Chapter 2

LITERATURE REVIEW

2.0 Introduction

This chapter begins with a discussion on the concept and evolution of management control and accounting systems and their shortcomings in today's new manufacturing environment. This is later followed by a discussion on traditional costing systems, including a discussion on the shortcomings of traditional costing systems, why precise costing information is needed, and evolution of new overhead. Subsequently, this chapter discusses specifically the Activity-Based Costing (ABC), its concept, its empirical research to date, and its criticisms. This is then followed by a review of the literature related to the variables which may influence ABC success, including behavioral and organizational variables, technical variables, organizational structure and organizational culture, and an additional variable, type of strategy. Then measures for ABC success for this study are also discussed. Finally the literature related to the relationship between firm performance and ABC success is also covered.

As Activity-Based Costing (ABC) is part of management accounting and control system, the literature review of this thesis begins with an overview of management accounting and control system, followed by a review of the literature on the ABC itself. Other potential contingent variables may influence ABC success implementation including behavioral and organizational variables, technical variables, organizational structure and organizational culture. The literature on management control and accounting systems suggests that the design and focus of management control and

accounting systems may be related to overall characteristics of the organization (Waterhouse & Tiessen, 1978; Merchant, 1981). This is essentially related to the contingency theory literature which suggests that efficient organizational design is contingent upon several contextual variables that surround the organization such as strategy, environment, size, structure, technology, as well as national culture (Chenhall, 2003).

2.1 Management Accounting and Control Systems (MACS)

This section contains discussions on the definitions and roles of management control systems (MCS), management accounting and control system (MACS), traditional management accounting practices and the needs for new management accounting practices.

2.1.1 Management Control System (MCS)

Past research showed a number of definitions for MCS. The earliest definition by Anthony (1965, p.64), who defined it as "the process by which managers ensure that resources are obtained and used effectively and efficiently in the accomplishment of the organization's objectives". However, several researchers pointed out the limitations of Anthony's (1965) definition for MAS. For example, Otley (1994) argued that Anthony's (1965) definition for MCS is not adequate in today's competitive environment. It needs to be modified to accommodate changes. Otley (1999) also stressed that Anthony's (1965) definition deliberately neglects three important elements which are essential for today's manufacturing environment, namely operational control, strategic planning, and non-financial performance measure.

Consistently with Otley, Langfield-Smith (1997, p. 208) gave the following comments on Anthony's definition:

> This definition limited subsequent researchers not only to envisage MCS as encompassing the largely accounting-based controls of planning, monitoring of activities, measuring performance and integrative mechanisms, it also served to artificially separate management control from strategic control and operational control.

Langfield-Smith (1997) further stressed that MCS should take consideration of both strategic issues, such as the general posture of the organization towards its environment, and the operational issues that deal with the implementation of plans designed to accomplish overall objectives. Furthermore, Malmi and Brown (2008) stated that Anthony's (1965) definition is too narrow and suggested a broader definition of management to include strategic and operational controls which assist in directing the behavior of employees.

Other researchers argued that MCS should deal with the control of employees' behaviors. For example, Abernethy and Chua (1995, p. 573) defined MCS as "a combination of control mechanisms designed and implemented by management to increase the probability that organizational actors will behave in ways consistent with the objectives of the dominant organizational coalition". Otley (1999) noted that MCS provide necessary information for managers to assist in managing employees' behavior. Merchant and Van der Stede (2007) defined MCS as dealing with employees. However, in their definition they excluded strategic control from management control system (Malmi & Brown, 2008).

In addition, some definitions of MCS move further than control behavior of employees and defined MCS as the achievement of goal congruence (Malmi & Brown, 2008). An example of this definition was given by Flamholtz (1985). Flamholtz *et al.* (1985, p.35) described MCS as "attempts by the organization to increase the probability that individuals will behave in ways that will lead to the attainment of organizational objectives". Malmi and Brown (2008) commented that those definitions of MCS lack clarity, and those definitions of MCS failed to conceptualize MCS and results in numerous problems in MCS research. They also suggested that contingency factors, such as environment uncertainty should be included in MCS definition. Similarly, Otley (1994) highlighted that the definition of MCS should incorporate the changes in current business environment.

After reviewing the previous definition of MCS, Malmi and Brown (2008, p. 290) suggested that the definition of MCS should be "all the devices and systems managers use to ensure that the behaviors and decisions of their employees are consistent with the organization's objectives and strategies". Isa (2006, p. 13) also expressed a similar view that

> Management control can be argued to be concerned with both the strategic issues that we are concerned with, such as the general stance of the organization towards its environment, and the operational issues that deal with the implementation of plans designed to achieve overall goals.

Birnberg and Snodgrass (1988, p. 447) defined management control system as "a mechanism designed to limit the decision space of individuals within an organization so as to affect their behavior". The definition proposed by Birnberg and Snodgrass's (1988) indicates that management control system should aim to coordinate the decision

made by employees so that conflict between employees and organizations, as well as probabilities of accomplishing organizations objectives could be enhanced (Isa, 2006).

This study adopts Birnberg and Snodgrass's (1988) definition of MCS, because their definition suggests that MCSs are not limited only to accounting and budgeting systems but also non-accounting based controls. Isa (2006) commented that Birnberg and Snodgrass's (1988) definition gives the perception that if organizations could coordinate individuals' work and unit throughout the organization as they carry out their appointed tasks well, the organizations' goals could be achieved. This definition is a very broad one, and it indicates that besides providing feedback about whether standards are met, MCS should act as a behavioral modification mechanism. Hence, MAS should encourage those behaviors which are capable of increasing the likelihood of attaining the objectives of organizations and on the other hand, de-motivate the opposite behavior. Birnberg and Snodgrass (1988, p. 448) argued that MCS should covers

> A broad range of an organization's activities and it facilitates the organization's achieving of its goals through the effective functioning of the four subsystems, namely planning subsystem, the monitoring subsystem, the evaluation subsystem and reward subsystem.

2.1.2 The Role of MACS

Management accounting system is viewed by Mia and Clark (1999, p. 138) as "a system which provides benchmarking and monitoring information in addition to the internal and historical information traditionally generated by management accounting systems". According to Bromwich (1990), benchmarking means the comparisons between the firm and its competitors which may include costs and cost structures, productivity, quality, price, customer service, and profitability while monitoring stands

for the "provision of feedback on the implementation of a firm's strategies in regard to above factors" (Mia & Clark, 1999. p. 138). Bromwich (1990) suggests that by the application of benchmarking and monitoring, the requirements of competitive environment can be met and value-added efforts in response to its competitors can be aided.

The facilitation of the development and implementation of business strategies is considered as one of the primary roles of MACS system (Ittner & Larcker, 1997). The role is conducted by providing supports to the formulation and communication of strategies, the implementation of tactics to implement these strategies, and the development of controls to monitor the success of implementation steps and the accomplishment of objectives (Bromwich, 1990; Dixon & Smith, 1993; Govindarajan & Gupta, 1985; Simons, 1990). MACS play an important role in providing top management with relevant accounting and control information about the organization and it is an important control tool. Emmanuel *et al.* (1990, p. 34) stated that "it provides one of the few quantitative, integrative mechanisms that are available". Moreover, accounting information is normally expressed in common monetary terms, and it can be used across all organizational units and for performance measures.

