the US Department of Defense started to assess the long-term cost effects of products when making purchasing decisions (Shields and Young 1991:39, Asiedu and Gu 1998:884 and Lindholm and Suomala 2005a:283). Thus, most of the methodologies developed by the US Department of Defense were only intended for procurement purposes. Despite the long history and potential usefulness of LCC, its use as cost management approach in some companies is quite limited (see e.g. Shields and Young 1991, Artto 1994, Sakurai 1996 and Hansen and Mowen 2000). Challenges in managing and evaluating future costs and dealing with uncertainties regarding different factors affecting life cycle costs may have restricted its use. However, a company should manage and evaluate life cycle costs, understand all relationships of the product lifecycle, and implement actions that take advantage of revenue enhancement and cost reduction opportunities (Hansen and Mowen 2000:505).

In traditional cost management systems, the life cycle of a product includes R&D, planning, design, and manufacturing. Of these, all of the costs that incur through planning, design, and manufacture also appear in traditional product costing (Sakurai 1996:164). However, the focus of traditional cost management is mainly on manufacturing processes. As a result, non-manufacturing costs such as research costs, development costs and service costs are often expensed in the period incurred as period costs (Sakurai 1996:164). In addition, the
organizations that have functional structures where they are separated by departments, individual department managers tend to focus only on their own department costs and give little attention to other costs and issues such as timeliness and quality (Maier and Laib 1997:99). In traditional cost management systems, companies do not show strong interest in many cost items associated with the product life cycle except manufacturing costs. The product life cycle costs do not end when the product has been manufactured. The thinking way of LCC enables the decision makers to analyze and understand the comprehensive view of the product life cycle costs from R&D and planning to disposal (Shields and Young 1991:39 and Sakurai 1996:164).

Strategic cost management emphasizes the importance of an external focus and the need to recognize and exploit both internal and external linkages (Hansen and Mowen 2000:503). LCC is a related approach that builds a conceptual framework that facilitates management’s ability to exploit internal and external linkages. LCC is a way of thinking where the attention is paid to the total costs that occur during a product’s entire life cycle (Booth 1994, Woodward 1997 and Asiedu and Gu 1998). Many studies such as Susman (1989), Shields and Young (1991), Artoo (1994), Coenenberg et al. (1997) and Hansen and Mowen (2000) argued that the total costs can be observed from diverse points of view - for example, from the viewpoint of the product’s supplier or producer or of the product’s user or customer, or even more broadly from the point of view of society. The figure 9.19 shows the actual life cycle costs of a product from the viewpoint of the product’s producer and the product’s user.

The main focus of LCC is not only the costs that the producer will incur over the product life cycle including design, manufacturing, marketing, logistics, and service, but also the costs that customer will incur such as the costs of acquisition, operation, maintenance, shutdowns, and disposal. Sakurai (1996:164) called these costs “the actual life cycle costs of a product”. Similarly, Shield and Young (1991:39) called these costs “whole life cost of the product”. They also stated that whole life cost of the product that includes the producer’s costs and user’s costs should be the primary focus of product life cycle cost management, because purchasers have become more sensitive to increasing costs after the purchase of a product. LCC is an approach within the holistic overview of strategic cost management that focuses on the total costs that occur during a product’s life. The more comprehensive view of the total costs refers to the costs from R&D and planning to disposal as shown in the figure 9.19.
Horngren et al. (2000:439) stated that the terms “cradle-to-grave costing” and “womb-to-tomb costing” convey the sense of fully capturing all costs associated with the product.

In fact, LCC has two distinct dimensions: estimating costs on a whole life cycle basis and managing the costs throughout a product’s life cycle (Woodward 1997 and Lindholm and Suomala 2005a). The focus of this study is on the second dimension. LCC is actually more a way of thinking than merely a costing tool because in addition to the management of costs, it focuses on the long-term performance of products by employing a variety of cost management methods such as target costing and ABC/M (see e.g. Coenenberg et al. 1997, Hansen and Mowen 2000 and Emblemsvåg 2003). The approach of LCC implies that the total costs of a product can be influenced early and that the various cost factors are interrelated. Thus, the holistic overview of strategic cost management requires integrating all viewpoints of LCC. To avoid partial optimization, costs must be managed with regard to the whole.

The basic idea of the LCC concept is to understand and recognize the interaction of the cost items that cumulate among the relevant stakeholders or actors during the different life cycle stages (Lindholm and Suomala 2005a:282). For example, continuing product development can lead to progressive solutions that lower the operation costs or the societal costs derived

<table>
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<tr>
<th>Producer’s Costs</th>
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<td><strong>R&amp;D</strong></td>
<td><strong>Operation</strong></td>
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<td>Planning &amp; design</td>
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<td>Manufacturing</td>
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Figure 9.19 Actual life cycle costs of a product (Sakurai 1996:165)
from pollution of the environment, but on the other hand these solutions will result in higher manufacturing costs as construction requires more expensive components and materials. In addition, the production of more expensive materials can, in turn, have a greater influence on the user’s costs or the societal costs. With this approach, one quickly notes that an extensive and detailed implementation of LCC easily leads to highly diversified and laborious analyses of cause and effect (Lindholm and Suomalä 2005a:283). However, in an individual organization it is possible to adopt a much simpler starting point. The thorough management of the product life cycle costs from the point of view of one actor - the company itself - can by itself expose the true cost structure of the product and reveal several interesting causalities.

Many studies (e.g. Susman 1989, Shields and Young 1991, Arrto 1994, Coenenberg et al. 1997, Hansen and Mowen 2000 and Lindholm and Suomalä 2005a) increasingly emphasize that rapid technological change and shortened life cycles have made LCC critical to organizations. However, the interest in LCC can be expected to increase for many reasons. As the total costs of many products often substantially exceed the initial purchase costs, rational customers would be willing to buy a product that generates the lowest costs in the long run (Barringer and Weber 1996 and Asiedu and Gu 1998). For example, the market for such high technology products as computers, aircrafts, and computer software has increased significantly. For the business planner, a key feature of these products is that they obligate the owner to extraordinarily large operation, maintenance, and/or disposal costs (Sakurai 1996:164). These post-purchase costs will often be many times greater than the purchase cost. For decisions about such products, there is an increasing need to measure and analyze total life costs, including not only manufacturing or purchase costs and marketing costs, but also user costs for operation, maintenance, and disposal. In addition, the trend to outsource also creates a need for both customers and suppliers to get to know the total cost of ownership of a product (Lindholm and Suomalä 2005a:283). In analyzing the long-term cost effects of products or in arriving at make-or-buy decisions, managing total life costs is needed.

9.1.3.2. The Significance and Objectives of Life Cycle Costing

LCC has significance for all actors (e.g. manufacturer and user) during the product life cycle stages. Manufacturers traditionally show interest in manufacturing costs that occur up until the time the product is transferred to the user (Sakurai 1996:166 and Greenwood 2002:123). They have not explicitly shown much concern over the costs that accrue to users after the
products have been transferred to them (Sakurai 1996:166). However, the intensified competition of today’s market along with the advanced of high technology means that the responsibility of the manufacturer no longer ends with production a product that matches stated features and specifications. Tanaka et al. (1993:167), Sakurai (1996:166) and Greenwood (2002:123) argued that to be competitive today, a manufacturer must design a product from the start that improves quality, reliability, and support in order to optimize performance and profitability for the users.

Many studies (e.g. Barringer and Weber 1996, Asiedu and Gu 1998, Rebitzer 2002 and Lindholm and Suomala 2005a) argued that LCC is particularly important for products that create significant cost burdens at discrete points, rather than continuously during the product’s life. Examples of these costs include planning and development costs for a new jet aircraft and decommissioning costs for a nuclear generating facility. Because different types of costs tend to predominate in different phases of the product life cycle, by identifying the timing and nature of significant costs in advance, organizations can develop more effective means of budgeting and managing these costs (Barringer and Weber 1996, Asiedu and Gu 1998 and Lindholm and Suomala 2005a). For example, research and development costs tend to predominate during the product’s planning and development phase, whereas warranty and service costs tend to predominate during the late stages of product maturity when the greatest number of products are in the customers’ hands.

While the primary role of LCC is to support, during the product planning stage, the analysis of the product’s lifetime profitability, LCC information also helps managers and planners manage costs more effectively since it focuses on cost behavior during each unique phase of the product life cycle (Tanaka et al. 1993:166f. and Hansen and Mowen 2000:503ff.). Effective planning and management of the individual elements of product life-cycle costs requires both understanding and recognition of the varying nature of costs during the product life cycle (Lindholm and Suomala 2005a:283f.). Moreover, there is evidence from practice that the failure to recognize the uneven flow of costs during the product life cycle can motivate undesired and inappropriate decision-making (see e.g. Rebitzer 2002 and Lindholm and Suomala 2005a).
The significance of LCC lies in the twofold possibilities, to assess and to manage all costs associated with the life cycle of a product that are directly covered by the any one or more of the actors in the product life cycle (supplier/producer, user/consumer), with complimentary inclusion of externalities that are anticipated to be internalized in the decision-relevant future (Rebitzer and Hunkeler 2003). Therefore, LCC requires planners and managers to systematically identify and estimate the types of costs an organization will incur during the product life cycle and to manage the size of those costs. Many studies (e.g. Shields and Young 1991, Arto 1994, Barringer and Weber 1996, Sakurai 1996, Asiedu and Gu 1998, Hansen and Mowen 2000 and Lindholm and Suomala 2005a) argued that there are four broad purposes for LCC:

- to identify whether the operating profits earned during the product’s active, or manufacturing, phase will cover the costs incurred in the planning and abandonment phases;
- to identify during the planning period significant non-manufacturing costs associated with a given product design (such as warranty or product environmental costs), and to motivate changes to the product design to eliminate or reduce those costs;
- to support cost comparisons among different product designs. For example, one product design might promise lower manufacturing costs but higher warranty costs. By comparing the total product life-cycle costs of alternative product designs, planners can make more informed choices among alternatives; and
- to identify the nature and timing of costs so that they can be effectively planned and managed.

As most concepts, LCC has evolved over time, and today LCC serves many purposes (Barringer and Weber 1996). Although the original intent for LCC was to provide decision support in the design and procurement of major open systems, infrastructure, and so on, now the objective of cost management has grown to incorporate all stages of the product life cycle. It is realized that it is better to eliminate costs before they are incurred instead of trying to cut costs after they are incurred. LCC overcomes many of the shortcomings of traditional cost accounting and can therefore give useful cost insights in cost accounting and management. The LCC message is that the pre-operations phases of a product or service are the most highly leveraged place to affect costs.
LCC is also necessary for the user or customer. Customers are becoming increasingly demanding in terms of reliability and maintainability of products. This places increased emphasis on LCC (Berliner and Brimson 1988:156, Shield and Young 1991:39 and Rebitzer 2002:132). The user of a product measures all the important life cycle costs incurred during the lifetime of the product, typically measuring life cycle costs with a cash flow analysis as part of a capital assets evaluation model (Sakurai 1996:166 Lindholm and Suomala 2005b:4). In the model, cash flow is discounted to its present value so that the user can have a means of making an optimal selection of products or assets. This allows the user to consider the trade-offs between cost elements during the product life phases. For example, a user may choose a higher initial cost in order to secure a future reduction in operation or maintenance costs (Horngren et al. 2000:439).

