The implementation of an integrated Activity-Based Costing (ABC) and Balanced Scorecard (BSC) System as a Strategic Management Tool: A Case Study in a Greek Manufacturing Company

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Abstract

In today’s competitive and complex world of business, a company needs new performance measurement systems which focus on managing the critical activities closely related to improving quality, enhancing flexibility, improving delivery to customers, and cost. Sink (1991) suggests that performance measurement system is a mystery: complex, frustrating, difficult, challenging, important, abused, and misused. But the performance measurement systems need information, having accurate information may be the key factor in distinguishing between the loser and the winner. Using more accurate cost information of a company may lead management to make better decisions, and as a result, may have a great effect on the success of the company.

Activity-Based Costing (ABC) provides correct costing information characteristics of being efficient and relevant. Balanced Scorecard (BSC) has been accepted by the business world, worldwide, as a very promising tool for the performance measurement of an organization at the firm level. The ambition of the present study is to demonstrate a method that could easily integrate ABC and BSC. By using Analytic Hierarchy Process (AHP) in a manufacturing firm we show how this firm can effectively select its performance drivers which in effect are the cost drivers of the firm's supply value chain or the internal business process perspective of the BSC. Integrating ABC and BSC by AHP could enable firms to deal simultaneously with internal (performance drivers) and external (outcome measures) environment, as well as objective and subjective factors. This integrated system is expected to induce innovation, improve customer service, increase customers and employee satisfaction, and enhance total performance.
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CHAPTER 1: Introduction

1.1. Introduction

It has become clear that the 1990’s have become a staggeringly different and much more demanding era for quality - and for business in general - than was experienced throughout the 1980's (Christopher and Thore, 1993, p. 2-3). The reason is that the gradual momentum toward an increasingly open, globally competitive marketplace, now has an unstoppable force - not only for Europe (with the establishment of European Union, the abandoning of import tariffs and quotas, and the monetary union agreement) but throughout the world (through the new General Agreement for Trade and Tariffs-GATT and other similar international agreements). This will mean an enormous increase in the competitive pressure upon most companies in both prices as well as quality standards (Christopher and Thore, 1993, p. 2-3).

The fundamental business strategic impact is that, to protect its position in its home market, a company must be able to design, build and sell its domestic product lines with the potential also for supremacy in the international market place, even though there isn't yet much import competition or interest in exporting. And it must do this quickly - a huge job for many companies. The principle is that if a company can get foreign competition today, it will get it. Operating in international leadership terms is the only way for a business to grow in terms of this principle rather than be eroded by it. (Feigenbaum, 1993).

The strategic management process does not end when the firm decides what strategy (ies) to pursue. There must be a translation of strategic thought into strategic action. Successful strategy formulation does not guarantee successful strategy implementation. David (1999, p. 216) says that it is always more difficult to do something (strategy implementation) than to say you are going to do it (strategy formulation). Furthermore, the best formulated and implemented strategies become obsolete as a firm's external and internal environments change. It is essential, therefore, that firms systematically review, evaluate, and control the execution of strategies. Effective performance measurement and improvement of the implemented strategies must be an integral part of the strategic management process (Kaplan and
Norton, 1993). A framework/model that supports this integrated management system will assist management and their firms to excel in both, taking proper strategic decisions and implement them effectively and efficiently. The focus of the performance measurement and improvement process should be on involving all levels of management in strategic planning, i.e., in translating strategy into action (Sink and Tuttle, 1989, p. 19).

Performance measurement, in order to have validity, must derive from the strategy of the organization. It is only when this derivation of performance measures comes from the heart of the strategic focus that management can hope to employ the necessary energies for effective continuous improvement. This process provides management with the necessary information feedback system to enable a continuous improvement process, which will drive the re-examination of the strategic direction of the organization. A valid collection of strategy driven performance measures will enable a continuous feedback of customer needs, competitive costs, responsiveness, and other critical indicators of world class performance (Campi, 1993).
CHAPTER 2: The Activity-Based Costing

2.1. Introduction

The new form of accounting has started to emerge with the general acceptance which is called Activity-Based Costing (ABC). In this chapter we will introduce an advanced management accounting technique called ABC which reviews the literature on the theory and application of ABC. ABC systems emerged, during the previous decades, as a response to the need for more accurate cost information. Traditional cost systems have been in use for more than a century. However, managers felt that in many circumstances, traditional cost systems do not provide accurate cost information. In today’s competitive world, the conditions and the variables have changed so traditional cost systems need to change and adapt to the contemporary environment.

Traditional cost systems were developed in an era that was characterized by labour-intensive processes and thus they allocate overhead cost in accordance with direct labour usage or some other aggregate allocation base. Also, traditional accounting is used to report to the stockholder, creditor, and external authorities. Such practice is no longer appropriate in today’s capital-intensive environments because it creates distortions in product costing and it can not help so much in internal organization management. The need for a new dynamic and adaptive cost system was fulfilled by the emergence of ABC. We can consider ABC systems as an evolution of traditional cost systems in order to enable them to capture the complexity of the underlying economic reality of costs.

This chapter begins with a description of what is ABC and why is important. He gives a short explanation of the fundamentals of ABC and the hierarchical model. It continues describing the steps for performing ABC and the building blocks for ABC. Finally, it explains what ABM is.
2.2. **Literature Review**

### 2.2.1 Explaining Activity-Based Costing

The *traditional* deficiency of cost accounting has always been the way in which overhead costs are attached to individual products. Historically, overhead costs were attached to individual products in proportion to direct labour hours, machine hours, and material costs. Using the two stage allocation base, traditional cost accounting in the first stage assigns overhead expenses to cost centres and in the second stage allocates these expenses to specific products. Therefore, traditional systems tend to over-cost customers, services, high volume products, and under-cost low volume products.

On the other hand, as we can read in the handbook issued in 1994 by the Office of the Assistant Secretary of Defence, Director of Defence Information, called the Framework for Managing Process Improvement (Department of Defence, 1995). Activity accounting is a fully inclusive management information concept which includes the total spectrum of accounting controls, reports and analysis. It is oriented on the activity structure of an organization rather than on the formal departmental or organizational format. The process provides quantitative activity-based cost information to:

- assess continuing operations and project future impacts for a mature activity-based organization.
- evaluate selected process flows, relative cost of various activities, and potential effects of modifications.
- analyze alternative process flows with comparative economic evaluation.

As Activity-Based Costing (ABC) focuses on activities performed in manufacturing the product it offers an alternative to the traditional way of accounting. Activity-based costing (ABC) is defined by Computer Aided Manufacturing – International (CAM-I) as “a methodology that measures cost and performance of activities, resources, and cost objects, assigns resources to activities and activities to cost objects based on their use, and recognizes causal relationships of cost drivers to activities.” Turney (1997, p. 72) gives another detailed definition
saying, “Activity-based costing (ABC) is a method of measuring the cost and performance of activities and cost objects. Assigns cost to activities based on their use of resources, and assigns cost to cost objects based on their use of activities. ABC recognizes the causal relationship of cost drivers to activities.” Finally Department of Defence (1995) describes that ABC “measures process and activity performance, determines the cost of business process outputs, and identifies opportunities to improve process efficiency and effectiveness.”

The basic idea of ABC can be see in Turney’s definition. According to it products (or other cost objects) do not cause costs directly. The activities consume resources and the products (or other cost objects) consume activities and materials. In other words, ABC system is based on the understanding that products consume activities, activities consume resources, and resources consume cost (Kaplan, 1984) by assigning costs through a logical and systematic procedure (Cooper and Kaplan, 1999):

1. Identify activities performed by the organizational resources.
2. Determine costs of performing these organizational activities and business processes.
3. Determine how much output of each activity is required for the organization’s products, services, and customers.
2.2.2 Why is Activity-Based Costing Important?

Knowing how to cost is imperative. Only then can you make comparisons and compete with confidence. The cost accounting methodology of ABC provides process definitions, identifies the cost drivers of such processes, and determines unit costs and services then produce reports on agency components. Those reports can then be used to budget activity or performance.

ABC offers the added advantage of avoiding or at least minimizing distortions in product costing arbitrary allocated as indirect costs.

ABC can provide useful information on how expenditure is occurred, how cost-effective is every department and how you may achieve quality improvements against your competitors.

This is in contrast to traditional line item budgets which cannot be linked to specific outputs.
2.2.3 Fundamentals of Activity-Based Costing

ABC consists of two stages: Firstly, taking into account that every activity or performance causes costs, ABC assigns all costs of resources to activities. These activities take place in activity centres (or cost pools) and are measured by cost drivers (O’Quin, 1991). The cost of those resources or activities is called “a cost element” (Cooper, 1988a, 1988b).