Anthony (1989) stated that assisting managers and influencing their behavior to achieve the organization's goal are the objectives of management accounting system. Therefore, the concept of control and its application is already embedded in management accounting. For example, budgeting can be used during planning and control process and performance measure and cost-profit-volume can be applied for decision making.

However, since mid-1980s researchers have argued that the roles of MACS have changed due to tremendous changes in the business environment especially with the advancements in communication and manufacturing technologies. Numerous researchers criticized the traditional management accounting practices. Johnson and Kaplan (1987) highlighted that the traditional management accounting practices that developed more than 30 years ago are not suitable for today's competitive and advanced manufacturing context.

Others have also pointed out the other weaknesses of traditional management accounting system. According to Shillinglaw (1989), instead of focusing on a department's cost effectiveness, cost control and cost as an ex post evaluation issue, traditional management accounting system only emphasized on cost effectiveness, cost reduction and cost as an ex ante design issue. Nanni and Dixon (1992) stated that management accounting system fails to assist strategies and actions as it is viewed as providing only cost data. Bromwich and Bhimani (1989) stressed the needs for evolutionary change in MACS. Burns and Vaivio (2001) stressed that significant change in organizational design, competitive context and information technologies leads to the management accounting change. Isa *et al.* (2005) stressed that traditional management accounting system should be changed to meet the needs of current modern business environment. Furthermore, Maskell (1991) summarized several limitations of conventional management accounting system, which lack relevance, cost distortion, inflexibility and impediment to progress in manufacturing excellence.

Lack of Relevance:

Johnson and Kaplan (1987) claimed that traditional management accounting practices have become subservient to financial accounting requirements and ignore non-financial accounting information that result in their loss of relevance nowadays. Maskell (1991) argued that under traditional management accounting system, traditional reporting is mainly in financial. It cannot monitor non-financial strategic goals such as customer satisfaction, quality and flexibility. Therefore, it is no long suitable for operational control any more. Drury and Tayles (1997, p. 264) stated that "management accounting practices follow, and have become subservient to, financial accounting." Isa *et al*. (2006) highlighted that traditional management accounting practices only stress the importance of profit measurement but overlook the necessary strategic information, and new management accounting practices should provide the information requested to monitor the existing strategies or support the formation of new strategy.

Cost distortion:

One of the criticisms which traditional management accounting system are subjected to is failure to reflect the current production processes and unrelated to today's advanced manufacturing environment where the percentage of direct cost have shrunken significantly, while overhead costs have ballooned (Johnson & Kaplan, 1987; Isa & Foong, 2005). Cooper and Kaplan (1988) argued that direct labor decreases sharply due to new advanced manufacturing technologies, so traditional management accounting could lead to distorted costing information. Maskell (1991) and Jusoh (2006) stated that overhead cost is the dominant cost under the current environment, and direct labor only makes up less than 10% of total costs. So using direct labor as the basis for overhead cost allocation would distort the cost information. In addition, Shank and Govindarajan (1988) highlighted that traditional management accounting practices, especially,

traditional costing system results in undue costs being allocated to high volume products, while under cost the low volume products. Hardy and Hubbard (1992) found that in many companies that indirect costs account for 50% or more of the total manufacturing cost, traditional management accounting practices could lead to the distorted costing information. Moreover, Kaplan and Anderson (2004) stated that the efficiency of automation and industrial engineering-driven results in the significant changes in the cost structure in many firms, and direct labor decreases sharply in the total manufacturing costs. In this new environment, traditional management accounting techniques, such as volume-based costing system failed to provide accurate costing and eventually results in the poor strategic decision (Kaplan, 1988).

Inflexibility:

Accounting has the characteristics of confining itself to measureable and objective data and produces consistent reports. These characteristics make management accounting system inflexible for manufacturing management. The specific needs of performance measures among various plants, products, processes and departments can only be met if the measures are modified (Maskell, 1991; Jusoh, 2006).

Hussain and Gunasekaran (2001) stated that the major weaknesses of traditional management accounting system, such as inaccuracy, incompleteness, inflexibility and irrelevance drive the needs for advance management accounting system, such as Activity-Based Costing (ABC), Balanced Scored Card (BSC), and so on. A number of researchers stressed that management accounting system should be updated so that relevant, timely, and accurate information is provided to managers for planning, control and decision-making purposes in today's competitive environment (Kaplan, 1984;

Johnson & Kaplan, 1987; Cooper & Kaplan, 1988; Drury & Tayles, 1995; Bjornenak & Olson, 1999; Isa, 2006).

Impediment to progress in manufacturing excellence:

Traditional management accounting systems excessively emphasized on machine and labor efficiency, which leads to a large quantity production. It is actually in conflict with the modern manufacturing practices, such as JIT, which focuses on small lot size, zero inventory and high quality (Maskell, 1991; Jusoh, 2006).

Clarke (1995, p. 46) summarized that the traditional management accounting systems are subjected to some main criticisms: namely, failure to capture a company's progress towards world-class manufacturing performance, inaccurate costing information due to simplistic overhead absorption; and the internal orientation of accounting information is too narrow for strategic decision-making.

Sulaiman et al. (2004) claimed that the traditional management accounting techniques are less useful in the current manufacturing environment. New management accounting practices, such as Activity-Based Costing (ABC), JIT and so on should be adopted.

The following section discusses one element of management accounting; that is traditional volume-based costing systems.

2.2 Traditional Costing System

The traditional costing system is also called Volume-Based Costing system (VBC). Under VBC, manufacturing costs are classified as direct material, direct labor and overhead cost (Turney, 1990). VBC assigns overhead costs to products or services by assuming that product causes cost and direct labor is the main allocation basis to trace indirect costs (Akyol, Tuncel, & Bayhan, 2004).Traditional costing system only assigns manufacturing costs to products or service (Krumwiede & Roth, 1997). Moreover, traditional costing system assumes that output volume has positive relationship with direct labor so increase in the output volume leads to increase in direct labor in a linear fashion (Turney, 1990).

However, direct labor' proportion in total manufacturing has contracted sharply, while, the proportion of fixed costs has increased significantly (Akyol et al. 2004; Chung et al. 1997; Khaisaeng, 1998; Khalid, 2005, Tho *et al*., 2006). Hence, adopting a direct labor allocation basis to allocate overhead cost in conventional costing system is considered as inaccurate and incorrect (Akyol et al. 2004; Kaplan, 1988; Copper & Kaplan, 1988; Turney, 1996).

The next section discusses the deficiencies of the traditional costing system, and needs for a new costing system.