LCC is also necessary when making decisions concerning operation and maintenance costs incurred during the life of the product. While life cycle cost is usually considered at the planning and design stages of a product, some argue for a change in focus. The increased interest in disposal costs resulting from the advance of technological innovation and the related shorter product life suggests the need for a move from a design-to-cost focus at the design stage to life cycle analysis at R&D stage (Sakurai 1996:166). Many techniques can be applied in LCC such as cost-benefit analysis, cash-flow discounting, sensitivity analysis, probability theory, and other techniques for capital budgeting. These techniques are not new at all, in fact, they are actually nothing more than a combination of techniques to make managers think about the cost of managing products in order to maximize the product’s value (Sakurai 1996:167). The wide range of literature on the field of LCC suggested that to understand what is meant by life cycle cost management, one should understand LCC from viewpoints of producer or manufacturer and user or customer and the relationships between them.

9.1.3.3. Product Life Cycle and Perspectives in Life Cycle Costing

When talking about LCC, some studies discussed issues in the product life cycle in addition to changing user costs. For example, the studies by Susman (1989), Shield and Young (1991) and Czyzewski and Hull (1992) include discussions of the product life cycle when they talk about LCC. Berliner and Brimson (1988) described marketing, engineering, logistic support, and discontinuation of a product as the chief elements of life cycle cost issues. There is some
confusion here because the term product life cycle is used in three different ways in the literature. Under one definition, product life cycle refers to the state of production, sales, and earnings from the time a given product is placed on the market until sales are discontinued - this is the marketing viewpoint of product life cycle (see e.g. Meffert 2000 and Kotler 2003). Product life cycle profit management as suggested by Susman (1989) addresses this meaning (the periods of introduction, growth, maturity, and decline). The more comprehensive view of product life cycle is simply the time a product exists - from conception to abandonment. This is the production viewpoint of product life cycle or the producer-orientated definition of product life cycle. By replacing conception with purchase, we obtain the customer viewpoint of product life cycle or the customer-oriented definition of product life cycle (Hansen and Mowen 2000:503). In LCC this meaning (the production viewpoint and customer viewpoint) is generally used since the costs from R&D and product planning to disposal are the objects of its study.

The three viewpoints of product life cycle create two broad perspectives on LCC: that of the producer and that of the customer (Artto 1994:28f., Sakurai 1996:164 and Hansen and Mowen 2000:503f.). LCC takes into account costs and revenues related to the product during the life cycle. LCC is concerned with optimizing the total costs in the long run by determining and managing them (Taylor 1981 and Woodward 1997). Life cycle costs and revenues can be observed from the viewpoint of the product’s producer or supplier or of the customer or user. The costs and revenues (profitability) of a product throughout the life cycle is the main focus when the viewpoint is that of the product’s producer. Since the term product can refer to either a particular platform, a model or to one sold item (including or excluding related after sales activities), profitability can also be analyzed at different levels.

The profitability analysis of a product life cycle can be associated with determining the profitability of a product model from its development until its withdrawal from the market (Bauer and Fischer 2000). In this case, the focus is often on the development of sales volumes. This is typical in marketing theory, which considers the life-cycle curve that describes sales volume between product introduction and decline (see e.g. Meffert 2000 and Kotler 2003). The figure 9.20 which is adapted from the study by The Society of Management Accountants of Canada (1994) illustrates the general pattern of the marketing view of product life cycle. Also, this figure suggests a typical pattern of product profitability, which is
negative at first, then increases, then is stable, and then falls. This suggests that an important element of LCC is a determination that the product is profitable when all its life cycle costs, including planning costs, development costs, and abandonment costs, are considered. The profitability evaluation is best undertaken using a net present value analysis, which considers the net present value of all the cash flows associated with the project.

![Figure 9.20 The relationship between product and profit life-cycles: marketing viewpoint](image)

(The Society of Management Accountants of Canada 1994)

The pursuit of life cycle profits requires producers think continuously about the product life cycle from both the marketing and production perspectives (Susman 1989). LCC is necessary to provide a better picture of long-term product profitability; to show the effectiveness of life cycle planning; to quantify the cost impact of alternatives chosen during development and design phases; and to manage the product costs (Berliner and Brimson 1988 and Suomala et al. 2005). Product costs that arise during product life cycle stages must be linked to provide a long-term profitability picture and to support key management decisions about product line, mix, and pricing (Berliner and Brimson 1988:141). This becomes critical in environments where product life cycles are short or shrinking, because prices ultimately must recover all costs plus profit.
LCC is motivated by the observation that life cycle costs do not occur uniformly over the product’s lifetime for two reasons. First, different types of costs tend to predominate during each phase of the product life cycle (see Susman 1989, Barringer and Weber1996, Asiedu and Gu 1998 and Lindholm and Suomala 2005a). For example, research and development costs tend to be concentrated in the planning and development phase; investment in plant and facilities, marketing costs, and advertising expenses tend to be highest in the introduction and growth phase; and product service and warranty costs tend to be highest during the decline phase. Second, some types of costs tend to be higher than others (see Arrto 1994, Barringer and Weber 1996, Sakurai 1996, Asiedu and Gu 1998 and Hansen and Mowen 2000). Therefore, if a cost type is concentrated in a particular product phase, that phase will show a high level of costs. The recognition that product life cycle costs have important individual components that can vary in terms of amount and timing has two important decision-making implications:

- Evaluating the profitability of a prospective product requires a systematic identification of each element of the product’s life-cycle cost and an estimate of the magnitude of each (Susman 1989 and Suomala et al. 2005)
- Planning and managing product costs requires not only an understanding of the elements of the product’s life-cycle cost but also the magnitude and timing of each element (Lindholm and Suomala 2005b).

The producer’s perspective of LCC is based on the identifying, analyzing, and managing of each individual product’s costs throughout its life cycle. According to Arrto (1994:29) and Hansen and Mowen (2000:504) the producer’s perspective of LCC defines stages of the product life cycle and the product life cycle costs by changes in the type of activities performed: research and development activities, production activities, and logistical activities. The producer’s perspective of LCC emphasizes the product life cycle costs. These costs refer to all the costs a producer incurs over the life of a single product, including costs for the following: product conception, design, product and process development, production, logistics, marketing, service, and guarantees (Arrto 1994:29 and Hansen and Mowen 2000:504). The producer’s perspective of LCC is illustrated in the figure 9.21. In this case, LCC takes into account costs related to the product during the life cycle. LCC is concerned with optimizing the total costs in the long run by determining and managing them.
Traditionally - looking at the product life cycle costs from the producer’s perspective - it has been claimed that up to 70-80 percent of the product cost that will eventually be incurred is already determined (committed) during the development and design stages of the product life cycle (Shields and Young 1991:39 and Hansen and Mowen 2000:504). This argument is likely to put the emphasis in cost management quite strongly on product development and design. However, Cooper and Slagmulder (2004:45) argued that companies can achieve significant savings during product life cycle even in an environment of products with short life cycles and aggressive cost management focused on product design. Sakurai (1996:168) argued that the most effective strategy for reducing a product’s total life cycle costs is to focus cost reduction efforts on those activities that occur before manufacturing begins. Thus, it is the best policy for manufacturing companies to analyze life cycle cost at the time target costing is applied.

The process of LCC differs between manufacturer and user. In LCC and target costing, both manufacturer and user life cycle costs should be considered. For manufacturing companies, LCC is typically applied at the planning and design stages. In these stages, a company should attempt to build cost and quality into the product. Artto (1994:31) argued that manufacturers’ life cycle cost analysis can provide valuable cost information for target costing. Artto (1994:31) added also that the optimal solution (i.e. assumed profit) is reached by analyzing and managing the product life cycle costs in an iterative manner. The iterative process should be performed before any final manufacturing and investment decisions are made. The most
An important time for managing a product’s costs occurs during the analysis and development stage, even though most of the costs are not incurred until much later. The goal of LCC is to take actions and decisions that cause a product to be planned, designed, marketed, distributed, operated, maintained, and disposed of in a way that promotes the long-term competitive advantage of the company.

From the customer’s perspective, a similar logic of incurred costs and the costs to which one is committed can be applied. After making a purchasing decision, a company will be largely committed to the costs that will later be incurred, for instance, in the form of maintenance, repairs, energy, staff needed, and disposal. Of course, this does not mean that these costs cannot be affected at all during the life cycle of a product. Costs can be managed for example by optimizing maintenance strategy, by educating the individuals that operate the product, or by developing a more efficient way to utilize the product.

On the other hand, it is clear that different product alternatives or technology platforms may cause different costs, and therefore it is essential to practice LCC in the acquisition phase in order to be able to avoid unnecessary under- or over-estimations of total costs or phase-specific costs associated with a product (Artto 1994, Sakurai 1996 and Barringer and Weber 1996). Due to the large amount of after purchase costs in many cases, it is sometimes very difficult to gain a realistic perception of overall costs without a systematic life cycle cost analysis. In line with this, LCC is used for the forecasting of future costs in the acquisition phase of products and for influencing follow-up costs (Asiedu and Gu 1998 and Emblemsvåg 2003).

For the customer or user, LCC is generally a three process for the product or asset acquisition (Sakurai 1996:167). The first step is to clarify the need for the product or asset in question based on consideration of the business environment and the goals of the company. The second step is to purchase the product or asset that matches those needs at the lowest possible lifetime cost. To make this decision the company needs:

- To predict the requirements for the product or asset and the cost of the product or asset
- To quantify the life cycle cost of alternatives products or assets
- To decide upon the best proposal
After the purchase, the third step of LCC is to compare and analyze the actual cost over the lifetime of the product or asset with the target cost.

Customer’s product life cycle costs can be divided into initial costs (costs of planning, initiation and realization: e.g. costs of information-gathering and acquisition price) and follow-up costs - costs of operation and maintenance and disposal costs (Shields and Young 1991:40 and Artto 1994:29). The main aim of LCC is to influence follow-up costs (Fabrycky and Blanchard 1991:27). From a customer’s point of view, such decisions can refer to, for example, alternative products, machines, installations, selection of competition suppliers or the replacement of old installations. If a company takes the customer’s point of view, charging a higher price for a product is possible, as long as the entire life cycle costs for the product are lower or equal to those of the cheaper’ one.

When influencing costs, it is particularly important to identify and assess trade-offs between initial investment and follow-up costs. Higher initial investment can lead to lower subsequent costs: for example, by using environmentally friendly materials for products that increase material costs but lower waste disposal costs at end-of-life by several times more than the initial investment increases. In addition, increased initial investment can be compensated for by lower operation costs: for example, by using energy-saving bulbs instead of conventional ones. The figure 9.22 shows a well-known diagram for balancing optimal life cycle cost among the cost factors of initial investment, operating, and maintenance costs, and disposal costs (Taylor 1981:37 and Burstein 1988:257). This diagram suggests that though in the first option, initial capital investment is small compared to operating and maintenance costs, in the second option, by doubling the amount initially invested, operating and maintenance cost were significantly reduced.

In spite of the wide and varied usefulness of the LCC approach, it is not always advisable to apply life cycle cost analysis, and the applicability of LCC should be assessed in advance by answering the following four questions (Brown and Yanuck 1985:4):

- Does the product or system cause high follow up costs in comparison with the initial costs (e.g. high energy consumption of the system)?
• Does the product or system have a long lifespan? (The longer its lifespan, the more important the follow-up costs and vice versa; the shorter the product’s life span, the more important the initial costs.)

• What is the amount of capital invested in relation to current costs? (The more significant current costs are, the higher the potential for possible trade-offs.)

• Are there significant costs that can potentially be identified and reduced by applying LCC?