Secondly, ABC considers that products consume activities and so costs incurred at specific cost centres (or pools) are then assigned to the products’ based on the products consumption of each activity and the level of such an activity to the ABC. To do this cost drivers are dedicated to assigning activity costs to products. Any factor that causes costs to be incurred such as quality of machine setups, quality of engineering change notices or the amount of purchase orders is registered in the cost driver. Every activity requires at least one cost driver. More than one driver offer more accurate information (O’Quin, 1991; Raffish, 1991).

Traditional cost systems distribute costs around the major factors of production such as direct materials, direct labour and overheads. It has been shown that this traditional accounting methodology may create a significant difference in output costs because of the way in which overheads’ costs are allocated to output rather than traced to it. ABC systems were established to capture the true cost accounting operations by allocating overhead costs to cost centres and then onwards to output goods or services. ABC is therefore essential in improving processes both analytically and in an evaluating role. It can determine what activities are performed by which company resources and then attribute costs to products based on their use of such resources.

It must be stressed however that ABC is applied with sound accounting principles in order to interpret cost data and so provide reliable information on which managerial decisions can be based.

This difference is shown clearly in the subsequent Figures 2.1 and 2.2 (Kaplan and Cooper, 1997).
Chapter 2: Activity-Based Costing

Figure 2.1: Traditional Cost Systems Allocate Overhead Costs to Production Cost Centers and Then to Products (Kaplan and Cooper, 1997, p. 83).

![Traditional Cost Systems Diagram]

Figure 2.2: Activity-Based Cost Systems Trace Resource Expenses to Activities and Use Activity Cost Drivers for Tracing Activity Costs to Objects (Kaplan and Cooper, 1997, p. 84).

![Activity-Based Cost Systems Diagram]

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1 Stage 1: Allocate overhead costs to cost centres
2 Stage 2: Allocate costs incurred in cost centres to products
3 Stage 1: Determine what activities are performed by company resources
4 Stage 2: Attribute costs to products based on their use of resources
2.2.4 Activity-Based Costing Hierarchical Model

The costs of some activities are attached to a higher level, such as to a batch of products or to a certain product directly and are not always related to a unit of a product, (O’Quin, 1991). Cooper and Kaplan (1991b) categorize activities of an ABC system in manufacturing organizations into four levels, which all together form the ABC hierarchical model as it shown in Figure 2.3, according to their relation to the types of costs assigned to the products: unit-level, batch-level, product sustaining, and facility sustaining.

![Activity-Based Costing Hierarchical Model Diagram](image)

**Figure 2.3:** Measuring Factors Expenses: Activity-based costing Hierarchical Model (Cooper and Kaplan, 1991b, p. 4)
According to Drury (2001), unit-level activities are performed each time a unit of the product or service is produced. Typical cost drivers for unit-level activities include labour hours, machine hours and the quantity of materials processed. These cost drivers are also used by traditional costing systems. As the costs of unit-level activities are directly linked to the number of products produced it follows that an increased production volume will cause the increase of the costs of the relevant activities (O’Quin, 1991).

**Batch-level activities,** such as setting up machine or processing a purchase order, are performed each time a batch of goods is produced. The cost of batch-related activities varies with the number of batches made, but is common for all units within the batch. The cost drivers assigned to batch-related activities allocate the cost of an activity to a batch and are called **batch drivers** (Cooper and Kaplan, 1991a). Such activities include: set-ups, material movements, purchase orders, inspection etc. **Product-sustaining activities** are performed to enable the production and sale of individual products (or services). Because these activities are not affected by the level of production volume they should not be allocated based on the amount of units or batches produced, as they in depend of them but should be faced to each product. Such product sustaining costs can only be eliminated by discounting the product (Cooper and Kaplan, 1991a). Such activities include process engineering, product specifications, engineering change notices, product enhancement etc. **The final activity category is Facility-sustaining activities.** They are performed to support the facility’s general manufacturing process and include general administrative staff, plant management, and property costs. They are incurred to support the organization as a whole and are common and joint to all products manufactured in the plant. The costs of these activities are not related to the production volume or product mix. Since these activities are common to each product produced in the plant, their costs require information by allocating overhead costs to products based on cost drivers that best represent the consumption of resources by products (Cooper and Kaplan, 1991a).
Many of facility-sustaining activities are administrative and are necessary to provide a factory that produces products, but the extent of these activities is unrelated to the volume and mix of individual products. Such activities include plant management, building maintenance, security and landscaping, taxes etc. Ideally, facility-sustaining expenses are treated as period-expenses (costs) and are not allocated to individual products. However, if they are allocated to individual products, this is done in some arbitrary manner. An implication of the hierarchical ABC model is that ABC analysis treats spending on all factory resources as variable at some level (Cooper and Kaplan, 1991a, p. 270-4).
2.2.5 Steps for Performing Activity-Based Costing

The design of an ABC system is based on an accurate procedure, that identifies certain stages or (activities) that need to occur in order to determine activity costs.

These stages may have a number of different application criteria and individual options, Figure 2.4 (Department of Defence, 1995):

1. Analyzing Activities
2. Gathering Costs
3. Tracing Costs to Activities
4. Establishing Output Measures
5. Identifying Activity Drivers and Analyze Costs.

Figure 2.4: The five activities (Department of Defence, 1995)
Yoshikawa et al., (1993) give us a similar design of ABC, which they call the structure of ABC shown in Figure 2.5. The implementation plan consists of seven phases: an ABC seminar, a design seminar, design and data gathering, progress meetings, an executive seminar, result meetings, and interpretation meetings.

Stage 1: Activity identification

Stage 2: Attribution of cost to activities

Stage 3: Identification and measurement of cost driver (association of drivers with product lines)

Stage 4: Calculation of cost driver rates

Stage 5: Application of cost driver rates

Figure 2.5: The structure of ABC in a production facility (Yoshikawa et al., 1993, p. 110).

Analyzing Activities

Represents the first stage in the ABC system in which an activity is identified in a process flow or activity model and which identifies all efforts required to perform the identified task. It may be subdivided into subordinate activities which may enhance the understanding and the more precise definition of the work needed to complete this task.
It helps to determine the value of an activity and its importance and the necessity of its existence.

Also, it studies how each activity interacts with other activities in the process flow or activity model either from inside or outside the organization, and offers outputs (products or information) as used by other activities of the customer. These outputs are created using resources within designated restrictions (controls and standards). Restated, "An activity is the transformation of inputs into outputs performed by mechanisms under the constraints set by controls."

**Gathering Costs**

In this step, costs are gathered for the activity producing the products or services provided as the outcome. These costs can be salaries, expenditures for research, machinery, office furniture, etc. These costs are used as the baseline activity costs. When documents for the costs incurred are not available, cost assignment formulas may be used.

**Tracing Costs to Activities**

In this step, the results of analyzing activities and the gathered organizational inputs and costs are brought together, which produces the total input cost for each activity. A simple formula for costs is provided – outputs consume activities that in turn have consumed costs associated with resources. This leads to a simple method to calculate total costs consumed by an activity – multiply the percent of time expended by an organizational unit, e.g., branch, division, on each activity by the total input cost for that entity. Here we are not calculating costs, just finding where they come from.
Establishing Output Measures

In this step the actual activity, unit cost is calculated. Even though activities may have multiple outputs, only one is identified as the primary output. Activity unit cost is calculated by dividing the total input cost, including assigned costs from secondary activities, by the primary activity output volume; the primary output must be measurable and its volume or quantity obtainable. From this, a bill of activities can then be calculated which contains or lists a set of activities and the amount of each activity consumed. The amount of each activity consumed is extended by the activity unit cost and is added up as a total cost for the bill of activity.

Analyzing Costs

In the final step, the calculated activity unit costs and bills of activity are used to identify candidates for improving the business processes. Managers can use the information by stratifying the activity costs and identifying a certain percentage of activities that consume the majority of costs. The thing to keep in mind is that the identification of non-value added activities occurs through this process with a clarity that allows us to eliminate them, and at the same time permits the product or service to be provided to the customer with greater efficiency.
2.3. **Activity-Based Costing building blocks**

The following introduction to the structure of ABC is mostly based on Turney’s (1997) way to describe the ABC. According, to Turney (1997, p. 77-87) there are two generations of ABC systems. The earlier models were one-dimensional. They were designed and viewed as tools for improving the accuracy of reported product costs.