2.2.1 Reason for a New Costing System

The present fierce global competition drives firms to pursue excellence in manufacturing practices. To become a world class company, companies should take

efforts to enhance the quality of products and processes, to reduce the inventory level, and to improve the policies of workforce (Gunasekaran, 1999). However, as Cooper and Kaplan (1991) stated that application of traditional costing systems that were developed decades ago can still be found in many firms. Cooper and Kaplan (1991) also stressed that today's competitive environment is tremendously different from decades ago, thus, MACS needs to be improved, otherwise, product costs maybe distorted by existing costing system, and the distorted costing information would result in incorrect judgments for decisions (Cooper & Kaplan, 1988). Gunasekaran (1998) stressed the reasons for using the new costing system. The details are presented as follows:

2.2.2 The traditional costing system fail to supply non-financial information

Non-financial information, for example, manufacturing cycle time, lead time and customer satisfaction in a company cannot be reflected in traditional costing system. Traditional costing system only provides financial information, such as the rate of return on asset, current ratio and profitability, but much less information about issues (such as matters to customers) are required by any world-class companies. Other non-financial measures like customers' satisfaction, internal process, however, failed to be reflected in the traditional costing system (Gunasekaran, 1999; Kaplan, 1984). Maelahet al. (2006) stated that traditional costing system concentrates on the efficient use of resources, and focus on products and only report financial performance such as ROI or market share.

The utility of financial information is limited by conventional costing system (Gunasekaran, 1999). Turney (1996, p. 28) presented the following factors which are the explanations for the above arguments.

- Quality and time cannot be measured by costing information directly, direct measure of the defects rate and throughput time are easier to analyze than an complex of cost variance.
- Activities do not report cost information. It leads to difficulty to determine how much each activity costs to serve its customers. Instead, traditional costing system reports costs according to cost categorization, for example wages and amortization and by function such as engineering or marketing. This information is too aggregated (related to numerous activities) and it limited analysis of the value customers receive from any one activity.
- Cost information is not reported on a timely basis, so it is too late to support improvement efforts, also cost system reports are set on a monthly basis and reach the relevant users on several days. A monthly report presented in the middle of the following month contains information that is, on average one month outdated. By this time the trail has gone outdated; decreasing the possibility that action would be taken.

In another research, Kaplan (1984) stressed that the non-financial measure, such as quality, inventory levels, productivity, flexibility, deliverability, and employees are required by today's global competition, and all these measures are also applied to evaluate a company's financial performance. He also highlighted that even though a company may achieve a satisfactory level of financial performance, but if it shows a

stagnant or deteriorating performance on non-financial aspects, it may be impossible to meet the standards required by world-class company.

2.2.3 Traditional Costing System is Inaccurate

Researchers have argued that the application of traditional volume-based costing system results in the inaccurate costing system. Turney (1996) contended that the conventional costing system often reports error in product cost by a large proportion. Turney (1996) further stated that one of the factors that contribute to the drawbacks of the conventional costing system is the assumptions that product cost is incurred when a unit of the product is produced, not by activities related to the costs.

Gunasekaran (1999) identified some important factors in determining customer profitability. These factors include the type, number and cost of products or services purchased, and he also claimed that the traditional cost systems measure the manufacturing overhead of each type of product inaccurately. Cooper and Kaplan (1991) highlighted that the conventional costing system takes units into consideration rather than batches, and the traditional costing system generates inaccurate costing information that may result in cost distortion, imprecise information and poor decision (Khaisaeng, 1998).

In another research, Cooper (1989) presented several circumstances which use existing costing system fails to explain. Firstly, some products (low-volume customized outputs) show a high profit margin even though they are sold at a low price; secondly, why certain products have a higher profit margin than others; thirdly, some products not

being offered by competitors are showing a high profit margin; fourthly, competitors offer their high-volume products at a fairly low price; the outcome of bids and finally, sometimes, production cost increases, but customers do not complain any increase in prices.

In addition, Kaplan and Anderson (2004) suggested that under today's competitive environment, the traditional costing system may prevent a company from making appropriate cost management decision as erroneous product cost may produce a disastrous impact on the company. Consistent with Kaplan and Anderson (2004), Abduallah, *et. al* (2004) argued that indirect cost are heavily driven by non-volume-related activities rather than volume-based measure. However, the traditional costing system allocates indirect costs based on output volume and direct labor that causes misleading allocation of indirect costs to products or services and fails to reflect the true cause and effect relationship between indirect costs and individual products (Majid & Sulaiman, 2008). Krumwiede and Roth (1997) also expressed that the traditional costing system is no longer suitable when manufacturing processes are complex and products are manufactured in a large volume.

Khalid (2005) stated that under the conventional volume based costing system, a wide range of overhead costs are illogically traced to products or services, which leads to products consuming a higher portion of resources but bear a lower amount of overhead costs. Inaccurate costing information produced by the traditional costing system will eventually mislead the pricing and marketing strategy (Abduallah *et al.*, 2004).

Tho *et al.* (2006) stated that even though many overhead costs do not have a relationship with direct labor, but direct labor is the main basis to trace overhead costs in traditional costing system. As a result, the system produces an inaccurate product especially when there is a great variety, diversity and complexity of products.

Furthermore, Banker *et al*. (2008) stated that instead of applying direct labor or machine hours as the basis for tracing overhead costs, ABC separate indirect costs and support resources by identifying organizations' major activities, and then assign indirect costs based on the drivers of these activities. Therefore, ABC is able to provide a more structured method to appraise the expenses related to the specific activities employed to support a product (Banker *et al.* 2008).

2.2.4 Costing system should encourage improvements

Functional classification dominates traditional costing systems. Under functional categorization, department performances are measured by cost variance, such as comparing budget and actual performance. However these measures often cause behavior that enhances the functional performance and ignore the overall performance, resulting to the non-achievement of the goal congruence (Gunasekaran, 1999).

Today's competitive environment needs a new way of measuring performance (Turney, 1996). Abdullah (2004) stated that the current highly competitive business context, accurate costing information and abilities to reduce cost are crucial for firms to arrive at competitive pricing strategies. Competitive environment makes it a necessity for

companies to adopt a new costing system which could address the shortcomings of conventional costing systems.

Furthermore, Turney (1996, p. 44) argued that to become a world class company, the following information are needed: show what matters to its customers (such as quality and service); reveal how profitable its customers and products are; costs a reasonable amount to report; identifies opportunities for improvement; and encourages actions that enhance meeting customer needs profitably. However, the above information cannot be reflected in the conventional costing system. The traditional costing system only performs well decades ago, but under today's environment, companies need a new costing approach (Gunasekaran, 1999; Turney, 1996). Fullerton and McWatters (2002) noted that the implementation of world class manufacturing strategies needs the changes in management accounting systems.

Gunasekaran (1999, p. 119) argued that

> To move in the right direction, companies need indicators or signals to guide them. For example, cost measures are signals that stimulate action. People pay attention to cost signals because they are usually used to gauge and reward performance. It is essential for a cost system to send the proper signals. The wrong signals may misdirect improvement efforts, encourage action that interferes with improvement and even endanger the company's existence.

A company can improve performance by focusing on the activities of the organization. However, some useful activities which have the most potential for improvement are often neglected by traditional costing system. Information about salaries and administrative expenses can be clearly provided by the conventional costing system at departmental level. But traditional costing system fails to identify any value-added

activities by the workers in the department (Gunasekaran, 1999, p. 119). In order to improve performance, the non-value added activities should be identified and eliminated (Akyol, Tuncel & Bayhan, 2004)

Tho *et al*. (2006) highlighted that the traditional costing system ignores those non-manufacturing costs, such as product selling, product distribution costs, interest costs and so on. They also stated that ignorance of non-manufacturing costs leads to a "significant cross-subsidization among products that have varying demand for non-manufacturing costs as the consumption of these costs by products is not accounted as product cost in a traditional costing system"(p. 29).