![Diagram](image_url)

**Figure 9.22 Trade-offs between initial investment and subsequent costs (Burstein 1988:257)**

The customer’s perspective of LCC emphasizes product performance for a given price (Artto 1994:29, Sakurai 1996:169 and Hansen and Mowen 2000:505). Price refers to the costs of ownership, which include purchase cost, operation costs, maintenance costs, and disposal costs. Thus, total customer satisfaction is affected by both purchase price and post-purchase...
costs. Because customer satisfaction is affected by post-purchase costs, producers also have a vital interest in managing the level of these costs. Shields and Young (1991) and Hansen and Mowen (2000) argued that how producers can exploit the linkage of post-purchase activities with producer activities is a key element of LCC as an approach of product life cycle cost management.

The customer’s perspective of LCC offers insights that can be useful to producers of products (Artto 1994, Sakurai 1996 and Hansen and Mowen 2000). In fact, producers cannot afford to ignore the customer viewpoint. Shields and Young (1991) argued that the holistic approach of life cycle cost management must pay attention to the variety of viewpoints that exist. This observation produces an integrated, comprehensive definition of life cycle cost management. LCC as an approach of product life cycle cost management requires taking actions that cause a product to be designed, developed, produced, marked, distributed, operated, maintained, serviced, and disposed of so that life cycle profits are maximized (Hansen and Mowen 2000). Maximizing life cycle profits means producers must understand and capitalize on the relationships that exist between LCC viewpoints. Once these relationships are understood, then actions can be implemented that take advantages of revenue enhancement and cost reduction opportunities.

**9.1.3.4. Cost Reduction and Revenue Enhancement under Life Cycle Costing**

The above sections underscore the importance of LCC for producers and customers. The producers of products are interested in maximizing profits over the product life cycle (Susman, 1989, Artto 1994, Hansen and Mowen 2000 and Suomala et al. 2005). Revenue enhancement and cost reduction are both important for profit maximization. However, the priorities between revenues and costs will shift over the various stages of the product life cycle (Susman 1989 and Hansen and Mowen 2000). The focus of the customers will be mainly on product performance for a given price. The customers’ sensitivity to performance versus price will vary over the product life cycle. Also, their sensitivity to price versus follow-up costs (costs of operation and maintenance and disposal costs) will vary with the length of the product life cycle. LCC differs from other costing methods because it generally includes revenues as well as costs of the product life cycle (Artto 1994, Hansen and Mowen 2000 and Suomala et al. 2005). The below discussion of cost reduction and revenue enhancement under LCC will be from the perspective of the producer.
Revenue enhancement under LCC. Under LCC, a producer should think continuously about product life cycle from both marketing and production perspectives in order to maximize product life cycle profits. The stages of these two perspectives should be related to each other to achieve this purpose (Hansen and Mowen 2000:505f.). The producer who does not understand and recognize the differences between product life cycle stages and the significance of the costs during product life cycle stages might assume that the best way to maximize the product life cycle profits is to maximize revenues and minimize costs at all times (Susman 1989).

However, minimizing cost and maximizing revenue at every stage of the product life cycle will not necessarily lead to maximizing profits over the entire life of the product. For example, a company that prematurely standardizes its product design during the product’s growth stage in order to quickly lower costs may sacrifice the flexibility it needs in an industry that is still dynamic (Susman 1989). Alternatively, selling a product at a high price to enhance revenue can lead competitors to enter the market and drive prices down. Also, selling a product solely to maintain revenues, regardless of profit margins, can lead to industry overcapacity and price wars.

Many studies (e.g. Susman 1989, Meffert 2000 and Kotler 2003) argued that the producer can take actions at the start of and during the product life cycle to achieve revenue enhancement. During the start-up and growth stages, the product conception plays an important role. The company may introduce a product that is so radically new that it actually creates a new industry. Alternatively the company might follow an innovator in a new industry with a somewhat improved product (Susman 1989). Computer industry is a suitable example for this. Most of the companies follow the lead of major companies totally, or by making incremental improvements in the products. Many manufacturers of computers used to follow the lead of IBM. However, by the end of 1970, Apple company came out with a radically new product of Desk Top Computers. Then the market profile radically changed. While the risk factor is low for a company that follows established product, its profit can not be maximized as the sales space has to be shared with other companies (see Meffert 2000 and Kotler 2003). The risk factor is high for an innovator of a product. Once the product gain acceptance, profitability can also be high.
During start up and growth stages the company should make basic pricing decisions (Hansen and Mowen 2000:507). The primary aim is to cover the cost. This will be more in the case of radically new products since it has to cover high product development costs (Meffert 2000 and Kotler 2003). There can also be monopoly situation, at least for a short time, in the case of developing new products. In emerging industries, the competition between companies is based on product performance than on cost (Proctor 2000:25). A producer can charge high prices, if its long-term strategy is to differentiate itself from competitors by offering more value-added product than from a standardized product (see Susman 1989, Meffert 2000 and Kotler 2003). For example, in Cosmetic industry one manufacturer promises more value than its competitor, like better sheen etc. At times a high price is charged if it is expected that the product will be superseded soon, as in the cost of some medicine manufacturers.

The company may also consider “forward pricing” that is based on penetration prices -that is lower price than the cost as a market penetration strategy and could also be based on economy of scales (Susman 1989). Decision-making regarding this is very difficult since in the start up and growth stage, there is high product and R&D costs, high advertising cost and heavy investment in plant and machinery, etc. and the cash flow will also be negative (Meffert 2000 and Kotler 2003). However, final pricing strategy would be based on assumption of a greater role for the product and significantly enhancing marketing niche. Susman (1989), Meffert (2000:340f.) and Kotler (2003:330f.) argued that companies should consider the start-up and growth stages as periods of investment and calculated risk taking. Only a few companies that dominate their industry prior to introducing a new product are likely to make profits before the growth stage. Many companies will have to wait for the maturity stage to make peak profits. Susman (1989) stated that while return on investment may be low for a time, failure to investment early and adequately may leave a company permanently disadvantaged against its competitors at later product life cycle.

Susman (1989) argued that a company that introduce a new product form or brand in a mature industry will have to pay more attention to price than will a company that introduce a new product in a new or emerging industry. However, this may present no problem for a company that is already a large-scale producer in another geographical region or in another industry and has the cost cutting skills needed to compete in such an industry. A company’s profits usually peak during product-maturity stage, and then begin to level off, depending on company’s
competitive strategy and the structure of the industry (Meffert 2000 and Kotler 2003). There will be a constraint to a certain extent if there is fragmentation in the industry, thus lack of opportunities for companies to gain economies of scale (see Porter 1998a). However, if the manufacturer is able to find special niche, then he can command a premium prices for a high value-added products.

While there is a problem of profit and economy of scales as seen above, companies with a larger market share in a highly concentrated industry would depend heavily on increased sales volume for profit (Susman 1989). The products would be of usually of low-value-added and standardized products. Since the players are not many, they have to compete for the same space and competition will be intense during products-maturity stage (Meffert 2000:341). Market share appears to be positively correlated with return on investment (see Buzzell and Gale 1987). However it is not really necessary that there should be a direct positive correlation between market-share and return-on investment (Susman 1989). There are many examples of companies with low market share but which still earn good profit in their industries, especially in slow-growth industries. Here input costs like R&D costs, inventory cost, advertising cost, etc. is usually low. The converse is also true: that the companies with large market share become less profitable, especially when they compete in segments where the need of new product introduction is high and the cost of auxiliary services and customers support services are also high (Susman 1989). Example is cosmetic industry.

As seen in the product life-cycle approach, the sales of products will decline in course of time due to several reasons like saturation of the market, change in user preference, increased domestic or foreign competition, etc (Meffert 2000:341 and Kotler 2003:336). In some companies, the decline can also be due to technology development. When the technological development is fast, then the decline in sales can be equally fast as in the case of electronic goods and computers. This would require considerable investment in R&D to continuously update the product. However, sales-decline in an industry would not necessarily mean that the company cannot generate reasonable profits (Susman 1989). This is dependent on the relative position of the company in the industry. When a company has got strong market share, it can afford to spend more on product improvements, modernization and advertisements. By lowering prices, it can force big competitors out of the market.
However gaining the market share from competitors is not an easy task after the delivery and maturity stage in case of products where loyalty of the customers is strong. For instance, customers who using perfume or soap normally tend to be brand loyal or where the customers are also knowledgeable about the products and alternative products or where switching costs are high. But the company can still be in market by concentrating on specific segments. Finally, companies can revitalize the sales of some products by continuously improving them, or by finding new users and uses for existing products (Susman 1989). If it is not possible to revitalize the product or maintain that such level, this will lead to product abandonment. Thus, product abandonment is an option that a company might choose after considering whether or not it can revitalize the product or maintain profits at steady-state.

**Cost reduction under LCC.** Under LCC, many studies (e.g. Berliner and Brimson 1988, Susman 1989, Artto 1994, Sakurai 1996, Asiedu and Gu 1998, and Hansen and Mowen 2000) argued that a company can take many actions at each stage of the product life cycle that can impact the costs incurred at that stage and the costs incurred at subsequent stages. The key issue is how far beyond the stage where action is taken should a company look for impacts that reduce product life cycle costs (Susman 1989 and Hansen and Mowen 2000). During early stages (development and design) of the product life cycle, a company can take actions that lower costs in the subsequent stages of the product life cycle as well as lower user’s costs such as operating and maintenance costs. While other actions a company takes may lower the user’s costs at the expense of higher production costs.

For the later case, Susman (1989) argued that the company will get much benefits from reducing the user’s costs when it has to pay a substantial warranty costs and customer service or when the customer or user is willing to pay premium price for products with lower follow-up costs. Brown and Yanuck (1985), Susman (1989), and Artto (1994) stated that the focus of the customer on reducing life cycle costs will increase when the customer is knowledgeable about the product to shift preference from product performance to price. This is likely to happen when the product is in the mature stage. Also, the customer will show increased interest in reducing life cycle costs when the follow-up costs are high relative to acquisition cost. In the case where the consumable life of the product is short and the follow-up costs are low, the customer and the producer will likely have much interest in decisions that affect such
costs. The interest will be proportional to the ratio of operating and support costs to acquisition costs.

Shields and Young (1991:42), Artto (1994:28f.), Sakurai (1996:168), and Hansen and Mowen (2000:507) argued that cost reduction is the emphasis of LCC. The most effective strategy for reducing a product’s total life cycle costs should clearly recognize that actions taken in the early stages of the production life cycle can lower costs for later production and consumption stages (Shields and Young 1991:42 and Hansen and Mowen 2000:507). During the product conception stage, the company should determine how customers consider various product attributes such as product performance, features, and price (Susman 1989). A company can treat low operating and maintenance costs or disposal costs as another product attribute that the customer weighs against acquisition costs. Attributes such as low follow-up have to be designed into the product at the conception stage. Susman (1989) argued also that the cost of designing such attributes is not always free. For example, increased product durability may require expensive components and materials, increased reliability may require redundant parts, increased reparability may require a design that simplifies part replacement, but all these actions increase product costs. Thus, the company should attempt to achieve a trade-off between achieving preferable attributes and an acceptable price, depending on the consumer’s ranking of attributes; which is likely to be less certain during the start up and growth stages.