The desire for operational performance information about activities led to the appearance of second-generation ABC. This was specifically designed to supply information for internal as well as external improvement purposes. This later generation of ABC has two main views: the **cost assignment view** and the **process view**. The overall structure of the ABC model is shown in Figure 2.6.

The vertical part of the model, the cost assignment view, provides information about how costs are assigned to activities and cost objects (including customers as well as products) in order to assist critical decisions. Such as pricing, product mix, sourcing, product design decisions, and setting priorities for improvement efforts. The horizontal part of the model, the process view, identifies the causes of various works taking place and the efficiency level at which they are performed.
Cost Assignment View

Resources

Resource Cost Assignment

Resource Drivers

Cost Objects

Activity Cost Assignment

Activity Drivers

Performance Measures

Activities

Activity-based costing comprises several building blocks. The building blocks in the vertical dimension work together to assign cost from resources to activities and from activities to cost objects. The building blocks in the horizontal dimension supply information about the performance of activities. (Turney, 1997, p.96)
2.3.1 Cost assignment view

Cost assignment view is where ABC calculates costs it is therefore of most importance. At this part an economic picture of the organization is created, and the improved methods of ABC give accurate and useful information for key business decisions. This view also provides useful information on activities, resources, and cost objects. Cost assignment occurs in two stages. First, the costs of resources are traced to activities by assigning costs. Then the costs of activities are traced to cost objects by an activity driver. The structure of the cost assignment view is shown in Figure 2.7.

The elements of the cost assignment view, according to Turney (1997, p.115-116), are as follows:

- **Activity** - Activities are units of work performed within an organization.
- **Activity centre** - Activity centre is a collection of related activities, such as those in a particular department.
- **Activity cost pool** - Total cost assigned to an activity. The sum of all the cost elements assigned to an activity.
- **Activity driver** - A factor used to assign cost from an activity to a cost object. A measure of the frequency and intensity of use of an activity.
- **Cost element** - The amount paid for a resource and assigned to an activity. Part of an activity cost pool.
- **Cost object** - The reason for performing an activity. Cost objects include products, services, customers, projects, and contracts.
- **Resource** - Economic element applied or used in the performance of activities.
- **Resource driver** - The link between resources and activities. It takes a cost from the general ledger and assigns it to the activities.
Figure 2.7: The building blocks of the cost assignment view (Turney 1997, p. 97).
2.3.2 Process view

The process view provides information about why work is performed, what factors determine the effort required to perform it, and how well the work is carried out (Turney 1997, p. 85). This part of ABC provides information for operational decision-making. It helps management to identify improvement opportunities and ways to improve processes. The critical factors of the process view are the cost drivers and performance measures. These are connected to each activity or process in the customer chain. Cost drivers and performance measures are primarily non-financial (Turney 1997, p. 87).

Cost drivers provide information on the causes of an activity performed and how much effort must be expended to carry it out. Cost drivers are useful when we are searching for opportunities to improve our processes. Working to reduce the negative effects as presented by cost drivers can yield important gains in efficiency (Turney 1997, p. 87). Brimson (1991, p. 52) mentions that a positive result from cost driver in revenue, production or support-related activities that generate profit. In contrast negative result identifies unnecessary work and reduced profitability.

Performance measures provide information on the work done as well as the results achieved by how well an activity meets the needs of its internal or external customers. According to Turney, (1997, p. 88) performance measures include information about the efficiency of the activity, the time required to complete the activity, and the quality of the work done. Performance measures should be compared with other comparable activities inside or outside the firm and monitor progress over time.
2.6. The Benefits of Activity-Based Costing

In this section, the benefits of ABC systems will be presented from a theoretical perspective. The theoretical benefits of ABC can be summarized as follows:

- ABC systems report more accurate product cost and thus reduce the possibility of managers making poor decisions based on available cost information. In other words, ABC systems improve managerial decision-making, which are particularly important for firms, which face intense competitive pressures (Cooper and Kaplan, 1991b, p.277).

- An important benefit of ABC systems is the fact that they are used to influence behaviour. ABC systems measure more accurately the costs of product design and process complexity. In this way, they help product designers to understand the economic implications of their design choices and thus influence their behaviour by achieving design for manufacturability (Cooper and Kaplan, 1991b, p.397).

- ABC systems identify the amount of expenses incurred on activities and thus define which activities are necessary for the production. By identifying activities, which are not necessary, the concept of continuous improvement (Kaizen) is introduced. By eliminating these activities, a reduction in overhead costs can be achieved (Cooper and Kaplan, 1991b, p. 277-278). This is particularly important because it reflects a change in the philosophy. We have a transition from costing to cost management or better still to activity management. ABC draws management’s attention on the underlying causes of cost and profit and introduces new concepts like JIT, TQM, target costing, value chain analysis (Johnson, 1988, p. 23-26).

- ABC analysis performs activity mapping and that provides a link between the activity and the product. Consequently, managers have a clear view of the whole process and they can make improvements by redesigning the business process wherever it is necessary (Morrow and Hazell, 1992, p. 36-38).
In contrast to traditional cost systems, ABC performs customer profitability analysis. ABC recognizes that each customer has his/her own characteristics and thus the company does not make the same profit from each customer. In order to produce analyses of customer profitability, both revenue and costs must be associated with customers. The former is easily achieved through the sales and debtors accounting systems. The latter requires that the customer becomes the cost object. The ABC recognizes that the customer characteristics such as the type of distribution channel used to service the customer, the size of the customer, and the location of the customer, can influence the demand for activities. Thus, finding cost drivers for these activities and using ABC methodology to attach their costs to products can produce some novel information for management (Yoshikawa et al., 1993, p. 140-142). Cooper and Kaplan (1991b, p. 526-553) found novel and unexpected patterns of customer profitability when they examined the Kanthal Case and the Winchell Lighting Inc. Case. Their results showed that a small proportion of customers (20%) often accounts for a majority of the overall profit (80%).

ABC systems promote accurate analysis, provide efficient operating control and result in appropriate resource allocation. Operating control is not limited only to financial areas, but also in non-financial areas such as quality, delivery (including throughput and cycle time), inventory, material utilisation, and machine availability (Howell and Soucy, 1987, p. 26). With efficient operating control, appropriate resource allocation is made during the budgeting process. This is possible by “defining the activities underlying the financial figures in each function and using the level of activity to determine how much of a resource should be allocated, how well it is being managed and to explain variances from budget” (Morrow and Connoly, 1991, p. 38).
2.6. **Activity-Based Management**

In recent years there have been plenty of articles, which describe the adoption of ABC and its implementation at firm level. ABC was initially presented as a new way to establish more accurate product costs (e.g. Gunasekaran and Sarhadi, 1998; Gunasekaran et al., 1999; Kim and Ballard, 2001; Baxendale, 2001). In the last few years there have also been articles which go behind the cost numbers and cost allocations reached by ABC and focuses on the management of indirect activities and processes, at various levels beyond direct production/activity (e.g. Turney, 1992; Sharman, 1993; Mostaque Hussain and Gunasekaran, 2001; Ben-Arieh and Qian, 2003). These articles can be dealt with under the title activity-based management (ABM) or activity-based cost management (ABCM). There are a number of reasonable factors, which have changed the scope from ABC to ABM. Some of these are:

- The costs do not decrease by calculating
- If you want to affect the costs, you have to affect the activities
- It is a question of changing the way of managing and thinking.

ABM is, as mentioned above, a discipline that is focused on the management of activities as the route to continuously improve the value received by the customer and the profit achieved by providing this value. ABM utilizes the information of ABC. ABC information helps to direct resources to activities that yield the greatest profitability and helps to improve the way the work is carried out (Turney 1992, p. 20). It is possible to understand ABM as a straight extension of the process view of ABC.

On its own ABC provides better-cost information. But its most effective use is in a framework of change and continuous improvement, usually involving process re-engineering and performance measurement. *Activity-based management means integrating activity-based costing information into an overall management process* (Sharman 1993, p. 17).
Brimson (1991) provides a methodology for promoting accounting-based activity management:

1. Determine enterprise activities.

2. Determine activity cost and performance. Performance is measured as the cost per output, time to perform the activity, and the quality of the output.

3. Determine the output of the activity. An activity measure (output) is the factor by which the cost of the process varies most directly.

4. Trace activity cost to cost objectives. Activity costs are traced to cost objectives such as products, processes, and orders based on the usage of the activity.

5. Determine corporate short-range and long-term goals (critical success factors). This requires an understanding of the current cost structure, which indicates how effectively operating activities deliver value to the customer.