2.2.5 The Preponderance of Overhead Costs

Over the last 3 decades, great changes have taken place in the cost structure of manufacturing businesses, and companies are forced to make changes to all aspects of business, including cost management (Gunasekaran, 1998). Companies have committed more resources to operational management and provision of products or services to customers make production and non-production become relatively important, and also the need for cost control become increasingly significant (Gunasekaran, 1999).

Changes have taken place in features of overhead cost, and now overhead costs are determined mainly by complexity and variety of production (Kaplan, 1984). With the increase of overhead costs, the chance for distorting costing information will also be increased (Turney, 1996). Turney (1996) also concluded that if overhead cost is greater than 15 percent of total costs may result in inaccurate product costs. Gunasekaran (1999) expressed a similar view that today only less than 15 percent of total manufacturing

costs are made up of direct labor costs, while, overhead cost accounts for more than 50 percents of manufacturing overhead. This overhead value can lead to the failure of the traditional costing system (Khaisaeng, 1998). Moreover, Brierley *et al*. (2001) concluded that if overhead cost only accounts for a relative small proportion of the total cost, then the traditional costing is an appropriate method to allocate overhead cost, and investing in developing a sophisticated accounting method is not worthy, but if overhead costs grow larger, traditional costing system may lead to cost distortion. In another study, Khalid (2005) also highlighted that as overhead cost is becoming the dominant cost of total production cost, the traditional costing system have been subjected to much criticism due to reliance on a single cost driver such as direct labor and machine hour to allocate overhead cost. This allocation method leads to the distortion of cost information through over allocating overhead to high volume products and under applying overhead to low volume products.

A variety of products or a service that differ from one another is also an important factor (Gunasekaran, 1999). Khalid (2005, p. 288) claimed that "Production diversity relates to the variety of type and/or volume of products and/or product lines that are manufactured by a firm". Production diversity also may lead to distorted costing and pricing decisions and subsequently results in bad competitive strategy (Cooper & Kaplan, 1988).

Profound changes have produced a great impact on the organization and technology of the companies' manufacturing process. A conclusion could be drawn from the above discussion that the information generated by the conventional costing system is insufficient for the continuous improvement programs which is crucial for companies

to survive in a competitive and dynamic context (Cooper and Kaplan, 1988; Turney 1996; Gunasekaran, 1999; Khaisaeng, 1998; Khalid 2005). The traditional costing systems are not able to supply any accurate information about the consumption of different resources and the activities of the organization (Cooper & Kaplan, 1992; Kim, Park & Kaiser, 1997; Gunasekaran, 1999). Due to the limitations in the traditional costing system, an alternative costing system, such as ABC is proposed to replace the traditional costing system, which is argued to be essential for the success of firms (Gunasekaran, 1999). In the next section, ABC costing system will be discussed.

2.3 Activity-based Costing System

In order to overcome the limitation of the traditional volume-based, Cooper and Kaplan (1988) proposed an alternative method to the traditonal costing system, which is known as the Activity-Based Costing method (ABC). Cooper and Kaplan (1988, p.15) stated that "ABC certainly ranks as one of the two or three most important management accounting innovations of the twentieth century". ABC is designed to overcome the significant shortcomings in the conventional costing sytem (Dodd & William, 2002). Instead of relying on single cost driver, such as machine hours or direct labor, ABC applies mutiple cost drivers to trace overheads to activities, then allocate costs to products according to activities required for manufacturing (Gunasekaran & Sarhadi; Kim, Park & Kaiser 1997). The risk of distortion can be minimized and the accuracy of cost information can be improved by applying multiple activities as cost drivers (Kim, Park & kaiser, 1997). In recent years, ABC system has attracted the attention of both academics and practitioners since it evolved since in the late 1980s (Shields, 1995; Innes & Mitchell, 1995, 2000; Foster & Swenson, 1997; Bjoernenak & Michelle, 2002; Byrne *et al*, 2009).

2.3.1 The Definition of Activity-Based Costing system

Much has been written about the ABC system. Serveral definitions have been given for the ABC system. The examples are as follows:

The Computer Aided Manufacturing-international (CAM-I) viewed ABC as

> A method that measures the cost and performance of process-related activities and cost objects. ABC assigns cost activities based on their use of resources, and assigns cost to cost objects, such as products or customers. ABC recognizes the causal relationship of cost drivers to activities. (Cited in Raffish, 1991, p. 37).

Turney (1996) defined ABC as a method for tracing cost and measuring performance of activities and cost objects. It traces cost to activities according to their consumption of resources and then assigns cost to cost objects based on their use of activities.

Krumwiede and Roth (1997) stated that ABC system is an accounting system, which is used to measure the cost and performance of activities, products as well as other cost objects. They also stressed that when manufacturing processes are complex or products are manufactured in a large volume, the cost data produced by ABC is generally more accurate than the data generated by traditional volume-based costing system.

Needy and Bopaya (2000) argued that ABC is an approach for cost management that aims to avoid the shortcomings inherent to conventional costing system for dealing with the overhead cost. Baxendale (2001) claimed that ABC uses accounting information produced by accounting standard to analyze product profitability and to identify unused cost information for strategic decision making and planning. Furthermore, Roztocki and Needy (2000) stressed that ABC is a reliable method for

cost analysis, and ABC is also a highly effective tool in assisting strategic decision making.

Horngren, Datar and Foster (2003, p. 141) proposed that

> Activity-Based Costing refines a costing system by focusing on individual activities as the fundamental cost objects. An activity is an event, task, or unit of work with a specified purposes; for example, designing products, setting up machines, operating machines, and distributing products. ABC systems calculate the costs of individual activities and assign costs to cost objects such as products and services on the basis of the activities needed to produce each product or service.

Akyol, Tuncel and Bayhan (2004) presented that ABC is an economic model, it is used to identify the cost pools and activity of an organization in producing a product or service and to trace cost to cost drivers according to the number of each activity consumed

Tho (2006, p. 28) described ABC as:

> A methodology that measures the cost and performance of activities, resources and cost objects. Resources are assigned to activities, then activities are assigned to cost objects based on the use or consumption of the relevant activities. ABC recognizes the causal relationship of cost drivers to activities.

From the various definitions presented above, it can be concluded that ABC is an instrument that provides a better understanding about the relationship between cost and organizations' activities.

2.3.2 Why Activity-Based Costing needed?

Gurses (1999) summarized the features of current manufacturing environment compared to the previous setting (see Table 2.1), and stated that in the current

manufacturing environment, much have changed in terms of lower volume, shorter product life cycles, variation in international market, the use of high technology, and a larger proportion of indirect costs. He further stated that in order to adapt to today's competitive environment, manufacturers should make changes, become more information intensive, be highly flexible, and response to customers' expectation as quick as possible.