Since the 70-80 percent of the product life cycle costs are determined during the development and design stages, it makes sense to emphasize management of activities during this phase of a product existence (Shields and Young 1991, Artto 1994, Sakurai 1996, Asiedu and Gu 1998, and Hansen and Mowen 2000). A company should invest more in pre-production assets and dedicate more resources to activities in the early phase of the product life cycle to reduce production, marketing, and post-purchase costs. In addition, product design and process design provide multiple opportunities for cost reduction. Susman (1989) argued that process innovation reduces costs by modifying the way in which products are produced. This is true in engineering industries. While standardization can reduce the cost, it would also have the negative effect of discouraging innovation. Innovation could reduce the cost in longer runs, so right trade-off has to be achieved between them.
In the literature (see e.g. Susman 1989, Shields and Young 1991, and Hansen and Mowen 2000), other approaches can be used to reduce costs such as advanced manufacturing technology, shared technology, design for manufacture and assembly, design to lower logistical cost and design to reduce post-purchase costs which includes customer time involved in maintenance, repair, and disposal. For these approaches to be successful, managers of producing companies must have a good understanding of activities, cost drivers, and how the activities interact. In addition, designers and managers should understand and recognize the interaction among design, manufacturing, logistical, and post-purchase activities. Some designs may reduce post-purchase costs and increase manufacturing costs. Other designs may simultaneously reduce production, logistical, and post-purchase costs.

The approach of LCC implies that the total costs of a product can be influenced during the development and design stages and the best policy for manufacturing companies to analyze life cycle cost at the time target costing is applied (Artto 1994 and Sakurai 1996). However, Susman (1989) stated that cost reduction in production stage can be achieved by using advanced manufacturing technologies like computer aided manufacturing, computer aided design, computer aided engineering, manufacturing resource planning and computer aided process planning, etc. Using advanced techniques can reduce cost by having less inventory, less floor space, shorter throughput time and higher quality. Advanced manufacturing technologies also gives increased flexibility by giving lower set up time and higher utilization factors.

Moreover, cost reduction in production stage can be achieved by many methods. Cost reduction can result from economies of scale (dedicated technology - standard parts, processes, and products - high volume/experience curve), economies of scope (flexible technology - focused factories - elimination of changeovers), and activity and cost driver analysis (elimination of non-value-adding activities - reducing of value-adding cost drivers) (Susman 1989 and Shields and Young 1991). In addition, product cost can also be reduced by scientifically matching capacity of production to the demand of the products so that the excess capacity and excess storage can be avoided. Finally, the logistical support costs (e.g. cost of storing finished goods, delivering the product to the customer, installing the product, training customer in using the product, warranty, product servicing, etc.) that are incurred at the last
stage of the production life cycle may be reduced by decisions made during any of the previous production life cycle stages

9.1.3.5. Regaining Competitive Advantage with Life Cycle Costing

Markets and customers analyses consider the starting point and the primary focus of product design and production planning. In a market analysis, three dimensions should be taken into account when viewing the customer’s product selection criteria (Artto 1994:28):

- Product quality (or product performance)
- Time-related factors such as: delivery or availability of the product and associated service or support, and length of life (after-purchase service and service cost are strongly associated with the length of economic product life)
- Purchase price

Figure 9.23 shows these three dimensions. Artto (1994:28f.) argued that LCC is a way to take all three of the criteria that customers use in selection a product into account. In addition to the management of costs, LCC focuses on the long-term performance of products (Shields and Young 1991, Artto 1994, Sakurai 1996, Asiedu and Gu 1998, and Hansen and Mowen 2000). Thus, LCC requires determining the appropriate targets of product quality, time-related factors, and price. Product design and development criteria should derive from the customer’s product selection criteria of quality, time-related factors, and price, all of which are considered in the customer life cycle costs analysis. According to the customer needs, a company determines that a product with certain characteristics (in terms of performance, quality, delivery, product life, and price) ought to be manufactured and marketed.

![Figure 9.23 Customer’s product selection criteria (Artto 1994:29)](image-url)
Successful application of LCC can provide companies with competitive advantages through achieving the previous criteria that customers use in selecting a product. Drury (2000) argued that LCC involves understanding and managing the total costs of a product incurred throughout its life cycle. One of the purposes of LCC is to reduce the costs that customers incur after they have bought the product. The lower the after-sale cost, the stronger the competitive advantage of a company. Sakurai (1996:176) stated that companies that produce and sell products of high value with superior quality satisfy their customers, and as a result, are able to dominate the market. The figure 9.24 shows how LCC can provide companies with competitive advantages. It illustrates that the life cycle costs are related to cost, quality, and service, and ultimately are linked with customer satisfaction.

Shields and Young (1991:44) argued that the goal of effective product life cycle cost management is to make decisions and to take actions during the product life cycle that cause a product to be designed, manufactured, marketed, distributed, operated, maintained, serviced, and disposed of in a way that creates and increases long-term competitive advantage for the company. This goal can be achieved by determining and balancing the critical features of the product, including its whole life cost (the producer’s costs and user’s costs), method of delivery, innovativeness, and quality. Shields and Young (1991:44f) stated that the
dimensions of quality according to Garvin (1987:104ff.) are: performance, features, reliability, conformance, durability, serviceability, aesthetics, and perceived quality.

Similarly, Sakurai (1996:176) explained that under the approach of LCC and the thinking way of life cycle, high quality product and superior service are needed to satisfy a customer’s needs. He stated that high quality means a safe product with superior features, performance, and reliability. The product must be delivered on time, with good service and suitable follow-up. When application of LCC can achieve these requirements, and can provide not only a low manufacturing cost but also low operating, maintenance, and disposal costs, then LCC can provide a company with competitive advantage.

9.1.3.6. Integrated Cost Management under Life Cycle Costing

In the literature, many instruments of cost management are analyzed and discussed. Most eminent among these instruments are life cycle costing, target costing and activity-based costing and management. The general features of these instruments are to provide accurate product cost information to determine the accurate profit of this product and to emphasize on intermediate or long-term cost management (Ewert and Ernst 1997:3 and Kajüter 2002:39). They can accomplish this by emphasizing the importance of an external focus and the need to recognize and exploit both internal and external linkages (Hansen and Mowen 2000). Target costing and activity-based costing and management can be applied together under life cycle costing and can be seen as distinctive representation of strategic cost management.

Though target costing and life cycle costing often are analyzed and discussed separately, there exists a general consent in the literature that these instruments or methods must not be seen as independent entities (see e.g. Artto 1994, Sakurai 1996, Coenenberg et al. 1997, Ansari et al. 1997, Hansen and Mowen 2000 and Cooper and Slagmulder 2004). These authors claim that a company can only achieve the goal of a successful long-term and market-oriented cost management, if it integrates various cost management-instruments such as life cycle costing and target costing into one coherent concept. For example, in Olympus Optical’s cost-management program, Cooper and Slagmulder (2004:50) explained that integration of cost management-instruments provides additional savings above and beyond those associated with the individual techniques.
Taken together, target costing and life cycle costing can be seen as a holistic approach of strategic cost management that takes a broad focus to include all stages of the product life cycle from the R&D and planning to disposal. Some studies (e.g. Brausch 1994, Sakurai 1996, Ansari et al. 1997, Kim et al. 1999:4 and Feil et al. 2004) stated that target costing is life cycle orientation. Although target costing focuses on managing costs at the development and design stages of the product life cycle, it considers all the costs of the product over its life cycle such as purchase price, operating costs, maintenance costs and disposal costs.

Moreover, Berliner and Brimson (1988:140), Tanaka et al. (1993:166), Artto (1994:31), Sakurai (1996:168), and Hansen and Mowen (2000:509) argued that the most effective decisions and actions for managing the product life cycle costs are to focus the cost management efforts on the development and design stages. Thus, the best policy for analyzing and managing the product life cycle costs is at the time where the target costing is applied. This does not mean that the cost reduction efforts do not continue to later stages of the product life cycle. As discussed previously, many decisions and actions can be taken to reduce the product life cycle costs beyond the design and development stages.

Artto (1994:32) concluded that target costing and life cycle costing help to decrease the production cost of a product throughout its life cycle, from design conception through withdrawal from the market. Cooper and Slagmulder (2004:50f.) argued that integrated cost management provides many benefits for companies. In the case of Olympus Optical, they found out that there are three major benefits of integrated cost management such as target costing during the product life cycle. First, it leads to reduce total costs throughout the product life cycle. Not only do products cost less at launch, but the ongoing activities also ensure that they have steadily decreasing costs all the way through to discontinuance. Second, Olympus' experience has shown that more products are launched on time. Without an integrated program, a greater number of product launches would have to be delayed to bring their costs in line with their selling prices. Finally, fewer product introductions are cancelled. The tight discipline of target costing with its emphasis on target prices forces the design process to be cost sensitive from the very beginning.

The merging of life cycle costing and ABC is not a revolutionary concept. Consideration of all costs, from the introduction phases to product maturity, can allow for the development of
better design methods, production methodologies, marketing strategies, and disposal options (Kreuze and Newell 1994:39). The combination of ABC and life cycle costing can provide management with many significant advantages. Cokins (2002:14) argued that during the mature phase of the product life cycle, ABC information is applicable without question. As discussed previously, ABC/M systems provide many advantages that are significant for LCC such as enhanced product cost accuracy, more comprehensive cost information for performance measurement, more relevant data for management’s decision-making, providing a model prospect on value-adding organizational transactions and activities, improving visibility of activities and cost transparency, understanding, analyzing and improving business processes, etc.

ABC information is also useful during the design and development phases of the product life cycle. ABC/M systems are significant for LCC because they focus attention on how product design leads to the consumption of various activities and therefore, increases overall costs. Many studies (e.g. Innes et al. 1994, Turney 1996, and Cokins 2002) argued that ABC/M application is guiding product designs for lower costs. Moreover, ABC as costing system works under the principle that costs are driven by activities, thus, applying ABC for costing the activities of the product life cycle can provide LCC the means to estimate life cycle costs accurately. The combination of ABC and life cycle costing can provide management with accurate product cost information and therefore a realistic understanding of profitability. Finally, to attain those benefits, a company should develop and implement integrated cost management such as target costing, life cycle costing, and activity-based costing and management successfully. This requires many factors such as top management support, commitment to work, cross-functional teams, employee education and training, etc.

9.1.3.7. Evaluation of Life Cycle Costing

Just like any other cost management approach, LCC too has its advantages and disadvantages. Some of the benefits of LCC as cost management approach are summarized as follows:

- LCC enables decisions makers to analyze and understand the comprehensive view of the product life cycle costs from R&D and planning to disposal (Shields and Young 1991 and Sakurai 1996).
- LCC emphasizes the importance of an external focus (customer) and exploits both internal and external linkages in the value chain (Hansen and Mowen 2000).
LCC integrates all viewpoints (e.g. the customer and producer) and thus it leads to avoid partial optimization of the product life cycle costs (Sakurai 1996, Hansen and Mowen 2000 and Lindholm and Suomala 2005a).

LCC supports the profitability analysis of the product life cycle (Berliner and Brimson 1988) and helps managers to manage costs more effectively because it focuses on cost behavior during each phase of the product life cycle (Tanaka et al. 1993 and Hansen and Mowen 2000).

Successful application of LCC provides a company with competitive advantage (Shields and Young 1991 and Sakurai 1996).

Although LCC declares a lot of benefits and advantages as an approach of cost management, there are also some drawbacks and difficulties for implementation and application of the LCC approach to organizations. Dhillon (1989:42) stated that the drawbacks of LCC are: costly, time consuming, accuracy of data is doubtful, and obtaining data for analysis are a trying task. Sakurai (1996:182) argued that application of the approach of LCC has two major areas of problems. First, problem with the companies themselves; the managers and employees are very little interest in, or understand of LCC. Second, problems belong to LCC, for example, it is difficult to compute user costs such as operating, maintenance, and disposal costs. In addition to these difficulties, implementing LCC will take much time and effort, evaluating the results will also take time.