6. Evaluate activity effectiveness and efficiency. Knowing the critical success factors (step 5) enables a company to examine what it is now doing (step 4) and the relationship of that action to achieving those goals.

Activity analysis is an important part of ABM which focuses on the activities performed in organization in order to satisfy customers’ requirements. One of the purposes of activity analysis is to identify resources and their costs, and then to identify activities as value added and non-value added (Turney 1992, p. 22). First, by an activity has value if it is essential to the customer. These activities increase the customer value. Secondly, an activity has value if it is essential to the functioning of the organization. All other activities are non-value added.
As far as performance improvement is concerned it is important to know which activities are values added and which non-value added. Elimination of the unnecessary, non-value added, activities is a good way to reduce costs. The performance improvement actions should be directed to the value added activities. The productivity improvement is most useful in those activities, which increase the customer value or are essential to the functioning of the organization. If a firm can increase the customer value with constant costs it can get higher prices and higher profits.
CHAPTER 3: The Balanced Scorecard

3.1. Introduction

During the late 1980s there was great publicity of criticisms on traditional management accounting practices. It therefore emerged a need for new improved approaches on this matter. It is emphasised that in the competitive environment under which the organizations act, is necessary to dedicate significant amount of time, energy, as well as human and financial resources, in order to measure their performance in their effort for achievement of their strategic objectives.

Performance measurement systems constitute tools of vital importance for management. Moreover, they constitute a mechanism that increases the probability of successful introduction of strategy as well as the achievement of objective business goals.

The financial statements, such as analysis of balance sheets and income statements were the dominating elements of performance measurement systems up to the recent past. The ratios of liquidity, activity, financial structure and profitability were the main tools of performance measurement. However, financial statement analysis portrays the results of administration energies that took place in the past and display the final picture of business performance without entering into the factors that have created this performance. The exclusive use of financial statements analysis embodies the risk to ignore the long-term company development in favour of its short-term economic objectives.

The traditional performance measurement systems seem to fail on measuring and controlling the efficiency of multiple dimensions of performance. In recent times a number of studies have shown the limitations of traditional accounting measures and the importance of introducing new financial as well as non-financial measures. “The traditional method of measurement has been financial. While they provide an excellent review of what has happened in the past, they are inadequate in addressing the real value-creating mechanisms in today’s organization” Niven (2002).
“Traditional financial accounting measures like return-on-investments and earnings-per-share can give misleading signals for continuous improvement and innovation” (Kaplan and Norton, 1992).

However, businesses face numerous impediments towards the development of systems to measure performance and accurately highlight facts. What is actually needed is a system that counterbalances the historical precision of economic sizes with the factors of future output, whereas this system should also help the business in the implementation of its strategies. The Balanced scorecard undoubtedly plays an important role, regarding the new theoretical tendencies of management, with its characteristic dynamism to transform the non-tangible elements of a business to tangible, developing, namely, the aspects of economic processes and activities that hide values. “The balanced scorecard supplemented traditional financial measures with criteria that measured performance from three additional perspectives – those of customers, internal business process, and learning and growth” (Kaplan and Norton, 1996b, p.75).
3.2. Literature Review

3.2.1 What is the Balanced Scorecard?

Robert Kaplan of Harvard University and David Norton CEO of Nolan Norton and an American management consultant at the beginning of 1990s, after a year long research in 12 companies, which were considered as pioneers of performance measurement in their respective fields, presented a new approach of firm evaluation and performance the so called “Balanced Scorecard” (BSC).

Scorecard is understood to mean quantified performance measures and balanced is understood to mean that the system as a whole is balanced.

The concept of Balanced Scorecard was the result of a study in “Measuring performance in the organization of the future” timed in early 1990’s, which was sponsored by Nolan Norton Institute. In Kaplan and Norton first article (1992, p.71) we see a first version for the significance of Balanced Scorecard, “a set of measures that gives top managers a fast but comprehensive view of the business”.

The basic idea is to align financial measures (that tell the results of actions already taken) with non-financial (operational) measures (on customer satisfaction, internal processes, and the organization’s innovation and improvement activities, operational measures that are the drivers of future financial performance) together in a comprehensive presentation. This may allow management to overview the current situation and present an innovative management perspective that can be used to interpret strategy for growth into operational terms on the understanding that today’s managerial requirements demand that managers are in a position to overview performance in several departments concurrently.
Kaplan and Norton (1996b) state that the Balanced Scorecard describes an organisation’s mission and strategy into a detailed set of performance measures and provides the framework for strategic measurement and management.

The concept of the Balanced Scorecard offers answers to four main often asked management questions:

How do customers see us? (leads us to a customer perspective with measurement of customer relations).

What must we excel at? (leads us to an internal perspective of processes and co-workers in the organization).

Can we continue to improve and create value? (leads us to an innovation and learning perspective where we look for future success already today).

How do we look to shareholders? (points out the financial perspective, as something the organization must handle well), (Kaplan and Norton, 1992).

In short, we can see that Balanced Scorecard is a framework allows the interpretation of the enterprises’ targets into a series of performance indicators which may be divided into four main categories:

a) Financial  
b) Customer  
c) Internal Business Processes and  
d) Learning and Growth.

Some indicators may measure the company’s progress towards its targets while others may measure the long-term drivers towards success. Through the balanced scorecard an organization may monitor its current performance (finance, customer satisfaction, and business process results) as well as the endeavours to improve processes, motivate and educate employees, and update information systems. In other words offer the facility to learn and make improvements accordingly.
Wachtel et al. (1999) argue that the Balanced Scorecard approach gives the possibility in the leadership of an organization to follow long-term improvements, without focusing only on short-term financial objectives, and under the condition that already it has translated the mission and vision in concrete strategic objectives. The whole process begins after the determination of the appropriate objectives, and the Scorecard guides the organization to develop reasonable performance measures and establishes targets, initiatives and alternatives to meet programmatic goals.

The adoption of Balanced Scorecard from several companies shows that it meets several managerial needs. “The scorecard brings together, in a single management report, many of the seemingly disparate elements of a company’s competitive agenda: becoming customer oriented, shortening response time, improving quality, emphasizing teamwork, reducing new product launch times, and managing for the long term” (Kaplan and Norton, 1992, p.73). Also, “The scorecard guards against sub optimisation. By forcing senior managers to consider all the important operational measures together, the balanced scorecard lets them see whether improvement in one area may have been achieved at the expense of another” (Kaplan and Norton, 1992, p.73).

It would be wise to stress at this point that performance measures indicate the after-effects of actions and financial measures already taken as lag indicators. They often outline the results at the end of a set time period as well as historical performance. For example; sales figures may be considered a lag indicator.

“Lead indicators” on the other hand should show expected future economic performance and should compliment “lag indicators”

“Leading indicators should predict performance of lagging measures” (Niven, 2002).

Hence, an effective Balanced Scorecard should contain a mix of lag and lead indicators. The assumed relationship between the two suggests that improved performance in a leading indicator will drive better performance in the lagging indicator.
For example, offering better services and products to a valued customer (a leading indicator) may hypothetically lead to improvements in customer satisfaction (a lagging indicator).

Kaplan and Norton (1996a, 1996b) report their experience of several companies using the Balanced Scorecard as the basis of integrated strategic management. According to them it assists the company in aligning its management processes and allows it to steer towards a long-term strategy to be implemented in the company as a whole. These companies have reported to use the balanced scorecard for four main reasons (figure 3.1):

- **Clarify and translate vision and strategy** (Executives agree on the common long-term strategy along with objectives and measures which employees can understand and implement accordingly).

- **Communicate and link strategic objectives and measures** (Understanding of strategy throughout the entire organisation and aligning of all relevant parties to it)

- **Plan, set targets, and align strategic initiatives** (helps various managers to prioritise objectives and allocate resources accordingly) and

- **Enhance strategic feedback and learning** (allows employees to report progress and/or problems in the implementation and identify shortcomings of employees and even management staff).
As Kaplan and Norton (1996b, p.75) stated “managers using the balanced scorecard do not have to rely on short-term financial measures as the sole indicators of the company’s performance. The scorecard lets them introduce four new management processes that, separately and in combination, contribute to linking long-term strategic objectives with short-term actions.”