Table 2.1: The Changes in Manufacturing Environment

Yesterday	New Paradigm
High volume, long production runs, long product life cycles	Low volume, short products runs, short product life cycles
Small number of product variations in a domestic market	Large number of product variations in an international market
Large direct labor component; high cost of processing information	Relatively high technology costs; relatively low information processing costs
Small indirect/overhead costs in relation to direct labor	Large indirect/overhead costs in relation to direct labor

Source: Gurses (1999, p. 10)

Cokins (1999) pointed out that with the rapid development of advanced technology both in the manufacturing and non-manufacturing environment, the traditional costing system is disappearing rapidly. The traditional costing system is only suitable when direct labor makes up a large percentage of total cost. Nowadays, the advent of manufacturing technologies, such as Just-In-Time (JIT), flexible manufacturing system and Total Quality Control (TQC) have reduced the proportion of direct labor cost in total manufacturing cost and increased the overhead costs in production. Under the current circumstances, overhead has already become the dominant cost made up of at least 35 percent of total cost, while direct labor only accounts for less than 10 percent. As a result, cost maybe distorted due to adoption of direct labor as the basis to allocate overhead costs (Harsh, 1993; Gurse, 1999).

The solution to the problem of cost distortion is ABC (Gurse, 1999). Campbell, Brewer and Mills (1997) argued that ABC can assist firms to close the communication gaps between the departments and support cross functional decision making. Similarly, Cokins (1999) stated that ABC is the practical solution for problems caused by the traditional costing system. Others, such as, Bhimani and Gosselin (2002, p. 3) reported that

> During 1990s, organizations have been challenged to change their costing practices more specifically to adopt new cost management innovation, such as Activity Based management, and the impact of these pressures seems to have varied from one organization to another.

Numerous research also showed the several major reasons to adopt ABC in Western countries, such as calculating costs more accurately (Innes & Mitchell, 2000; Cohen *et. al.* 2005; Pierce & Brown, 2004), managing costs (Kinani & Sangeladji, 2003; Nicholls, 1992; Cohen *et.al* 2005; Pierce & Brown, 2004; Booth & Giacobbe, 1997), ensuring product/customer (Innes & Mitchell, 1995; Cohen *et. al.* 2005; Clarke *et. al*, 1999), budgeting performance evaluation (Krumwiede, 1998; Innes & Mitchell, 1995; Cohen *et. al* 2005; Clarke et. al, 1999), increasing competitiveness or coping with more competition (Swenson, 1995), supporting other management innovations such as TQM and JIT systems (Swenson, 1995; Cohen *et. al*, 2005), improving product quality via better and process design (Kiani & Sangeladji, 2003; Innes & Mitchell, 2000; Clarke *et. al*, 1999), responding to increased pressure from regulators (Kiani & Sangeladji, 2003), evaluating and justifying investments in new technologies (Swenson, 1995; Cohen *et. al*, 2005).

2.3.3 ABC Benefits and Limitations

This section outlines the basic feature of the advantages and disadvantages of ABC.

2.3.3.1 Benefits of ABC

ABC is believed to possess many obvious advantages over the conventional costing method (Johnson & Kaplan, 1987). Majid and Sulaiman (2008) argued that there are two types of benefits a company can get through the ABC adoption; they are strategic and operational benefits.

Strategic Benefits:

From strategic perspective, researchers, such as Johnson and Kaplan (1991) claimed that the cost information generated by ABC is essential to certain number of decisions, such as pricing, new product development, whether to drop out-of-date products and decisions on how to react to competitors properly and timely. Bhimani and Pigott (1992) and Chung et al. (1997) asserted that ABC could improve product cost accuracy; provide more comprehensive cost information for performance evaluation; more relevant data for management's decision-making; more potential for sensitivity analysis; and a model prospect on value-added organizational transactions and activities.

Swenson (1995) proposed that ABC could help product designers to formulate a decision on trade-offs between minimizing cost and achieving the targeted performance. Product designers can make comparisons among the various cost information supplied by ABC system (Kaplan, 1990). Moreover, ABC technique can be applied to the design

stage of a product to assist in determining the product mix to produce and sell (Atkinson, Banker, Kaplan, & Young, 1995).

Moreover, research findings have shown that information supplied by ABC is an effective tool for top management to make operating decisions, such as performance evaluation, product design and process improvement (Innes & Mitchell 1995, 2000; Swenson 1995; Chung et al. 1997). ABC can be used as a tool to justify the strategic decisions, such as pricing, customer profitability and product mix and it has the ability to increase overall accuracy of output cost, so that it helps managers to make better decisions on product, product design, process improvement, market segments and customer mix (Cooper & Kaplan1988; Shim & Stagliano, 1997; Chung *et al*., 1997), ABC is perceived as a useful tool in generating information for strategic decision making on product costs and product-line profitability.

In addition, Narayanan and Sarkar (2002) conducted a survey among top and middle level managers in a steel factory in the U.S.A to find out whether ABC could influence the strategic managerial decisions. The findings showed that the companies' managers could improve the operational process through the implementation of ABC. They can identify which are unprofitable products and customers. They concluded that ABC implementation would lead to a significant saving on costs and consequently improved the bottom line.

Operational Benefits:

From the view of operational benefits, Shields's (1995) research in the USA showed that 75% of respondents have the perception of receiving financial benefits from ABC implementation. Carolfi (1996) stated that ABC information could assist managers in identifying value added and non-value-added activities. Managers are also allowed to improve the efficiency of current activities and eliminate non-value added activities by using the detailed information provided by ABC.

Clarke *et al*. (1999) conducted a survey among Irish firms and found that the main benefits the surveyed companies reported from the adoption of ABC are: more accurate cost information for product costing and pricing, improvement in cost control and management, improvement in approaching into cost causation, more accurate performance measure and customer profitability analysis.

Malmi (1999) claimed that with the implementation of ABC, companies could bring up to date their costing system, so that the accounting system could adapt to competitive environment. Douglas and Bouwan (2000) carried out a study with a purpose of measuring the improvement in financial performance that is associated with ABC application. The findings revealed that ABC is positively associated with one financial performance dimension, which is the return on asset. Gerdin (2004) stated that by using the information generated by ABC system, management could conduct a variance more effectively.

Kennedy and Affleck-Graves (2001) found that ABC adaptors produce a higher level of stock return than non-adaptors. Kennedy and Affleck-Graves (2001, p. 2) summarized the key attributes of ABC in contrast to the traditional costing systems, they are:

> A more equitable allocation of overheads by identifying the underlying "driver" of activities; a "new technology" capable of dealing with an increasingly complex and opaque cost base; a process of activity identification with the ability to integrate non-accounting aspects; and a control device in the spirit of "panopticon" and build upon the knowledge created through the management information system.

Ittner *et al.* (2002) concluded from a survey among 2,789 US manufacturing plants in 1997 that the implementation of ABC is significantly linked to higher quality products, manufacturing cycle time reduction and a large increase in first pass quality.

ABC could play an effective role in setting the price for products and services in competitive environment. Cardinaels *et al.* (2004, p. 133) concluded that:

> In a multimarket context involving cost allocations …cost-system refinement can play a significant role in pricing setting, even in the presence of informative market feedback…and even in less informative settings, ABC still outperforms traditional costing.

In addition, ABC could assist managers in making operation decisions. Gupta et al. (2004) stated that ABC could support various operation decisions, such as product planning and design, quality management and control, inventory management, capacity management, as well as work force management. They also concluded that ABC could lead to the improvement in the quality of decision-making process.