In their study, Lindholm and Suomala (2005a: 289) found out that most of problems seem to be connected with the application of LCC were, for example, the long life cycles of products were seen as making life cycle costing difficult, existence of the factors of uncertainty, LCC is not regarded as important, and the unfamiliarity of the concept. Götze (2004:308f.) argued that LCC enables management to analyze and manage the product life cycle costs and to enhance the product life cycle revenues, however, LCC has also some problems. They stated that the problems of LCC are: the relevant data about the whole life cycle, the problem of the overhead costs, the long life cycles of products, the problem of the complexity, existence of the factors of uncertainty and effects of the external factors (e.g. environmental requirements). Overall, the limited use of LCC as cost management approach results from that LCC might be primarily associated with capital budgeting and the financial assessment of investment.
alternatives rather than be perceived as part of continuous long-term cost and profitability management (Lindholm and Suomala 2005a: 289).

However, Dhillon (1989:42f.) and Shields and Young (1991:48ff.) argued that there are a number of important points associated with LCC that help a company to develop and implement LCC as an approach of cost management successfully. Some of those are given below:

- The structure and the process of a company must create a human integrated enterprise.
- Long-term success with consumers requires low expected whole life costs - not only low production costs.
- Use only the whole life costs of a product that are relevant to a particular decision.
- Invest more in pre-manufacturing assets and in people skills to increase the probability of low cost, higher quality and innovation.
- Use more resources in the early phases of a product life cycle.
- Target costing is the key to establishing cost goals for a product.
- Cost reduction, not cost control.
- Performance evaluation and compensation systems should reinforce a whole life cycle cost perspective.
- All sources of organizational resistance to product life cycle cost management must be dealt with in implementing a culture of cost consciousness and continuous improvement.
- Continuous education.
- A cost analyst with excellent knowledge and experience may compensate for various data base difficulties.
- The management plays an important role in making the LCC effort worthwhile.
- The risk management is the essence of LCC.

9.1.4. Benchmarking

9.1.4.1. A Brief History of Benchmarking

The concept of benchmarking is not new (see e.g. Camp 1989, Bendell et al. 1993 and Zairi and Leonard 1994). It has been with us since time began - since the first day we decided to look at what others do in order to learn how to improve our own capability. Since then, the concept has taken on a number shapes. The philosophy of benchmarking concept is based on
the advice that Sun Tzu (500 BC) offered to Chinese warlords. That is, “if you know your enemy and know yourself, you need not fear the results of a hundred battles” (Camp 1989:253 and Zairi and Leonard 1994:23). This means that if the company knows itself and its competitors, it can take steps to ensure its competitive position is maintained. On the other hand, if competitors are believed to be particularly strong, it is important to take action. Battles could be over both internal and external barriers affecting the success of the company and its competitiveness in the marketplace. Camp (1989) and Zairi and Leonard (1994) stated also that origins of the benchmarking concept can be traced to the Japanese word *dantotsu*, which literally means striving to be the best of the best. This word captures the philosophy of benchmarking. Camp (1989:3) pointed out that “We in America have no such word, perhaps because we always assumed we were the best.” World competition events have smashed that notion forever.

With regard to the development of benchmarking, it is believed that Japanese businesses began benchmarking studies in the 1950s by visiting many companies around the world to absorb ideas that they could adopt, adapt and improve upon. They investigated Western products and processes in order to build superior alternatives at a lower cost (Bendell et al. 1993). With reference to the chronological order presented by (Cook 1995) for the systematic development of benchmarking, benchmarking was first applied during the 1950s to measure business performance in terms of cost/sales and investment ratios. This stimulated businesses to identify their own strengths and weaknesses by comparing them with those of their counterparts within the industry. However, it was unable to provide alternatives as to how further performance improvements could be achieved.

However, the modern concept gained prominence when it was used by Xerox Corporation in the response to the competitive threat it faced from the Japanese companies in the 1970s (Zairi and Leonard 1994:24, Codling 1995:3 Andersen and Pettersen 1996:5, Götze 2004:311). Xerox was the largest manufacturer of copiers in the world. However, Xerox lost market share as the competitors were making better copiers, selling them for less, and making a good profit (Leibfried and McNair 1994:117 and Zairi 1998:5). This prompted the company to directly compare itself with its competitors to determine what it could do to increase productivity while decreasing costs. Xerox began to compare itself directly with this new competition in terms of unit manufacturing costs, manufacturing methodologies, time to
market, and so on, to understand what had to be done in order to stay in business (Zairi and Leonard 1994:24 and Codling 1995:3). Xerox even examined L.L. Bean’s distribution methods to see what it could adapt (Götze 2004:311). The improvement opportunities that where identified and put into practice resulted in a turnaround for Xerox’s fortunes and led to best practice benchmarking becoming a center part of its business strategy.

A few other companies began to follow Xerox’s lead in the early and mid-1980s, but by the end of the decade the benchmarking movement had been supercharged by many developments (see e.g. Bendell et al. 1993, Zairi and Leonard 1994 and Coers et al. 2001). For example, the Malcolm Baldrige National Quality Award can be credited with accelerating the application of benchmarking practices by American organizations since its introduction in the mid-1980s (Codling 1995:3 and Coers et al. 2001:16). The award’s criteria emphasized documentation of superior standing through external comparison, with candidates required to demonstrate how their quality practices and results compared with other “world-class” or “best-in-class” organizations (see e.g. Bendell et al. 1993, Zairi and Leonard 1994 and Zairi 1996). Companies that aspired to be recognized for their excellence were encouraged to benchmark their performance.

In addition, many studies (e.g. Bendell et al. 1993, Zairi and Leonard 1994, Codling 1995, Andersen and Pettersen 1996 and Coers et al. 2001) argued that the applications and studies of benchmarking have increased tremendously since 1989 when the first textbook: (Benchmarking: The Search for Industry Best Practices that Lead to Superior Performance) published by Camp appeared. Coinciding with the book’s release, Xerox Corporation was named a 1989 Baldrige Award winner, spurring widespread interest in Xerox practices in general and benchmarking, in particular. By the early 1990s, a European Quality Award has been developed and benchmarking has also a popular method among European companies.

9.1.4.2. The Concept and Characteristics of Benchmarking

When defining benchmarking, it may be useful to understand the basis of the term. The term benchmarking evolved from the surveyor’s benchmark, a reference point in determining position in topographical surveys and tidal observations (Andersen and Pettersen 1996:3). In a more general sense, a benchmark is a sighting point from which measurements can be made
or a standard against which others could be measured. As used in its many applications, the benchmarking concept has evolved well beyond a simple reference point.

Benchmarking has established its position as a tool to improve organization’s performance and competitiveness in business life (Andersen and Pettersen 1996:4 and Kyrö and Finland 2003:210). Benchmarking has also extended its scope from large companies to small businesses and public sectors (see e.g. Ball 2000 and McAdam and Kelly 2002). Benchmarking definitions have mainly been derived from experiences in manufacturing. There are slight deviations in definitions as both managers and academics tend to create their own definitions according to their perceptions and applications of the technique and philosophy (Fernandez et al. 2000). The words in italic are especially significant in the following examples of benchmarking definitions.

For example, the most widely accepted definition of benchmarking is by Xerox and Camp at the end of the 1980s, which is “the continuous process of measuring our products, services, and practices against the toughest competitors or those companies recognized as industry leaders (Camp1989:10). Benchmarking has also been defined by Camp (1989:12) simply as “the search for industry best practices that lead to superior performance”, while Spendolini (1992) expanded it saying that “benchmarking is a continuous, systematic process for evaluating the products, services, and work processes of organizations that are recognized as representing best practices for the purpose of organizational improvement”.

As many organizations have tried to become more competitive, benchmarking has evolved as another available tool for management. According to Bhutta and Huq (1999:255) “benchmarking is first and foremost a tool for improvement, achieved through comparison with other organizations recognized as the best within the area”. On the other hand, Ahmed and Rafiq (1998:228) stated that the central essence of benchmarking is to learn how to improve business activity, processes, and management. Similarly, Andersen and Pettersen (1996:4) defined benchmarking as “the process of continuously measuring and comparing one’s business processes against comparable processes in leading organizations to obtain information that will help the organization identify and implement improvement”. They argued that the purpose of benchmarking is not only comparing for the sake of evaluation, but also learning for achieving improvements.
The American Productivity and Quality Center has contributed to the definition of benchmarking by stating that “benchmarking is systematic and continuous measurement process: a process of continuously measuring and comparing an organization’s business processes against process leaders anywhere in the world to gain information which will help the organization to take action to improve its performance” (cited in Watson 1993:3). Similarly, Vaziri (1992) stated that benchmarking is “a continuous process comparing an organization’s performance against that of the best in the industry considering critical consumer needs and determining what should be improved”.

In addition, Watson (1993:2) argued that benchmarking should be a process of adaptation, not adoption. It is not just a question of copying what others are doing. Benchmarking is more than just copying. Watson (1993:2) stated that benchmarking is “a continuous search for and application of significantly better practices that lead to superior competitive performance”. Geber (1990:36) focused on the importance of looking at best practice in his definition of benchmarking. He defined benchmarking as “a process of finding the world-class examples of a product, service or operational system and then adjusting your products, services or systems to meet or beat those standards”. Cook (1995:13) focused on the best practices, learning from other, external focus and improvement in his definition of benchmarking as follows: “the process of identifying, understanding, and adapting outstanding practices from within the same organization or from other businesses to help improve performance. This involves a process of comparing practices and procedures to those of the best to identify ways in which an organization (or organizations) can make improvement. Thus new standards and goals can be set which, in turn, will help better satisfy the customer’s requirements for quality, cost, product and service.”

Although different authors have defined benchmarking in different ways, there are common characteristics of the benchmarking concept. For example, benchmarking is based on the theme “see what others companies do and try to improve upon that.” (Watson 1993:2, Andersen and Pettersen 1996:4, Bhutta and Huq 1999:255 and Götze 2004:312) Therefore, this implies some kind of measurement, which can be accomplished in two forms: internal and external. Both internal and external practices are compared and a statement of significant differences is prepared to identify the gap that should be filled. In addition, Benchmarking can be applied to all facets of a business; it includes products, services, processes, structures and
methods (Hoffjan 1997:348 and Ahmed and Rafiq 1998:228). Benchmarking goes beyond the traditional competitor analysis in the form of identifying strengths and weaknesses and includes clear understanding of how the best practices are used (Götze 2004:312f.)

Furthermore, benchmarking is not aimed solely at direct product competitors but those organizations and businesses that are recognized as best or industry leaders (Camp 1989:10, Geber 1990:36 and Cook 1995:13). Benchmarking is a continuous process and not just one-shot action (Camp 1989:10, Vaziri 1992, Watson 1993:2, Hoffjan 1997:347, Ahmed and Rafiq 1998:228, and Götze 2004:312). It is continuous because industry practices constantly change and a continuous monitoring of these practices is required to bring suitable change in the organization. Götze (2004:312) stated that benchmarking is customer, competition and market oriented. The process of analysis of business processes, products, services, etc. often takes place under the point of view of the customer satisfaction and including the practices from competitors or other companies. The objective is to improve organization’s performance and competitiveness in the marketplace.