According to Kaplan and Norton (2001a, 2001b) research indicating successful implementation of the Balanced Scorecard identified five main principles: 

- “translate the strategy into operational terms” they mean that the scorecard means a commonly comprehensible outline which can help as reference point to all organizational units as well as employees by presenting strategy into an architectural and strategical map. On the other hand the Balanced Scorecard details all the main elements of the organization’s growth strategy.
“align the organization to the strategy” (Kaplan and Norton, 2001a, 2001b) refers to how linked and intergraded the organization as a whole must be in order to achieve improved performance. The Balanced Scorecard describes how such linkage and integration may be developed in order to prevent different units and/or departments of the organization from counteracting and counter balancing one another. It is a common occurrence in many organizations that different departments are uncoordinated and there is lack of communication and understanding of each other’s functions. These may create a major barrier in achieving towards a common and mutually advantageous goal and in implementing strategy as a whole.

“make strategy everyone’s everyday job” signifies that the Balanced Scorecard could help to inform and help everyone together towards a common goal i.e. the company’s strategy. There are of course sceptics claiming that such limitless communication may make it easier for competitors to know about it as well and therefore act accordingly. To this they answer that “knowing the strategy will do little good unless they execute it. On the other hand we have no chance to execute it if people don't know about it”. Similarly Kotter (1996) argues that real power occurs when everyone within the organization have a clear understanding of objectives and directions. He adds that true success stems from a “top down communication” rather than a “top down direction”.

“make strategy a continual process” it is understood that the Balanced Scorecard introduces a new “double loop process” for strategic management. In it management tactics and strategy management are intergraded. This is done in mainly as follows:

✔ Firstly, by linking strategy to budgeting and where the Balanced Scorecard is used to evaluate potential investments and initiatives. It therefore offers some protection to long-term objectives from sub-optimising short-term ones. Budgeting on the other hand aims to the protection of long-term objectives from pressures to deliver short-term financial gains.
Secondly, by making strategy a continual process simply by introducing management meetings in which staff can review the strategy as well as offer feedback on progress and/or problems on it. Through a continual process of dual learning the strategy evolves and conforms to reality. The initial Balanced Scorecard starts by making a hypothesis about strategy. As it evolves is offer the best estimation for long-term financial gains. It links the “cause and effect” of the strategy hypothesis. Therefore, as it is put into action and as the feedback starts to work its way through the system the organization is in a position to actually test the strategy hypothesis.

“mobilize leadership for change” also named “mobilize change through leadership” (Kaplan and Norton 2001b) the authors claim that while in the first four principles the greater emphasis is given to the Balanced Scorecard and the actions and processes that offer support to it, they also advocate that actual active executive staff involvement is perhaps the most significant factor of all. If top management are not leading the process – there will be no change – strategy will not be implemented and opportunities for outstanding and improved performance will be left unexploited. As time goes, there is good evidence to indicate that a new type of management will became more accepted. This is a management system that allows new cultural values and processes to become more established. This is also in line with Kotter (1996) who describes the occurrence of transformational change. Linking some traditional process such as compensation and resource allocation to a Balanced Scorecard describing strategy, “a strategic management system” is created. He adds that strategy evolves continually to allow foe changes in opportunities arising and threats appearing. At this point it should be stressed that integrating a new strategy into an organization should not risk or threaten future progress.
3.2.2 Implementation Method

The Balanced Scorecard offers more than a comprehensive list of measures in which problems are identified. It offers a linkage between the organization’s strategies with a number of key metrics.

Otherwise, by adding new metric measures to already existing financial ones would result to a huge number of measures to be created. That would cause information overload and would be impossible to implement. In order to avoid such an occurrence the Balanced Scorecard gives greater emphasis to only four major areas of performance:

a) the financial perspective
b) the internal business perspective
c) the customer perspective and
d) the innovation and learning perspective (Figure 3.2).

Figure 3.2: Translating Vision and Strategy: Four Perspectives. (Kaplan and Norton, 1996b, p. 76)
a) The **financial perspective** refers to the company’s long-term objectives. The measures deriving from that perspective offer evidence as to how well the strategy is executed and whether it is actually improving bottom line results. It does, however, include traditional accounting methods such as return on capital, cash flow analysis, revenue volume and so on.

b) The **customer perspective** should include several standard measures such as customer satisfaction and customer retention always tailored to meet the value proposition chosen.

There are three main value proposition “disciplines” as presented by Treacy and Wiersenna (1995).

- **“Operational excellence”** focusing on “no frills” services offered at value for money prices.
- **“Product leadership”** where the company aims to be pioneering products in the market place.
- **“Customer intimacy”** focusing on customer retention through deep knowledge of the clientele’s needs and demands.

Drivers of these objectives may include advertising and reputation building and should aim to customer satisfaction and increased market share.

c) The internal process perspective aiming at organising the company by allocating internal processes leading to increased productivity and efficiency as well as customer satisfaction and increased shareholders’ benefits. As per Kaplan and Norton (1996a, p. 96) this internal value chain should include three fundamental processes common to all firms i.e.

- **“innovation”** (where managers define measures to identify and respond to customer needs).
- **“operations”** (where managers define measures to illustrate the company’s performance in making and delivering the product to the customer) and,
• “post sales service” (where managers determine whether the existing post sale services are adding to the value of the product sold).

d) The learning and growth perspective relates mainly to employees and how well the objectives and measures are implemented as well as ways to facilitate any training and knowledge diffusion required. In this way, companies invest through training programs and seminars, updating information technology systems and generally keeping up with changing market conditions and requirements.

In the short-term all these activities cost the company in the way of increased expenditure but they enable long-term success through competitive market challenging, employee satisfaction, employee retention and increased productivity.

The developing process of the Balanced Scorecard refers to the translation of vision and strategy into measures and objectives in both the bottom-up as well as the top-down approach (Figure 3.3).

Figure 3.3: Translating with the Balanced Scorecard (Niven, 2002, p. 107)
Within the aforementioned four perspectives it should be noted that, in total, the number of measures should not surpass 15 and 20 and conversely should not be more than three or four for each one of the four perspectives. These numbers should stay so low in order to avoid potential information overload. These measures should be the ones most critical in enhancing and achieving breakthrough performance to fight competition. They should be the true definition of "performance".

Balanced Scorecard combines a number of flows that are going on in the organization. By understanding the organization in this context, the manager can learn what connections exist between the different perspectives. Earlier, these perspectives have been viewed orderly and separately from one another. The common picture of the four dimensions is one of the contributions of the Balanced Scorecard concept.
3.3. **Scepticism on the Balanced Scorecard**

The Balanced Scorecard has also been shown to have certain weak points according to Atkinson, Wells and Waterhouse (1997).

- It may fail to successfully demonstrate the benefits deriving from certain suppliers.
- It similarly may fail to successfully identify the positive contributions of well meaning and well motivated employees.
- It may be hard to identify the importance of the local community and the economic environment the company works in.
- It may fail to clearly show the stakeholders’ contributions to the company.

In other words, it cannot clearly demonstrate the quality of service and products provided by certain suppliers as opposed to others. All firms need good and steady relations with theirs suppliers as the quality and timeliness of the finished product partially depends on the quality and timeliness of the suppliers’ services and products.

It may also, fail to demonstrate the role of human resources. It cannon measure the importance of “motivated employees”. Considering that most companies nowadays are dealing in the service sector which makes employees probably the most valuable company asset.

It also, fails to give answers to the importance and role of the local community in which the company is based and operates in the relevant laws and macro-economics’ environment and what implications they have on the company.

One other essential aspect of the Balanced Scorecard is the strategic orientation and how according to Simons (1990) difficult it may be to use it as a strategic control system. Strategic control may be effective only when using familiar, tried and tested methods which can be easily understood and implemented by managers thus achieving unobstructive strategy control.
According to Buglione and Abran (1999) although the Balanced Scorecard connects strategic goals and drivers logically it cannot provide consolidation for each perspective in either relative or absolute terms and thus failing to offer overall value.

Letza (1996, p. 58) also states “The scorecard puts strategy and vision at the centre. Traditional measurement systems have a control bias, that is, they specify the particular actions they want employees to take and then measure to see whether or not the employees have taken these actions – they try to control behavior. The balanced scorecard, on the other hand, assumes that people will adopt whatever action is necessary to arrive at these goals”.

Another disadvantage is that the bigger the company the more complex and numerous the Balanced Scorecards will have to be. For the successful creation and implementation of the Balanced Scorecard it is necessary to employ external management consultants. This in turn, increases the cost of implementing it. (Kaufman and Wagner, 2004).

Epstein and Manzoni, (1998) similarly think that perhaps the biggest disadvantage with the Balanced Scorecard is the necessity for external professional help.