Furthermore, Byrne *et al.* (2009, p. 40) summarized that benefits produced by ABC application are "accurate product costing, timely information, improvements in profitability and improvements in physical operations and the working environment".

2.3.3.2 Limitation of ABC

Even though companies claim to receive many benefits through the ABC implementation, but ABC still has its limitation. Clarke and Mullins (2001, p.3) stated that among the limitations of ABC are top management normally resists the changes to ABC system, firms experience troubles in identifying suitable cost drivers and relevant activities, ABC application is pricey and time consuming, it needs lots of time and resources during the ABC implementation stage, and ABC system may be too complicated for the needs of the organization. Thus, top management needs to review the scope and the role of the proposed system.

Kaplan and Anderson (2007, p. 8) summarized the main weaknesses of the ABC system:

- The interviewing and surveying process is time-consuming and costly.
- The data for the ABC model are subjective and difficult to validate.
- Most ABC models are local and do not provide an integrated view of the enterprise's wide profitability opportunities.
- The ABC model could not be easily updated to accommodate changing circumstances.
- The model is theoretically incorrect when it ignores the potential for unused capacity.

2.3.4 ABC Implementation

2.3.4.1 Stages of the Implementation Process of ABC

Krumwiede and Roth (1997) considered ABC as an information Technology (IT) innovation, rather than a pure technical innovation. Managers can make better decisions by using the information produced by ABC. Therefore, managers should have a clear

understanding of each stage of the IT implementation so that companies could implement ABC successfully. Cooper and Zmud (1990) divided the IT implementation process into six sequential stages: initiation, adoption, adaptation, acceptance, routinization and infusion. Krumwiede and Roth (1997) adapted Cooper and Zmud (1990)'s model and apply it to the ABC implementation and they summarized each stage of ABC implementation process as follows:

1. Initiation

Pressure to change an existing system, normally comes from organizational need, technological innovation or external competitive threats which causes the occurrence of initiation. If firms believe their existing costing system is unsatisfactory, they may introduce ABC as a possible solution, and may initiate ABC implementation.

2. Adoption

During 'Adoption' stage, companies make decision on investing necessary resources in ABC implementation process, and this kind of decision must be permitted by top management, so that top management could provide powerful support in this stage.

3. Adaptation

Normally, companies develop and install ABC system in the following way: the implementation team identifies the resources costs and the major activities in organization. Then ABC teams collaborate with each other to select the appropriate cost driver and allocate those activities to final products or services. Also, in this way, training programs should be provided to improve the understanding of the objectives and scope of ABC and training can also enhance the cooperation among different departments.

4. Acceptance

'Acceptance' means organizational members commit resources to implement ABC, they understand the potential benefits of ABC and they also perceive that ABC is worth implementing. 'Acceptance' occurs only if organizational members have a clear understanding of the nature of ABC. Disagreement would lead to resistance to ABC adoption and implementation. So companies should educate members about the benefits of ABC system and to remove the resistance to ABC. According to Anderson and Young (1999), in the acceptance stage, upper management only use ABC for decision-making occasionally, but they still view ABC as a project or a model.

5. Routinization

'Routinization' means that organization use ABC as part of daily activities. In this stage not only accounting/finance staff but also staff from other departments accept ABC and make decision according to ABC information. Managers are encouraged to apply ABC information to decision making by outlining all costs in financial statement and formulating budgets according to activities. 'Routinization' may fail due to the changes of external context after 'Adaption' or 'Adoption' stage, that means, ABC no longer meet the companies' requirements when the company experiences the disasters or industry turbulence, if a company experiences the circumstance, it should review the 'Adaption' stage to redesign ABC system and alter the objectives in the changed environment. In routinization stage, ABC information is used by top management for decision-making commonly, and ABC has been accepted as the normal part of the information system (Anderson & Young, 1999; Byrne, Stower, & Torry, 2008).

6. Infusion

In this stage, organizations combine ABC with other organizational systems harmoniously and ABC enhances the overall efficiency of the company. ABC 'infusion' stands for the application of Activity-Based management; ABM means applying activity information of management to increase profits and competitive advantages. Once non-value added activities are confirmed, eliminated and ABC information is applied for performance measure or for continuous improvement, ABM could be achieved. Therefore, when formulating strategy, companies should focus on cost reduction or improving process, and ABM can be supported by linking ABC to major competitive strategies and to performance measure.

ABC under infusion stage means it is applied extensively and totally integrated the financial accounting system (Anderson & Young, 1999; Byrne et al., 2008).

For the purpose of this research, ABC "implementation" stage is focused on three main stages: "Acceptance", "Routinization" and "Infusion/integration". Swenson (1995) and Krumwiede (1998) stressed that it is more significant and clear to evaluate ABC at the system implementation stage rather than at the initial stage (initiation, adoption and adaption). Krumwiede further stated that the higher the stage of implementation is, the higher the level of "satisfaction appears. Hence, this study contributes to the ABC implementation literature by confining the scope of analysis to implementation stage only.

2.3.4.2 The Implementation Procedure

Akyol *et al.* (2004, p. 55) summarized the steps of ABC implementation. The details are as follows:

1. Identifying the key activities of organizations, such as engineering, machining, inspection.
2. Determining the activity costs.
3. Selecting the appropriate cost drivers, such as direct labor, machine hours, and number of set up.
4. Collecting activity data.
5. Calculating product or service cost.

2.3.5 ABC Adoption

2.3.5.1 ABC Adoption in Western Countries

Results of previous research suggest a general increase trend in the rate of ABC implementation over the last decade, and ABC has been widely applied to various industries, such as manufacturing, wholesale, retail and the service sector organizations (Majid & Sulaiman, 2008). Adoption of ABC by firms worldwide has showed a fairly low rate, but in western countries, such as USA, the adoption rate is relatively high (Innes & Mitchell, 1995; Chenhall & Langfield-Smith, 1998b; Majid & Sulaiman, 2008).

From the U.S perspective, Armitage and Nicholson (1993) showed that among manufacturing firms in the U.S.A. the ABC adaptors only accounted for 11% of total respondents. Shim and Sudit's (1997) survey among US Fortune 1000 companies show that an ABC system is becoming more popular and rapidly accepted in the U.S.A, and

the ABC adoption rate jumped to 25%. In addition, research conducted by Kiani and Sangeladji (2003) on the largest 500 US industrial firms shows 44 out of 85 participated companies (around 52%) used ABC model. The latest research was carried out by Lawson (2005) in the healthcare industry indicates no significant changes in ABC adoption rate from 1994 (16 percent) to 2004 (14 percent).

In the UK, the first research on ABC implementation was carried by Innes and Mitchell in 1991. They found that ABC development was apparently at an early stage and only 6% of respondents in 1990 were implementing ABC and 33% of respondents were taking ABC into consideration. Nicholls's (1992) research showed that ABC adoption rate in the UK jumped from 6% to 10%. Drury and Tayles (1994) found that among the manufacturing firms, 13% of respondents were using ABC for various purposes. In another study in the UK, Innes and Mitchell (1995) found similar findings that 20% of respondents within the UK's largest firms were using ABC and 27.1% of the UK's largest firms were considering its adoption. However, a more recent study by Innes, Mitchell and Sinclair (2000) reported a lower average adoption rate of 17.5%, which consisted of 14.3% among manufacturing firms, 12.1% among service firms, and 40.7% among financial firms which adopted ABC. The latest research done by Tayles and Drury (2001) showed a 23% of ABC adoption rate.