The benchmarking process contains mostly an intensive information exchange, which presupposes a partnership relationship between the benchmarking company and the comparison company; therefore benchmarking may require establishing a specific form of cooperation and collaboration between companies (Götze 2004:312). Moreover, benchmarking is not only for the sake of evaluation, but learning for achieving changing and improvement (Cook 1995:13 and Andersen and Pettersen 1996:4). Achieving parity against the best in the industry may not always guarantee success. The benchmarking goal should be to analyze one’s performance against the best in the world for the output being benchmarked. This may be with a non-competitor organization outside one’s industry. Finally, benchmarking is not some left-hand task that one heirs a consultant to do. It should be done according to a structured process, where one self harvests the learning effects.

9.1.4.3. Types of Benchmarking

Benchmarking can be carried out in a number of different types. However, there are three criteria for the systematization of the types of benchmarking (Götze 2004:313). First, objects (compare what?): different types of benchmarking can be defined based on what is compared. Second, different types of benchmarking can be defined based on the objective criterion.
Finally, the benchmarking partner (compare against whom?): different types of benchmarking can be defined based on whom it is comparing against. The figure 9.25 shows the types of benchmarking.

Different types of benchmarking can be defined based on the objects of benchmarking (what is being compared?). Basically, the objects of benchmarking are products, services, processes, methods and structures. For example, product benchmarking that concentrates on product design evolutions and manufacturing and assembly methods (Wagener2006:10). Benchmarking is different than reverse engineering, which is the systematic dismantling of a product to understand what technology is used and how it is made for the purpose of replication. However, the “tear-down” of a product without the intent of replication is frequently used as part of product benchmarking (Magrab 1997:8). Process benchmarking is used when the focus is on the value chain (Karlof and Östbloom 1994:59). In addition to products and processes, the objects of benchmarking can be methods, i.e. certain procedures, and structures.

<table>
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<tr>
<th>Types of benchmarking</th>
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<tr>
<td><strong>Parameter</strong></td>
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<td><strong>Forming of the parameter</strong></td>
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<td><strong>Object</strong></td>
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<tr>
<td>Products and services</td>
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<td>Processes (process benchmarking)</td>
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<td>Methods</td>
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<td>Structures</td>
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<tr>
<td>(On different levels and with varying complexity)</td>
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<tr>
<td><strong>Objective criterions</strong></td>
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<td>Cost (Cost Benchmarking)</td>
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<td>Quality</td>
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<tr>
<td>Customer Satisfaction</td>
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<td>Time</td>
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<td><strong>Benchmarking partner</strong></td>
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<td>Other department of the same company (Internal Benchmarking)</td>
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<td>Competitor (Competitive Benchmarking)</td>
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<td>Other companies of the same industry</td>
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<tr>
<td>Companies in a different industries (Functional Benchmarking)</td>
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Figure 9.25 Types of benchmarking (Horváth and Herter 1992:7 and Götze 2004:313)

Benchmarking can be accomplished in each case on different levels and with varying complexity. In this connection, Meyer (1996:280f.) introduced three types of benchmarking for different levels (strategic, tactical, and operational). Strategic benchmarking (it focuses on the organization’s core competencies, key business processes, and success factors, such as return on sales, productivity, customer satisfaction, growth, innovation, etc.) supports the strategic management process (Meyer 1996 and Wagener2006:11). It examines how
companies compete and seeks the winning strategies that have led to competitive advantage and market success. In addition, Meyer (1996) argued that benchmarking can be set at both tactical level (e.g. from marketing costs, marketing-mix, R&D costs and inventory) and operational level (e.g. the delivery method, the technical service, the treatment of customer complaints, etc.). Operational benchmarking focuses on how things are done, on how well other organizations perform, and on how they achieve performance.

The objective criterions of benchmarking help to examine certain aspects of benchmarking objects (Wagener 2006:11). Typically, the objective criterions include costs, quality, time, and customer satisfaction (Horváth and Herter 1992:7 and Götze 2004:313). Benchmarking that seeks to reduce costs as a primary objective is called cost benchmarking (Hoffjan 1997:345 and Götze 2004:314). Cost benchmarking is a future oriented form of benchmarking. Hoffjan (1997:345) stated that cost benchmarking is a strategic cost management instrument. By comparing with the best of the best, cost benchmarking gives indicators for optimizing processes. Götze (2004:314) pointed out that benchmarking is closely connected with the process benchmarking, since the costs can be attributed in high proportion to processes. Cost benchmarking can support a company improving its future cost situation by information about the cost structure of the competitors leading in terms of costs. Hoffjan (1997:345ff.) argued also that cost benchmarking is able to fix the volume of cost reduction that is necessary for a company’s continuance in competition and to determine a way to realize this reduction of costs.

In the literature (e.g. Horváth and Herter 1992, Watson 1993, Karlof and Östbloom 1994, Andersen and Pettersen 1996, Meyer 1996, Hoffjan 1997, Bhutta and Huq 1999, Götze 2004) different types of benchmarking are defined based on the benchmarking partner (compare against whom?). Benchmarking partner may be other departments within the same company, direct competitors, other companies of the same industry as well as companies in a different industry (Götze 2004:314).

Internal benchmarking refers to comparisons made within the same company, e.g., between departments, units and divisions. Internal benchmarking assumes that there are differences in the work processes of an organization as a result of differences in geography, personnel, financial situation, etc. (Götze 2004:314). Internal benchmarking is mainly used within large
organizations where different units may be assessed and compared to each other (Zairi and Leonard 1994:49 and Andersen and Pettersen 1996:6). If one unit performs better than others, practices can be transferred internally for improvement. Among the advantages of internal benchmarking are the ability to deal with partners who share a common language, culture and systems, having easy access to data, and giving a baseline for future comparisons (Spendolini 1992:20 and Götze 2004:314). Therefore, the outcomes of an internal benchmarking can be presented quickly. However, it is claimed that this type of benchmarking study is time-consuming because competitors could be busy increasing their market share while the sample organization is busy measuring its internal performance (Cook 1995).

Competitive benchmarking refers to a comparison with direct competitors only (Götze 2004:314). Direct competitors are the most obvious to benchmark against. Ultimately, any benchmarking investigation must show what the comparative advantages and disadvantages are between direct competitors. Camp (1989:62) uses the term competitive benchmarking as a synonym to the commonly used external benchmarking. Competitors are companies that may be direct competitors in the same business area, whereas the term external refers to companies that may not be direct competitors but still they may be a source of valuable information. Competitive benchmarking may be the most sensitive type of benchmarking because it is very difficult to achieve a healthy cooperation and collaboration with direct competitors and reach primary sources of information. Thus, it is more rational for larger companies than smaller ones because large companies have the infrastructure to support quality and continuous improvement (Cook 1995 and Andersen and Pettersen).

For example, when Xerox lost market share as a result of the entrance of new competitors, the Xerox management decided to benchmark its own performance with competitors within the same industry. Through benchmarking, Xerox improved its financial position, stabilized its market share and increased the satisfaction level of its customers (Camp 1989 and Cook 1995). Among advantages of competitive benchmarking are creating a culture that values continuous improvement to achieve excellence, increasing sensitivity to changes in the external environment and sharing the best practice between partners (Vaziri 1992). However, the main disadvantage of competitive benchmarking is that information is very hard to obtain from competitors (Zairi and Leonard 1994:47). A further risk may include the tendency to
focus on the factors that make the competitors distinctive instead of searching for the factors contribution to excellent performance.

Although each company has a few close competitors for each of its products, it can benchmark other companies in the same industry who may have the same products or services but are not competitors in the same market segments (Götze 2004:314). This type of benchmarking is called industry benchmarking (see e.g. Leibfried and McNair 1994 and Lewis and Naim 1995). An organization operating in the same business geographically far enough not to be a direct competitor may be an excellent benchmarking partner (Götze 2004:314). While competitive benchmarking is concerned with direct competitors, industry benchmarking looks for general trends across a much large group of related companies. Leibfried and McNair (1994:115) stated that industry benchmarking is a more general course of action as it focuses on the companies with similar interests and technologies, seeking to identify trends rather than current market share rankings.

Functional benchmarking refers to comparative research and attempts to seek world-class excellence by comparing specific functions e.g. distribution, logistics, service, etc. not only against competitors but also against the best businesses operating in similar fields and performing similar activities or having similar problems, but in a different industry (Davies 1990, Zairi and Leonard 1994 and Götze 2004). For example, in order to improve its logistics, warehousing, and material-handling functions, Xerox benchmarked these same functions at the mail order firm of L.L. Bean. The benefits of functional benchmarking include its potential for breakthrough and innovative improvements, bringing significant and fundamental changes. Barriers to sharing data rarely exist with this type of benchmarking (Götze 2004). However, the limitations of functional benchmarking include the challenge of transferring practices when environments are not comparable (Zairi and Leonard 1994:48). In addition it can take a long time to complete, and research outcomes may need a lot of modification in order for organization to set their own standards (Cook 1995). It may be difficult to effectively adopt or adapt these best practices.

9.1.4.4. The Benchmarking Process

Benchmarking as a process includes a series of actions, steps, functions, or activities that bring about an end or results: the identification and importation of the best practices to
improve performance. There are several types of benchmarking and the steps of action can therefore differ. In the literature (e.g. camp 1989, Watson 1993, Karlof and Östbloom 1994, Andersen and Pettersen 1996, Meyer 1996, Hoffjan 1997, Bhutta and Huq 1999 and Götze 2004), the benchmarking process has been formalized into several phases. The figure 9.26 shows the benchmarking process that is based on Götze (2004:315ff.).

Figure 9.26 The benchmarking process (Götze 2004:316)

**Planning phase**

**Identify the benchmarking object.** At first, in the planning phase, the benchmarking object must be identified. The benchmarking object can be product, service, method and structure. Potential benchmarking opportunities must be in areas critical to the success of the company.
as identified in the mission statement. Götze (2004:315) argued that a company should identify the benchmarking object that will play a key role to improve performance in the company and increase the competitive ability of the company. Identify the largest opportunity to improve performance in the company requires identifying and prioritising the key benchmarking-objects and flowcharting them for analysis and comparison of practices (Camp 1989 Watson 1993 Andersen and Pettersen 1996). The current difficulties and problems within a company can offer indicators for identifying the benchmarking object (Götze 2004). For cost benchmarking, Hoffjan (1997:352) argued that a company should examine the value chain as a whole then it can identify the benchmarking object that has a large opportunity for cost reduction. Examples of possible objects are logistics process, service customer activities, human resource activities, etc.

**Establish the benchmarking team.** The team that will be undertaking the benchmarking project should be formed as early in the process as possible in order to be actively involved in the planning stages. The benchmarking team should include the persons who are most knowledgeable about the internal operations and will be directly affected by changes due to benchmarking (Camp 1989, Watson 1993 Andersen and Pettersen 1996 and Götze 2004). The benchmarking team can be formed under the leadership of a benchmarking sponsor (Spendolini 1992 and Watson 1993). This is ideally the person who is responsible for the objects that are being benchmarked If not, it may appear to be difficult to implement the necessary improvements, as the required commitment is not adequately present.