Heinz Ahn (2001) believes that the Balanced Scorecard creates too many cause and effect relationship making difficult for employees and executives to have a common goal and adds that each company should develop their own unique scorecards tailor-made to their specific needs and targets otherwise risk deriving misleading information from it.

4.1. The Analytic Hierarchy Process

The Analytic Hierarchy Process (AHP), developed at the Wharton School of Business by Thomas Saaty (1980, 1996), allows decision makers to model a complex problem in a hierarchical structure showing the relationships of the goal, objectives (criteria), sub-objectives, and alternatives. Thus, a typical hierarchy consists of at least three levels, the goal(s), the objectives, and the alternatives.

AHP enables decision-makers to derive ratio scale priorities or weights as opposed to arbitrarily assigning them. In so doing, AHP not only supports decision makers by enabling them to structure complexity and exercise judgment, but allows them to incorporate both objective and subjective considerations in the decision process (Forman, 1983).

In most cases the priority ranking of the various measures is not uniform across all decision makers at all levels, i.e., different constituencies (such as departments or divisions) hold different opinions as to the relative importance of the measures. When opinions differ about ranking measures is where the AHP comes into its own. Whereas something like DELPHI technique seeks resolution by iterative polling until consensus is reached, the AHP user asks constituents (via a questionnaire) to make a sequence of pair wise comparisons of the measures, and the comparisons then are analyzed via a mathematical model to establish the relative priorities of the measures (usually taking the geometric mean of the answers for each specific question), after which another algorithm is applied to establish the final ranking of the decision objectives or alternatives (i.e., the different strategies, departments or divisions).

The results then are synthesized to determine the overall importance of each alternative in achieving the main (overall) goal. The pair wise comparisons are quantified using the standard one-to-nine AHP measurement scale (Saaty, 1980):
<table>
<thead>
<tr>
<th>Ratio</th>
<th>Term</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Equal Importance</td>
<td>Two activities contribute equally to the objective.</td>
</tr>
<tr>
<td>3</td>
<td>Moderate Importance</td>
<td>Experience and judgment slightly favour one activity over another.</td>
</tr>
<tr>
<td>5</td>
<td>Essential or Strong</td>
<td>Experience and judgment strongly favour one activity over another.</td>
</tr>
<tr>
<td>7</td>
<td>Demonstrated Importance</td>
<td>An activity is strongly favoured and its dominance is demonstrated in practice.</td>
</tr>
<tr>
<td>9</td>
<td>Extreme Importance</td>
<td>The evidence favouring one activity over another is of the highest possible order of affirmation.</td>
</tr>
</tbody>
</table>

**Table 4.1**: The standard AHP measurement scale

The AHP is ideally suited to help resolve certain problems that arise when multiple criteria are used in performance evaluation. For example, the pairwise comparisons for measure (s) priority can be done using a ratio scale. This facilitates the incorporation of non-quantitative measures into the evaluation scheme, since it forces participants to translate all criteria into relative priority structures based on the scale. Thus, using the AHP means that non-quantitative assessments can be combined with quantitative assessments in rating a unit or an individual.

The AHP has been widely and successfully applied in a variety of decision-making environments (Zahedi, 1986; Golden, Wasil, and Harker, 1989; Zopounidis and Doumpos, 1997, 1998, 1999a, 1999b, 2000a, and 2000b).
4.2. The Proposed ABC – BSC Framework Using AHP

4.2.1 The Balanced Scorecard Measures

Suwignjo, et al. (2000) developed an approach for the quantitative modeling of performance measurement systems. The objective of their research was to identify tools and techniques that would facilitate:

- identification of factors (measures) affecting performance and their relationships,
- structuring the factors hierarchically, and
- quantifying the effect of the factors on the overall performance.

Stage one of the approach uses the cognitive mapping technique to identify factors, which affect performance and their relationship with one another. This is a very similar approach to the 'strategy map' proposed by Kaplan and Norton (1996B; 2001).

In stage two the cognitive maps are converted into cause and effect diagrams, which are used as a discussion tool to structure the factors that affect performance hierarchically. Structure diagrams are then used to formalise the hierarchical nature of the performance measurement system (Suwignjo, et al. 2000, p 233). Finally, in stage three the Analytical Hierarchy Process is used to quantify the relationship of each factor with the others with respect to overall performance.

Sohn, et al (2003, p. 282) proposed a list of BSC measures, after a complete survey of relevant literature, which 'can be considered as a revision of Kaplan and Norton's original measures'. These BSC measures consist of the four major perspectives and twenty sub-measures, five by each major measure (perspective). For example, the financial measures include revenue growth, investment, profitability, asset utilisation, and unit cost. In particular, a measure called 'knowledge sharing' is included for the learning/growth perspective.

The relative weights for each performance measure can be calculated using the Analytic Hierarchical Process (AHP) on the basis of two stepwise questions. First, six questions are asked for comparing (pair wise) the major BSC measures.
(financial, customer, internal process, and learning/growth). Subsequently, ten questions are asked to compare (pair wise) the five sub-performance measures under each major measure (Saaty and Vargas, 1994).

Finally, Chen and Pan (2004) adopt the AHP in identifying key performance indicators (KPIs) for the service industry from a list of performance measures covering the four dimensions of the BSC. Their research employs two stages: They first identify as many as possible KPIs of the service industry that have been discussed through a meta-analysis on SSCI journals published between 1999 and 2002. Moreover, several depth interviews with various executives were performed to identify relevant KPIs. Then, colleagues of respective disciplines and practitioners were invited to fill respective AHP questionnaires and the results gathered from this survey were then analyzed to verify the most important KPIs of each dimension. Computation was ended at clearly determined KPIs through comparison of weight loading. Any AHP importance weight values larger than 0.1, were included as KPI of particular dimensions.

Our proposed methodology of integrating BSC and ABC is a different one based on the work of Hafeez et al. (2002), who employ AHP in determining key capabilities of a firm.

Cost drivers of the generic or outcome measures deserved firm's great amount of attention since costs appear whenever actions are performed and interacted. Supply chain perspective views the entire value-added flow that delivers products/services to customers as internal business process. BSC, as a dynamic strategic managerial tool, assumes that the four dimensions are interactive and interdependent. This research hence assumes that all generic measures proposed by Kaplan and Norton (1996c) could be significantly affected by an effective internal process control. Consequently, all our efforts are focused on the identification of the cost drivers of the internal business process that mostly affect the outcome measures, mainly, of the two perspectives, the finance and customer one.
4.2.2 The ABC - BSC framework

Cost drivers may be determined through internal business process or value chain analysis. This involves evaluating the contribution of firm cost drivers against the generic (outcome) measures of the finance and customer perspective. Essentially the framework consists of three steps:

Step 1: Determining generic performance measures and mapping firm cost drivers.

Step 2: Evaluating performance contributions using AHP.

Step 3: Determining key cost drivers.

As we have already mentioned above, Kaplan and Norton (1996c) indicate which exactly these generic measures should be (profitability, market share, customer satisfaction, customer retention, and employee satisfaction) and explain why these outcome measures should belong only to the two perspectives (financial and customer), mainly because they “reflect the common goals of many strategies, as well as similar structures across industries and companies”.

The cost drivers mapping exercise requires the management to fully understand their business processes and activities. Cost drivers could be mapped through the analysis of functional areas such as purchasing, R&D, manufacturing, marketing, and services after sales. Since each function usually comprises a large number of embedded activities, this could lead to an exhaustive list. However, firms that already use ABC could easily limit this list to an acceptable minimum.

Since most of the cost drivers are qualitative by nature, very often decision makers have to resort to some subjective assessment procedure to conduct the evaluation process. Also, the necessity of conducting a multi-dimensional performance analysis implies solving multi-criteria decision-making problem.

AHP is a suitable approach for undertaking quantitative as well as qualitative analysis (Saaty, 1980). The approach differs from other multi-criteria as subjective judgments are readily included and the relevant inconsistencies are dealt with appropriately (Chan and Lynn, 1991).
The application of the AHP is based on the following four principles (Saaty, 1994):

1. **Decomposition** - A complex decision problem is decomposed into a hierarchy with each level consisting of a few manageable; each element is further decomposed and so on.

2. **Prioritisation** - Involves pair wise comparisons of various elements residing at the same level with respect to an element from the upper level of the hierarchy.

3. **Synthesis** - The priorities are pulled together through the principle of hierarchic composition to provide the overall assessment of the available alternatives.

4. **Sensitivity analysis** - The stability of the outcome is determined by testing the best choice against 'what-if type of change in the priorities of the criteria.