Studies conducted in other countries showed various level of ABC adoption rate. Bjornenak (1997) conducted a questionnaire-based survey on ABC implementation among the largest manufacturing companies in Norway. Their results showed a high level of adoption rate, and also revealed that 40% of respondents were planning to use ABC. Furthermore, Cohen, Venieris and Kaimenaki (2000) reported a fairly low ABC

adoption rate of 12.7% in Greece context. However, another research conducted by Cohen, Venieris and Kaimenaki (2005) among manufacturing, retail and services sectors found that ABC adoption rate in Greece was relatively at a satisfactory level (40.9%). In Ireland, Clarke, Hill and Stevens (1999) stated that 12% of manufacturing firms in Ireland adopted ABC to assign overhead costs, while, another study by Pierce and Brown (2004) found that ABC adoption rate in manufacturing sector increased from 12% to 34.9%, also, they also reported 17.8% and 28.6% in the service industry and finance sectors respectively.

Several studies about ABC implementation has been done in Australian context. Booth and Giacobbe (1997) conducted a survey on the ABC experience of ASCPA (Australian Society of CPAs) members operating in Australian manufacturing sector in 1995 and found that 12% of respondent firms had adopted ABC and 29% were still planning the adoption of ABC, and 33% of firms that had not adopted ABC had planned to consider ABC in the future. (Cited in Chongruksut, 2002). Likewise, Van-Nguyen and Brooks's (1997) surveyed 120 Australian manufacturing businesses and found 12% of respondents in the State of Victoria in Australia were implementing ABC and 8.3% intended to implement ABC in the near future. In 1998, Chenhall and Langfield-Smith (1998b), who conducted a survey on the adoption and benefits of management accounting practices in Australia, found that the new management accounting practices, such as ABC, were more widely implemented than had been found in previous studies. They showed that the largest Australian manufacturing firms, listed on the Business Review Weekly, ABC adaptors made up 56% of the 78 participants. Booth and Giacobbe (1997, p.6) also claimed that 'ABC is still a highly dynamic area of management accounting innovation in Australian manufacturing firms' (Cited in Chongruksut, 2002).

Cotton, Jackman and Brown (2003) replicated Innes and Mitchell's (1999) survey of ABC application in New Zealand context and made a comparison between these two countries. The finding indicated that ABC adoption rate in NZ was slightly lower than that of UK companies. Cotton, Jackman and Brown (2003) also found that among the ABC adopter in NZ, they demonstrated a greater loyalty to ABC than their UK counterparts, and ABC system was less complex than that of UK. Additionally, Gunasekaran *et. al* (1999) shows that ABC was adopted by 4 percent of firms in Belgium and the Netherlands. They also stated that ABC in European countries was only used as a secondary system.

The results of previous research on ABC adoption in Western countries are summarized in Table 2.2. Prior studies showed that over the last decade, there is a general increase in ABC adoption rate in western countries (Baird *et al*. 2004; Cohen *et al.* 2005; Kaplan & Anderson, 2004; Wessels & Shotter; 2000).

Table 2.2: ABC Adoption in Western Countries

Year	Survey	USA	UK	Greece	Ireland	Australia	Norway
2005	Cohen et al Manufacturing=35.7% Service firms = 65% Retail firms = 30.8%			**40.9%**			
2004	Pierce & Brown Manufacturing 34.9% Services firms 17.8% Financial firms 28.6%				**27.9%**		
2003	Kinai & Sangeladji Largest 500 US industrial firms	**52%**					
2001	Tayles & Drury		**23%**				
2000	Innes & Mitchell		**17.5%**				
2000	Venieris et al			**12.7%**			
1999	Clarke et. al Manufacturing firm				**12%**		

1998	Chenhall & langfield Manufacturing firms					**56%**	
1997	Booth & Giacobbe Manufacturing firms					**12%**	
1997	Bjornenak Manufacturing firms						**6%**
1995	Shim & Sudit US Fortune 1,000 firms	**25%**					
1994	Drury & Tayles Manufacturing firms		**13%**				
1993	Armitage & Nicholson Manufacturing firms	**11**					
1992	Nicholls Wide cross-section of UK firms		**10%**				
1991	Innes & Mitchell Survey of CIMA members		**6%**				

Source: Adapted from Majid (2008)

The researches illustrated above suggested that ABC adoption rate in those countries are considered low. However, ABC application rate is growing, and more and more countries are showing their great interests in ABC (Chrongruksut, 2002). This view is shared by others, such as Mohsen (2002) who argued that Japanese firms' interest in ABC is growing. Innes and Mitchell (2000) also contended that Activity-based approach is still on the rise, not only in terms of the number of firms adopting it, but also in terms of the extent of how it is applied. Furthermore, Shim and Stagliano (1997) found that ABC approach is becoming more popular and acceptable by more and more firms in the U.S.A.

2.3.5.2 ABC adoption in Asian Context

Similarly, research on ABC adoption in Asian countries shows a fairly low rate (Majid & Sulaiman, 2008). Chen, Michael and Park (2001) surveyed companies in Chinese Hong Kong in 1999. They found that a low adoption rate of 11% and a further 5% of

respondents were considering adopting it the following year. They also highlighted that generally, ABC had made limited progress in Hong Kong. A more recent cross-sectional research of 1500 firms in the logistic industry in Chinese Hong Kong was done by Kee-Hung, Ngai and Chen (2005). They found the ABC adoption rate was 20.7%.

Ghosh and Chan (1997) reported the results of a longitudinal survey on the adoption of management accounting technique in Singapore. They found that ABC was ranked as the No. 12 in terms of management accounting practices. 11% domestic firms in Singapore were currently implementing ABC, while ABC adoption rate among multinational firms in Singapore were 14%. They also stressed that Singaporean firms had already made an improvement in management accounting technique, but still fall behind western countries. Chung et al. (1997) suggested that if Singaporean companies could spend more time and put more efforts on ABC experimentation, the ABC implementation rate may surpass that of developed countries having a longer experience in adopting ABC.

In addition, a questionnaire survey which incorporated data from 39 out of 100 largest firms in Saudi Arabia with the aim to assess the degree of ABC application in Saudi Arabia and contributing to understand the reasons why ABC was rejected by some firms. The study revealed that only 33.3% out of 39 firms applied ABC to assign overhead costs, 7.7% of respondents were considering whether to use ABC or not, while, 23 percent rejected ABC after careful evaluation, and fourteen firms which made up of 35.9 percent of the total respondents never considered ABC due to lack of top

management support and lack of knowledge of ABC (Alsaeed, 2005). In India, a survey showed that only 20% of 60 firms had adopted ABC (Joshi, 2001).