The benchmarking team should have communication skills, such as interviewing, presentation, meeting, and writing skills (Spendolini 1992 and Watson 1993). This is especially important since much communication with benchmarking partner is involved. Furthermore, team members need to be analytically skilled, because many data have to be processed and analyzed. Many studies (e.g. Camp 1989, Spendolini 1992, Grayson 1992, Watson 1993) stress the importance of benchmarking team leaders, training and education of team members, and experience of team members. In some cases (e.g. a company has no experience or expertise in-house), it may be more beneficial to bring in an outside consultant (Götze 2004:317). The extent to which the benchmarking team perceives that the benchmarking project is important to its organization and interesting to its members determines the level of its motivation during teamwork (Spendolini 1992 and Watson 1993).
Determine the criteria of performance evaluation. Once the benchmarking objects are identified, a company needs to determine the criteria for how its performance will be assessed against the performance of others. Selecting performance indicators includes defining what is to be measured and how it is to be measured in very clear terms. A balanced set of criteria or measures or family of indicators that reflects the perspectives of customer (both internal and external), stakeholders and employees is necessary to properly gauge performance (Götze 2004:317). When selecting performance criteria or indicators it is important to consider a range of factors such as alignment with organizational objectives and priorities, potential impacts on employee performance, stakeholder requirements and resource implications. The performance criteria or indicators most commonly used for benchmarking studies consist of ratios or percentages. In addition, measures of performance such as costs, quality, customer satisfaction and time should be developed (see Lamla 1995 and Götze 2004). For cost benchmarking, identifying and examining criteria or measures of costs (ratios or qualitative measures) can indicate a large opportunity for cost reduction through the benchmarking (Götze 2004:318). Finally, developing good measurements is the key to successful benchmarking.

Identify comparative companies. The planning phase also identifies the benchmarking partners. The first step in the identification of benchmarking partners is to develop a set of criteria for evaluation (e.g. critical success factors, experience, new methods, innovation, etc.) (see e.g. Herter 1992 and Pieske 1995). The candidate organizations can be matched to these criteria for selection. Kharbanda (1993:31) argued that the purpose is not to select a successful organization from a market perspective, but rather those organizations that are doing something particularly well in the area to be benchmarked. To help prepare a list of companies that are considered to be industry leaders or best in class, the benchmarking team should consult: customers; members of professional or trade associations; securities analysts; and business directories and the people in their own organization (Kharbanda 1993:31).

It should be recognized that no one company, however successful, is best at everything it does. The benchmarking team should, therefore, satisfy itself that the industry leader clearly has an advantage in the area under consideration for benchmarking. The benchmarking projects against the best companies may have to be reduced by cost, time, value, and the incentive for these companies to share data (Kharbanda 1993, Zairi and Leonard 1994,
Codling 1995, Andersen and Pettersen 1996 and Coers et al. 2001). Once the list of benchmarking partners is developed, it needs to be narrowed based upon several factors such as: whether the benchmarking partner is friendly and willing to share the information, and whether the benchmarking objects are similar enough to produce valid results.

**Determine information-gathering sources.** In the panning phase, the benchmarking team must determine information-gathering sources - primary and secondary sources (Göttze 2004:320). Thorough and accurate benchmarking will require at least some primary sources such as conferences, seminars, supplier and customer opinions, interviews with experts as well as above all the direct exchange with the comparative companies. Among the secondary sources are industry and trade publications and special reports, professional associations, general business periodicals, outside seminars and conferences, advertisements, competitors' brochures and newsletters, electronic databases, and specialized books. In addition, consultants are often valuable either to obtain the relevant and necessary information, or because they already have useful comparative information in their files. They may have an astute sense of what is needed and the knowledge and experience to help a company determine what and how to benchmark. Basically, the benchmarking team must use several sources to gather the necessary data.

**Analysis phase**

**Review, prepare, and process data.** After the data have been gathered, the benchmarking team should review them to ensure that they are complete or need improvements (Watson 1993:73). The benchmarking team uses these data to compare the performance, to identify the performance gap and to analyze the causes of this gap. Basically, the analysis should be related to the original purpose of the study. (Kharbanda 1993:32). One problem of the analysis phase is the comparison data with the best practice (Göttze 2004:323). The performance evaluation measures may lose its values through the benchmarking processes because of using different rules or methods, different benchmarks, etc. (Hoffjan 1997, Morwind 1995, Weber et al. 1995. and Götte 2004). Starting points for the solution of such a problem are by using standardized definitions and calculation methods (e.g. amortization methods in the case of costs), development relevant qualitative performance measures, deep examination and adaptation of detailed information (e.g. radios system), and classification the examined performance or processes in classes according to relevant factors (e.g., number of

**Determine performance gap.** The objective of this step is to draw reasonable logical conclusions from the collected and analyzed benchmarking data in terms of best practices, strengths, and weaknesses of benchmark partners (Camp 1989, Spendolini 1992 and Watson 1993. Furthermore, any performance gap that exists between the benchmarking company and its benchmark partners must be identified. The gap can concern for example the costs of a cost center that is the benchmarking object (Götze 2004). The current performance gap is a measure of the difference between the internal performance and the best in the industry. This could be positive, negative, or zero (Kharbanda 1993:32). The negative gap indicates an undesirable competitive position and provides a basis for performance improvement. The zero position should be analyzed for any contributing factors and the organization should identify the means to transform its performance to a level of superiority or positive gap. The benchmarking team is, however, unlikely to find many instances of positive performance gaps in the beginning (Kharbanda 1993:32). The challenge in the positive performance gap areas would be to maintain the superior performance. Irrespective of the nature of the performance gap, the competition is unlikely to stand still and, therefore, benchmarking teams should also estimate what the benchmark performance will be in the future (Morwind 1995:33f).

**Identify causes of performance gap.** In this step, the root causes of performance gap have to be identified. A properly conducted benchmarking study should lead to the causes of the performance gap. The benchmarking team uses the gathered information to analyze the examined object in order to develop a list of factors that appear to be driven the benchmark performance (Götze 2004). Thus, the benchmarking team should take a closer look at the examined object. For cost benchmarking, the team compares and analyzes cost drivers and cost structure of the benchmarking object (e.g. activity or process) with the benchmarking partner to determine the causes of the cost differences and to reveal how benchmarking partner does the same activity or process with less costs or lower resources (Hoffjan 1997:352.). Major cost differences have to be analyzed in detail. But it is not enough to measure cost differences, it is also necessary to ask the question why. Activity based costing provides information on the cost of each of the company’s activities (processes). This information can help the team to identify the causes of the cost differences and serve as a
reference point in assessing the benefits of improving the benchmarking object. For the analysis of the causes of performance gap different tools can be used such as comparison of flow charts, qualitative data matrices, relations diagrams, root-cause analysis, or the cause and effect diagram (see e.g. Andersen and Pettersen 1996, Zairi 1998 and Coers et al. 2001).

**Action phase**

**Reporting.** Knowing how to present your findings in a useful format is critical for the success of the project. During this phase, the benchmarking team prepares and presents the benchmarking report to management and obtains acceptance of the analysis, conclusions, and implementation actions necessary to close the performance gap (Kharbanda 1993:32). This step is an important because all can be lost if the results are reported poorly. To ensure that acceptance is as high as possible, the benchmarking team needs to document credible data and present clear and convincing arguments - specifically, the benefits to the organization - using effective presentation techniques. Otherwise, the benchmarking results may end up as another report that contains recommendations that never get implemented. The benchmarking team should document their results in a manner appropriate to the organization. The reports would also serve as reference material for future benchmarking projects.

**Adapt goals and strategies.** The main findings from the analysis phase can be used to adapt the existing goal or to select new goals that concern the benchmarking gap (Götze 2004:323). These goals should be carefully analyzed. Here the questions which need to be are: what performances/achievements do we have to obtain according to the benchmarking gap? What performances are we able to obtain? (Grönérus 1996:41). It is very important that everyone accepts the new plans and measures brought about by the new goals. In addition, the benchmarking results can be used to review and adjust the strategy of the company - particularly for strategic benchmarking (Götze 2004:323). Among the changes that can be made by the benchmarking project in the manufacturing companies are reduction of the manufacturing depth, concentration on few suppliers as well as adoption of simultaneous to engineering or decentralized organizational structures (Horváth and Lamla 1995 and Götze 2004).

**Develop action plans.** Now the actions plans should developed and implemented on the basis of analysis results and any revisions to goal and strategy (Götze 2004). In addition,
appropriate projects can be defined. It is critical that the actions are well defined to ensure their successful implementation. The actions plans should determine the resource requirements (costs), measures, time frame, responsibilities and the expected results and their measurement (Götze 2004). The action plan should also be reviewed with the functional staffs to obtain their commitment. All parties should understand the role they must play in implementation of the action plan (Karlöf and Östblom 1994:218).

After the implementation phase begins, it is necessary to monitor progress against the milestones established in the action plans. Adjustments may be necessary as a result of the organization’s resistance to change and additional training, coaching and nurturing may be required (Kharbanda 1993:33). Additionally, management should be kept apprised of the status to ensure continual involvement and commitment. Finally, benchmarking is not something you do once and forget about it, it is a process that has to be continued. Benchmarking is a method for continuous improvement.

9.1.4.5. The Pitfalls and Success Factors of Benchmarking

Benchmarking is accepted worldwide as a management technique to improve business performance. The concept is easy to understand, and many companies such as Xerox Corporation have applied the benchmarking approach successfully. Yet, some organizations have failed in their attempts to implement this simple concept. The causes of failed benchmarking projects are the same as those for other failed projects. According to DeToro (1995:61ff.), the pitfalls of the benchmarking projects are: Lack of sponsorship - Wrong people on team - Teams don’t understand their work completely - Teams take on too much - Lack of long-term management commitment - Focus on performance targets (metrics) rather than processes - Not positioning benchmarking within a larger strategy - Misunderstanding the organization’s mission, goals, and objectives - Assuming every project requires a site visit - Failure to monitor progress.

What are the success factors for benchmarking? The most important thing is to understand the intent of benchmarking that is to learn and improve. This seems simple, but in fact addresses the complex problem of how organizational learning is best generated. In benchmarking, learning occurs through the implementation of positive changes based on the identified causes of performance gaps. Benchmarking is clearly used not only as an analytical tool but also to
provide the impetus for translating new insights into action. In the literature (e.g. Karlöf and Östblom 1994, Andersen and Pettersen 1996, Grönérus 1996, Hoffjan 1997, Zairi 1998 and Götze 2004), many successes factors for benchmarking are discussed. Among these factors are: All the affected persons must take part in the change process - The goals and strategies of the company must be well communicated to everyone - The company must have a clear time- and action plan - Strong commitment on part of senior management - Information must be gathered and distributed - The resources are available - Integration of benchmarking into company priorities and planning;

9.1.4.6 Linkages between Benchmarking and other Cost Management Techniques

Although benchmarking studies are applied to improve the performance of the companies, they (especially cost benchmarking studies) are often most closely identified with productivity improvement and cost reduction. In the context of the suggested framework for strategic cost management, cost benchmarking can be linked to the instruments of strategic cost management. The relationships between cost benchmarking and target costing, life cycle costing and activity based costing and management will be discussed below.