The AHP provides a measure called the consistency ratio (CR) to check the consistency of judgment. Inconsistency is likely to occur when decision-makers make errors or exaggerated judgment during the process of pair wise comparisons. A consistency ratio of 0.1 is considered as the acceptable upper limit. If the consistency ratio is greater than 0.1 then the decision-makers have to re-evaluate their judgments in pair wise comparisons until the ratio becomes finally less than 0.1.

**4.2.3 The financial perspective evaluation model**

The overall objective of this evaluation is to examine the contributions made by cost driver alternatives to the financial business performance. Under this objective, the model may consist of evaluation criteria and cost driver alternatives. The criteria used here are those financial generic measures proposed by Kaplan and Norton (1996b), margin growth and revenue growth. The alternatives here are the cost drivers identified from the internal business processes and activities. Individually, the cost driver alternatives may have a hierarchy themselves.
A typical three-level AHP model involves three basic steps. The first step is to determine the importance of the criteria, i.e., the two generic financial measures, to the overall objective by pair wise comparison. It involves an objective or subjective assignment of preference weights to each pair of the measures. Asking the following question may help to make the comparisons:

- Which generic financial measure is more important with regards to the overall financial objective, margin growth or revenue growth, and by what scale (1-9)?

The second step involves evaluating the impact of each cost driver alternative on the financial business performance. The alternatives are compared among themselves with respect to each financial measure; hence a weight vector is assigned for each of the alternatives. The third step is to synthesize the assignment results. The weight vectors of the generic measures and the cost driver alternatives need to be combined together to generate a final list of weighting vectors for the cost driver alternatives. The list illustrates which cost drivers are more important than others in terms of contributing to the firm's financial performance.

The decision-makers may make the pair wise comparison with the help of a computer software package, e.g., the Expert Choice (2004). The software is able to execute each phase of the evaluation and then synthesize these judgments. It is also able to check the consistency ratio for the pair wise comparisons of each level automatically.

### 4.2.4 The non-financial perspective evaluation model

The overall objective of this evaluation is to examine the contributions made by cost driver alternatives to the non-financial business performance. The criteria used here are those non-financial generic measures proposed by Kaplan and Norton (1996c), customer acquisition, customer retention, and employee satisfaction. The alternatives here are the cost drivers identified from the internal business processes and activities. Again, the final result of the AHP evaluation is a list of prioritized cost drivers whose values indicate their relative importance to non-financial business performance. As mentioned earlier, most of the non-financial measures are
qualitative. This means that the pair wise comparisons of the non-financial measures rely upon the subjective judgment of the decision-makers. If there is more than one decision-maker involved, the pair wise scores assigned to the criteria and cost driver alternatives should be based on the geometric mean of the individual scores.
CHAPTER 5: Methodology

Case study is an ideal methodology when a holistic, in-depth investigation is needed. As Yin (1994) said case study is the preferred strategy when ‘how’ or ‘why’ questions are being posed, when the investigators has little control over events, and when the focus is on a contemporary phenomena within some real-life context.

Yin (1993) has identified some specific types of case studies: Exploratory, Explanatory, and Descriptive. Exploratory cases are sometimes considered as a prelude to social research. Explanatory case studies may be used for doing causal investigations. Descriptive cases require a descriptive theory to be developed before starting the project.

Yin (1994) presented at least four applications for a case study model:

- To explain complex causal links in real-life interventions
- To describe the real-life context in which the intervention has occurred
- To describe the intervention itself
- To explore those situations in which the intervention being evaluated has no clear set of outcomes.

Techniques that will be used for the collection of evidence – for the building model – is the direct observation to gather data which could be formal or casual activities, but the reliability of the observation is the main concern, and archival records (financial and non-financial) could be useful in some studies since they include service records, maps, charts, lists of names, survey data, and even personal records such as diaries. And the systematic interviewing - which is one of the most important source of case study information - with top management of the firm, using several forms: open-ended, focused, or structured; for the evaluation of the new proposed tool-model. Taking into consideration all above facts, that is, the type of questions under examination (‘how’ and ‘why’), and the contemporary set of events over which the researcher has no control, and then it is logical to adopt the case study research method.
Our case study could be described as descriptive, in the sense that the researcher will construct an “ABC - BSC” framework-model, with the cooperation of a chosen firm’s management team.

The model was based on the expert opinions of a Greek cigarette-manufacturing firm for the following reasons:

a) It is a firm that has allowed the researcher to have access in all its archival records and documents.

b) All top executives of the firm accepted the researcher for having scheduled interviews, either with each one separately or with all of them as a group, for the identification and valuation of the cost drivers.
CHAPTER 6: Case Study

Our case (Company A) is a Greek cigarette manufacturing firm with more than 400 employees and over 135 million Euros turnover. Its current competitive strategy is one of differentiation. The business of company A is compartmentalized into five main functions, namely, purchasing, sales and marketing, R&D, manufacturing and performance management. The management of the company A was asked to identify essential cost drivers within each functional area. The mapping process was restricted to analyze the activities at the operational level. A list of 34 cost drivers was generated, which were prioritized according to their perceived importance to the business. This helped to reduce the list to a set of twenty-six cost drivers understood to be the major cost drivers of the company keeping in mind the business objectives and strategies (Table 6.1).

<p>| | |</p>
<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Scope of improvement of production procedure</td>
</tr>
<tr>
<td>2</td>
<td>Frequency of improvement of production procedure</td>
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<tr>
<td>3</td>
<td>Increase in capacity</td>
</tr>
<tr>
<td>4</td>
<td>Expenses associated with updated equipment</td>
</tr>
<tr>
<td>5</td>
<td>Expenses associated with process improvement</td>
</tr>
<tr>
<td>6</td>
<td>Error Reduction</td>
</tr>
<tr>
<td>7</td>
<td>External marketing campaigns</td>
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<tr>
<td>8</td>
<td>External marketing expenses</td>
</tr>
<tr>
<td>9</td>
<td>Frequency of new products and services</td>
</tr>
<tr>
<td>10</td>
<td>Internal adjustment expenses</td>
</tr>
<tr>
<td>11</td>
<td>Price of products/services</td>
</tr>
<tr>
<td>12</td>
<td>Quality of products/services</td>
</tr>
<tr>
<td>13</td>
<td>Expenses on R &amp; D for new products' development</td>
</tr>
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<td>14</td>
<td>Expenses on Market Research</td>
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<tr>
<td>15</td>
<td>Short Lead-times</td>
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<td>16</td>
<td>On-time Delivery</td>
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<tr>
<td>17</td>
<td>Expenses associated with on job training</td>
</tr>
<tr>
<td>18</td>
<td>Number of returned products</td>
</tr>
<tr>
<td>19</td>
<td>Number of retail outlets</td>
</tr>
<tr>
<td>20</td>
<td>Location of retail outlets</td>
</tr>
<tr>
<td>21</td>
<td>Strategic Job coverage ratio</td>
</tr>
<tr>
<td>22</td>
<td>Strategic information availability ratio</td>
</tr>
<tr>
<td>23</td>
<td>Personal goal alignment</td>
</tr>
<tr>
<td>24</td>
<td>Ways of performance appraisal</td>
</tr>
<tr>
<td>25</td>
<td>Efficiency of performance appraisal system</td>
</tr>
<tr>
<td>26</td>
<td>Human-oriented compensation system</td>
</tr>
</tbody>
</table>

Table 6.1: List of the most important cost driver alternatives
The financial and non-financial AHP models were formed by translating the generic measures and the cost driver alternatives in a three-level hierarchical structure (Figures 6.1 and 6.2):

**Figure 6.1**: The financial AHP model of Company A (L1 = Level 1, L2 = Level 2 and L3 = Level 3)

![Financial AHP Model](image1)

**Figure 6.2**: The non-financial AHP model of Company A (L1 = Level 1, L2 = Level 2 and L3 = Level 3)

![Non-financial AHP Model](image2)
The first and second levels of the models were formed using respectively, the overall objective and the performance measures. The third level was formed using the identified twenty-six most important cost driver alternatives.

The evaluation process started at the second level. The generic performance measures were compared pair wise to assign the subjective priorities provided by the management of Company A. The assigned scales were subsequently processes using the Expert Choice software package. Tables 6.2 and 6.3, respectively, show the priority weights of the financial and non-financial generic measures:

<table>
<thead>
<tr>
<th></th>
<th>Margin Growth</th>
<th>Revenue Growth</th>
<th>Priority Weights</th>
</tr>
</thead>
<tbody>
<tr>
<td>Margin Growth</td>
<td>1</td>
<td>2</td>
<td>0.58</td>
</tr>
<tr>
<td>Revenue Growth</td>
<td>1/2</td>
<td>1</td>
<td>0.42</td>
</tr>
</tbody>
</table>

Table 6.2: The priority weights for financial measures

<table>
<thead>
<tr>
<th></th>
<th>Employee Satisfaction</th>
<th>Customer Acquisition</th>
<th>Customer Retention</th>
<th>Priority Weights</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employee Satisfaction</td>
<td>1</td>
<td>1/5</td>
<td>1/8</td>
<td>0.064</td>
</tr>
<tr>
<td>Customer Acquisition</td>
<td>5</td>
<td>1</td>
<td>1/4</td>
<td>0.237</td>
</tr>
<tr>
<td>Customer Retention</td>
<td>8</td>
<td>4</td>
<td>1</td>
<td>0.699</td>
</tr>
</tbody>
</table>

Table 6.3: The priority weights for financial measures
For level three, the selected cost driver alternatives of table 6.1 was compared pair wise against each of the criteria (generic measures) employing the same procedure as described earlier? In order to collect data at the level three of the hierarchy the decision makers were asked to compare each of the cost driver alternatives in pairs. The specific question put up to the management was: Which cost driver is more important with regards to the financial objective margin growth, the scope of improvement of production procedure or the frequency of improvement of production procedure, and by what scale (1-9)?, and so on. The final priority weights were calculated, automatically by Expert Choice software package; by cross-multiplying the priority weights from level three up to level one. Table 6.4 presents the overall scores for the financial and non-financial performance evaluations:

<table>
<thead>
<tr>
<th>No</th>
<th>Cost driver alternatives</th>
<th>Priority weights of financial evaluation</th>
<th>Priority weights of non-financial evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Scope of improvement of production procedure</td>
<td>0.0352</td>
<td>0.0216</td>
</tr>
<tr>
<td>2</td>
<td>Frequency of improvement of production procedure</td>
<td>0.0352</td>
<td>0.0277</td>
</tr>
<tr>
<td>3</td>
<td>Increase in capacity</td>
<td>0.0352</td>
<td>0.0152</td>
</tr>
<tr>
<td>4</td>
<td>Expenses associated with updated equipment</td>
<td>0.0354</td>
<td>0.0277</td>
</tr>
<tr>
<td>5</td>
<td>Expenses associated with process improvement</td>
<td><strong>0.0596</strong></td>
<td><strong>0.0601</strong></td>
</tr>
<tr>
<td>6</td>
<td>Error Reduction</td>
<td>0.0463</td>
<td>0.0330</td>
</tr>
<tr>
<td>7</td>
<td>External marketing campaigns</td>
<td>0.0354</td>
<td>0.0236</td>
</tr>
<tr>
<td>8</td>
<td>External marketing expenses</td>
<td>0.0354</td>
<td>0.0349</td>
</tr>
<tr>
<td>9</td>
<td><strong>Frequency of new products and services</strong></td>
<td><strong>0.0652</strong></td>
<td><strong>0.0604</strong></td>
</tr>
<tr>
<td>10</td>
<td>Internal adjustment expenses</td>
<td>0.0177</td>
<td>0.0236</td>
</tr>
<tr>
<td>11</td>
<td>Price of products/services</td>
<td><strong>0.0808</strong></td>
<td><strong>0.0828</strong></td>
</tr>
<tr>
<td>12</td>
<td>Quality of products/services</td>
<td><strong>0.0769</strong></td>
<td><strong>0.0734</strong></td>
</tr>
<tr>
<td>13</td>
<td>Expenses on R &amp; D for new products' development</td>
<td>0.0330</td>
<td>0.0236</td>
</tr>
<tr>
<td>14</td>
<td>Expenses on Market Research</td>
<td>0.0277</td>
<td>0.0215</td>
</tr>
<tr>
<td>15</td>
<td>Short Lead-times</td>
<td>0.0215</td>
<td>0.0152</td>
</tr>
<tr>
<td>16</td>
<td>On-time Delivery</td>
<td>0.0277</td>
<td>0.0152</td>
</tr>
<tr>
<td>17</td>
<td>Expenses associated with on job training</td>
<td>0.0452</td>
<td>0.0877</td>
</tr>
<tr>
<td>18</td>
<td>Number of returned products</td>
<td>0.0216</td>
<td>0.0154</td>
</tr>
<tr>
<td>19</td>
<td><strong>Number of retail outlets</strong></td>
<td><strong>0.0538</strong></td>
<td><strong>0.0584</strong></td>
</tr>
<tr>
<td>20</td>
<td>Location of retail outlets</td>
<td>0.0249</td>
<td>0.0115</td>
</tr>
<tr>
<td>21</td>
<td><strong>Strategic Job coverage ratio</strong></td>
<td><strong>0.0572</strong></td>
<td><strong>0.0604</strong></td>
</tr>
<tr>
<td>22</td>
<td>Strategic information availability ratio</td>
<td>0.0136</td>
<td>0.0177</td>
</tr>
<tr>
<td>23</td>
<td>Personal goal alignment</td>
<td><strong>0.0968</strong></td>
<td><strong>0.0872</strong></td>
</tr>
<tr>
<td>24</td>
<td>Ways of performance appraisal</td>
<td>0.0036</td>
<td>0.0077</td>
</tr>
<tr>
<td>25</td>
<td>Efficiency of performance appraisal system</td>
<td>0.0036</td>
<td>0.0393</td>
</tr>
<tr>
<td>26</td>
<td>Human-oriented compensation system</td>
<td>0.0115</td>
<td>0.0552</td>
</tr>
</tbody>
</table>

*CR=0.03<0.1 and**CR=0.02<0.1

Table 6.4: The overall priority weights for cost driver alternatives
Note that only seven cost driver alternatives (those in bold letters) have simultaneously secured high score (above 0.05) with respect to both dimensions (financial and non-financial). For example, 'expenses associated with on job training' and 'human-oriented compensation system’ were rated high (0.0877 and 0.0552 respectively) with regards to the non-financial performance but low (0.0452 and 0.0115 respectively) against the financial performance.

Consequently, those seven cost drivers should represent the performance indicators of the BSC of Company A. The complete BSC of Company A under an AHP environment should look like figure 6.3:

**Overall Objective (Level 1)**

**The Five Generic Measures (Level 2)**

- Margin growth
- Revenue growth
- Customer acquisition
- Customer retention
- Employee satisfaction

**The Seven Performance (Cost) Drivers (Level 3)**

- Expenses associated with process improvement
- Frequency of new products and services
- Price of products/services
- Quality of products/services
- Number of retail outlets
- Strategic Job coverage ratio
- Personal goal alignment

**The Alternatives for evaluation (Level 4)**

(These could be alternative strategic options or different departments/divisions)

Figure 6.3: The complete BSC - AHP framework of Company A
CHAPTER 7: Concluding Remarks

To ensure its survival in the global economy, the modern organization needs to develop better methods of assessing its performance than simply using financial measures such as return on investment or residual income. In addition to the goal of financial well-being, other goals are vital to the company's long-term profitability and survival. Kaplan and Norton (1992, 1993, 1996a, and 1996b) proposed the BSC as a suitable model for the performance measurement process of any type of organization. On the other hand, Activity-Based Costing (ABC) provides correct costing information characteristics of being efficient and relevant.

Although ABC and BSC are in practice well accepted as reliable tools for business operations, and it seems reasonable to adopt these two as an integrated tool for a better service to the top management and the firm, to our knowledge there are few if any existing researches covering this specific field. Since BSC is a multi-goals targeting model that focuses on the decision-making problems where multiple criteria involved it seems appropriate for this research to adopt AHP in identifying the performance drivers (cost drivers) of the generic or outcome measures proposed by Kaplan and Norton (1996c).

This study presents a structured framework for determining the key performance (cost) drivers of the BSC from the ABC system using the analytic hierarchy process (AHP). The AHP is utilized due to its ability for taking into account both the quantitative and qualitative measures. The framework is illustrated and validated using a case study. The results obtained are to be exploited by Company A to enhance their operational and strategic business performance.

We view our framework as a tool, combining the BSC and ABC information advantages, capable of assisting the whole decision-making process of any organization, from the evaluation of the strategic options formed during the formation and formulation stages to the continuous evaluation of the implemented strategy through the evaluation of the various departments, divisions, and SBUs. The framework is generic in nature, and is suitable to be exploited for identifying key cost drivers of any organization.
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