Primarily, target costing is future oriented, while cost benchmarking is aimed at analyzing the present cost situation. However, both instruments link the internal perspective to the external aspect (Wagener 2006:43). In the target costing process, a company can set the target price by analyzing product prices, features, and functions offered by the competition - out of competitor approach (Seidenschwarz 1993 and Ansari et al. 1997b). Here, this approach is similar to benchmarking. Also, the analysis must not be limited to the cost aspect; it can include many aspects such as quality and the customer satisfaction. In the case of a very innovative product, determining the drifting costs using the existing values is not possible, cost benchmarking can provide the information to determine the drifting costs if the benchmarking partner has offered a similar product (Wagener 2006:44). Apart from cost information about the overhead activities, it can also support the direct cost planning (Götze 2004:326). Cost benchmarking can be used to compare drifting costs with the benchmarking partner. The company can examine the measures of benchmarking partner to know whether the benchmarking partner has new measures that lead to reduce the costs (Coenenberg et al. 1997:211ff.).
Life cycle cost is similar to target costing - future-oriented - while cost benchmarking is aimed at analyzing the present cost situation. The best policy for analyzing and managing the product life cycle costs is at the time where the target costing is applied (during the development and design phases). Also, in the case of very innovative product, cost benchmarking can provide the information to plan the product life cycle costs. Linkages between cost benchmarking and life cycle costing may be difficult because the main focus of LCC is not only the costs that the producer will incur over the product life cycle including design, manufacturing, marketing, logistics, and service, but also the costs that customer will incur such as the costs of acquisition, operation, maintenance, shutdowns, and disposal (Wagener 2006:45). In most situations, a company can implement cost benchmarking for one phase of the product life cycle. To collect information above the costs in different phases of product life cycle, a company should carry out a separate benchmarking project for the product life cycle costs.

ABC/M are better instruments for overhead cost management. ABC/M and cost benchmarking can identify opportunities to reduce the costs of the overhead activities and improve the current cost situation of the company. Since cost benchmarking and ABC/M can examine and analyze all costs of overhead activities. Cost benchmarking can support ABC/M by providing information about the activity or process costs of the benchmarking partner. A company can use this information in planning overhead activities costs. Cost benchmarking can be used for a detailed analysis of the overhead activities in which ABC/M have difficulties. In addition, ABC/M provide information about cost drivers, resources, activities, cost assignment, etc. This information can serve as a reference point in assessment the benefit of improving performance on operational benchmarks.

Finally, instruments of strategic cost management must not be seen as independent entities. To achieve the goal of a successful long-term and market-oriented cost management, it is necessary to integrate various cost management-instruments such as ABC/M, life cycle costing, target costing and cost benchmarking into one coherent concept. The holistic overview requires integrating the instruments of strategic cost management in order to achieve the desired objectives.
9.2. Strategic Cost Management - Key Support Factors

Finally, strategic cost management-framework cannot be established without the active support of the top management of the company. Top management's commitment is a prerequisite to the successful implementation of any strategy or innovation (Hunt et al. 1985:112). In order to develop and implement the strategic cost management-framework, commitment on the part of the top management should include a culture of continuous improvement (see Shields and Young 1989:12ff.). It may appoint a team with members from different functional areas to suggest and implement changes that need to be made, with an individual acting as the champion of the cause.

Customer focus is the focal point of the cost management systems, therefore, companies have long realized that customer service means more than just fulfilling immediate needs. Anticipating future needs is what makes companies successful - and that attitude must pervade the entire corporate culture. Customer relationship management is an important support factor in the strategic cost management-framework. Companies must divide customers into segments, and decide which segments are most valuable, developing their marketing programs appropriately (Blois 1996:184). Changing needs of the customer must be treated as the guiding light for the company's development (Griffin et al.1995:96).

In strategic cost management-framework supplier management can be just as important as customer relationship management; suppliers not only produce and deliver inputs used in a firm's value activities but they importantly influence the firm's cost/differentiation position. Strategic cost management-framework requires that a firm should understand the entire value delivery system, not just the portion of the value chain in which it participates (Shank and Govindarajan 1992:179).

For a successful implementation of the strategic cost management-framework, it is necessary to have active involvement of workers at all levels - from factory floor to middle management. In addition to being involved with the manufacturing process, workers must also become involved with each other's responsibilities. This would require empowerment of individuals and teams (Meyer 1994:102). Many companies find it beneficial to identify and solve problems from a cross-functional view. It is desired and often necessary to assemble cross-functional teams in order to obtain a holistic or complete view of the operation.
Workers, or their teams, need to be empowered, such as to make change in the process, or stopping the production line when a difficulty is encountered (Williams 1996:65). This may be translated into self-managed teams that are completely responsible for a portion of a product or service. As such, they monitor quality, perform maintenance, influence costs, and track production or service volume. Involvement of workers also requires performance measurement techniques that would include both financial and non-financial measures and continuous education and training of workers in the whole organization. Consequently, this means the workers or teams will become the critical support factor for a successful implementing strategic cost management-framework.
10. Summary and Conclusions

Strategic cost management is in its infancy. Researches and studies are still in an early exploratory stage and have not yet developed a consistent theory for strategic cost management. In view of this, the main objective of this study is to suggest a comprehensive conceptual framework for strategic cost management. In particular the study attempts to contribute to filling the gap in the literature of strategic cost management, and to give complete coverage of the concepts, objectives, analysis fields and activities and instruments in this vital theme.

In order to achieve this objective, the study analyzed the effects of changes in the business environment (such as changes of the markets and a greater focus on the customer, shifts in the basis of competition, advances in the manufacturing and information technologies and new forms of management organization) on cost management systems. The study showed that the trends and changes in the business environment affect the costs structure and the composition of life-cycle costs. Thus, cost management systems should be adapted to meet the needs of the business environment. In addition, the study evaluated the traditional cost management systems in the light of the trends and changes in the business environment. The study introduced some examples that assure that traditional cost management should move to strategic cost management.

Although cost management has moved from a traditional role to a strategic role, strategic cost management is understood in different ways in the literature. In addition, strategic cost management has been discussed from many aspects in the literature. The existing conceptual approaches only consider certain individual contributions and therefore focus on specific aspects of strategic cost management. Thus, the study introduced a comprehensive conceptual framework for strategic cost management that covers the concept, the concerns and objectives, the principles, the analysis fields & activities, the objects, the instruments and the key support factors of strategic cost management.

The study explained that the term strategic cost management has a broad focus. It is not confined to the continuous reduction of costs and controlling of costs and it is far more concerned with management's use of cost information for decision-making. Strategic cost management is also not confined to use cost management techniques that reduce costs and
improve the strategic position of a firm at the same time. The study concluded that strategic
cost management is a philosophy, an attitude, and a set of techniques to contribute in shaping
the future of the company. In addition, strategic cost management should not confine its
concerns and objectives only to cost, but should also consider revenue, productivity, customer
value, and at the same time the strategic position of the company.

To reach such objectives, the suggested framework for strategic cost management is
supported by a set of pillars. The proposed pillars of the suggested framework for strategic
cost management are: (1) The guiding principles of strategic cost management, (2) The key
concepts of strategic cost management, (3) The objects of strategic cost management, (4) The
analysis fields & activities of strategic cost management, (5) The instruments of strategic cost
management, and (6) the key support factors of the suggested framework.

The study explained the significant principles that serve the suggested framework. It also
explained and analyzed the second critical pillar that affects strategic cost management-framework - key concepts (cost drivers and value chain). The study analyzed two views of
cost drivers - traditional view and strategic view. According to the traditional and strategic
views of cost drivers, the study developed the basic outline of cost drivers and analyzed the
interrelated relationships among cost drivers. Moreover, the study explained the ways of
identifying cost drivers and benefits of cost drivers. The study discussed the principal stages
of value chain analysis for strategic cost management. It concluded that using value chain
analysis and cost drivers as a basic pillar of strategic cost management-framework may
encounter many difficulties. Thus, strategic cost management-framework has to be able to
integrate all relevant aspects of cost management to get over such difficulties. Since strategic
cost management considers a task, it comprises several objects, analysis fields & activities,
and instruments that form other pillars of strategic cost management-framework.

The third pillar of the suggested framework is the objects of strategic cost management. The
study introduced three objects of strategic cost management - products, processes and
resources. Firstly, the study discussed and analyzed the product as a strategic cost
management-object. Product cost management begins with the product definition and design
because approximately from seventy to eighty percentage of the product cost is determined by
decisions made during the product development cycle. Thus, the study focused on product
design and development approaches and product cost management. Secondly, the study discussed and analyzed the process as a strategic cost management-object. The study developed three major dimensions to manage process cost, quality, and time. It also assured that process-oriented cost management can achieve many benefits for companies. Finally, the study discussed and analyzed the resources as a strategic cost management. The study introduced many dimensions of resources that are the focus of strategic cost management. It emphasized that resources cost management plays a key role in value creation.

The fourth pillar of the suggested framework is the analysis fields & activities of strategic cost management. The study focused on cost behavior, cost structure, and cost level management. It analyzed the significant factors or the key drivers that are used to manage cost behavior and then cost level. The study emphasized that cost level and cost structure management stand in close relationship to each other. It identified the concept and objects of cost level and cost structure management and explained the implications of cost level and cost structure. Since overhead costs and fixed costs form a special problem in the field of strategic cost management, the study deeply discussed and analyzed overhead cost management, fixed cost management and their instruments. The study emphasized that the analysis fields & activities of strategic cost management are critical to search for a sustainable competitive advantage.

The fifth pillar of the suggested framework is the instruments of strategic cost management. In the literature, various cost management-instruments are discussed, but the important thing is, which instrument can be strategic, integrated and interacted with other instruments to achieve strategic cost management objectives. According to these important considerations, activity based costing and management, target costing, life cycle costing, and benchmarking are chosen as instruments for strategic cost management-framework. The study deeply discussed and analyzed these instruments. In the context of the suggested framework for strategic cost management, the study discussed the integration aspects between these instruments. In addition, the study explained the significance of these instruments for the other pillars of the suggested framework. Finally, the study discussed the key support factors to develop and implement the strategic cost management-framework.

Strategic cost management literature lacks a comprehensive framework that covers, the concept, the objectives, the principles, the analysis fields & activities, the objects, the
instruments and the key support factors to meet different operational challenges that firms encounter from time to time and at different stages of development. The suggested framework for strategic cost management may contribute to this goal. However, further research is needed to enhance the suggested framework for strategic costs management. Future research should explore the organizational issues of the strategic costs management. In addition, the suggested framework for strategic cost management can be operationalized and thus used in empirical research. This requires future study that provides empirical evidence for the suggested framework for strategic cost management. Finally, continuous research efforts will contribute to further studies that develop a consistent theory for strategic cost management.
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Curriculum Vitae

Personal Data:

First Name: Ibrahim
Family Name: El Kelety
Marital Status: Married, three children
Nationality: Egyptian
Birthday: 1965
Place of Birth: El Menoufia, Egypt

Education:

1983 – 1987: B.Com. Degree in Accounting, Faculty of Commerce, El Menoufia University, Egypt
1990 – 1991: Master Courses (4 Semesters), Faculty of Commerce, El Menoufia University, Egypt
1992 – 1995: M.Sc. Degree in Accounting, Faculty of Commerce, El Menoufia University, Egypt
1995 – 1996: Ph.D. Courses (2 Semesters), Faculty of Commerce, El Menoufia University, Egypt
2001 – 2006: Ph.D. Student at the Chemnitz University of Technology, Faculty of Business Administration and Economics, Chair of Management Accounting and Controlling

Teaching Experiences:

1989 – 1995: Demonstrator in Accounting Department, Faculty of Commerce, El Menoufia University, Egypt
1995 – date: Assistant-lecturer in Accounting Department, Faculty of Commerce, El Menoufia University, Egypt
2001 – 2006: Ph.D. Student at the Chemnitz University of Technology, Faculty of Business Administration and Economics, Chair of Management Accounting and Controlling
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Chemnitz, 14.06.2006

Ibrahim El Kelety