Sulaiman *et al*. (2002) surveyed the industrial and consumer products sector about management accounting practices in Malaysia, and reported that 28 percent of respondents applied ABC to allocate overhead cost. A survey conducted by Shamsul Nahar, Zarifah and Amin (2004) was carried out among manufacturing firms in Malaysia with the objectives of identifying the extent of ABC implementation and the main purpose of adoption. The results showed that only 7.9% of the total respondents were currently using ABC. These respondents adopted ABC for the purpose of products or services output decision and manufacturing performance evaluation and improvement. The major reasons for some firms to reject or abandon ABC are behavioral issues and technical problems. Abdullah *et al.* (2004) reported a fairly low ABC adoption rate among Malaysian manufacturing firms as compared to the worldwide adoption rate. They concluded that ABC application in Malaysia was at an early stage and can be reduced to a basic level.

Another study about ABC adoption as an overhead costing system in Malaysian manufacturing organizations was carried out by Maelahand *et al.* (2006). They distributed a total of 1,257 questionnaires and managed to collect 145 completed questionnaires. The results revealed that only 39 firms were ABC adopters, which were made of around 36% out of 145 firms, while, the remaining 64% (69 organizations) were ABC non-adopters. They also found that among the ABC non-adopters, 48% had not considered using ABC, only 3% had considered but rejected after evaluation, and

among the ABC adopters, 11% were at analysis stage. Another interesting finding is that once firms started using ABC, none of them abandon the system.

2.3.5.3 ABC Adoption in China

In China, however, very few researches have explored the extent of ABC adoption among Chinese firms. According to Bromwich and Wang (1991), China's percentage of ABC adoption was even lower, only 1% among Chinese State-owned enterprises,

Sulaiman *et.al* (2002) stated that in comparison with other Asian countries, ABC adoption rate in China, are even lower, especially, among state-owned enterprises which reported only 1% of ABC implementation rate. However, research finding also showed that ABC usage among foreign firms and joint venture firms was much higher, with ABC adoption rate at 15% and 10% respectively.

Yanren *et al.* (2008) conducted a survey among Chinese enterprises to improve the understanding of ABC. Instead of asking whether or not they use ABC directly, the survey consisted of six questions describing various aspects of ABC as follows:

- Whether they use multiple cost drivers to allocate overhead cost;
- Whether the number of cost drivers increases greatly in the most recent three years;
- Whether they allocate period expenses to finished products;
- Whether they increase the proportion of period expenses assigned to products in the most recent three years;
- Whether the ABC is used to compute the costs of finished goods; and

- Whether they increase ABC application.

The result shows that instead of using the complete ABC system, the majority of Chinese firms used only some aspects of ABC, such as almost forty percent of respondents adopt ABC concept of allocating period cost to product costs, and around thirty-five percent apply multiple cost drivers to assign overhead. Yanren, Wenbin and Thomas (2008) concluded that ABC is still not widely applied among Chinese firms, but the number of ABC adopter is rising.

Majid and Sulaiman (2008) summarized the following reasons why conventional costing system is still applied in developing countries; there are:

- Lack of awareness of ABC and its benefits;
- Lack of expertise;
- High cost of implementation; and
- Perhaps more importantly, lack of top management championship.

2.3.6 Problems of ABC implementation in Western Countries

During ABC implementation stage, companies may encounter numerous problems. Firstly, Majid and Sulaiman (2008) pointed out that one of the problems experienced by western countries maybe the high cost of setting up ABC system, especially at initial stage. They further stated that during the initial stage, top management should spend considerable amount of time and effort in selecting the appropriate cost driver, identifying the need for extra accounting staff to implement ABC system, and costs

which also occurred due to the considerable amount of time spent in determining the main activities of one particular department. In addition, time availability is another significant problem in the ABC implementation stage in western countries (Sohal & Chung, 1998). This problem may become more serious when key staff involving both ABC and other task which is related to their daily works. Therefore, many managers claimed that ABC results in extra works (Lana & Fei, 2007; Majid & Sulaiman, 2008).

Secondly, lack of available skills within companies in western countries also can cause trouble in implementing ABC (Majid & Sulaiman, 2008). Sohal and Chung (1998) undertook two case studies on ABC implementation. One company produced engineering components from Australia, and another company based in Hong Kong, specialized in manufacturing specialty chemicals. The research findings revealed that top management should provide extensive training programs to employees before ABC project starts to solve the problem of lacking the necessary skills for ABC implementation.

Thirdly, gathering data is also a potential difficulty which companies in western countries may experience during ABC implementation stage (Majid & Sulaiman, 2008). According to Sohal and Chung (1998), in the initial stage of ABC, the only thing concerned by most production staff is the impact of ABC on their works. When employees are requested to determine the time and resources they spent on their works, they are concerned about how the impact of ABC on their works would become greater. If they are suspicious of the benefits of ABC, employees are usually unwilling to disclose the required information, which cause difficulties in collecting data from works.

The findings of Soin, Seal and Cullen's (2002) who undertook a longitudinal study of ABC implementation in a clearing department in a UK-based Multinational bank provided support for this claim. They found that many junior managers and first line workers perceived ABC as an excuse for the bank to downscale resulting in the difficulties in data gathering, identification of cost drivers, and selection of main activities.

Similarly, Sartorius, Eitzen and Kamala (2008) summarized the problems with ABC implementation in developed countries. These problems include lack of top management support, resistance from employees and management at each stage of ABC implementation (Swenson, 1995; Kiani & Sangeladji, 2003; Leahy 2004; Roztocki 2004; Cohen et al. 2005), conflicting with other competitive strategies such as JIT, advanced manufacturing technology (Swenson 1995; Leahy 2004; Roztocki 2004; Sartorius, Eitzen & Kamala 2008), difficulties in identifying and selecting the activities and cost drivers, trouble in gathering needed data (Cohen et. al 2005), and lastly, lack of resources, especially time, efforts, employees who have excellent knowledge of ABC (Innes & Mitchell 1995; Krumwiede 1998; Sartorius et al. 2008).

2.4 Critical Factors in ABC Implementation

After addressing the reasons and purposes of adopting ABC, it is important to identify the factors influencing ABC success implementation. Several studies have been undertaken among ABC adaptors and the majority of the research results showed that ABC success implementation depends on various factors, namely top management support, linkage to performance measure and compensation, training, non-accounting ownership, resources, and information technology.

2.4.1 Behavioral and Organizational Variables

During ABC implementation stage, a number of problems may occur, however problems during ABC installation stage can be overcome by enhancing and grasping the knowledge of ABC (Glad, 1993). Krumwiede and Roth (1997) argued that in order to implement ABC successfully, all the organizations should not ignore the behavioral, organizational and political perspective of each stage of the ABC implementation. Moreover, Kaplan and Anderson (2007) also highlighted that ineffectively dealing with behavioral and organizational factors might eventually leads to failure of ABC. Behavioral and organizational variables are consisted of seven components: top management support, training, adequate resources, link ABC to performance evaluation and compensation, non-accounting ownership, link ABC to competitive strategies, and clarity of the objective of ABC.

Top Management Support

Past research showed that the most crucial factors influencing ABC success is top management support (Turney, 1990, Shields, 1995; Shields & McEwen, 1996). Top management refers to "the active and open promotion that upper level executives, such as the Chief Executive Officer or the Chief Financial Officer, give to an innovation." (Brown *et al*., 2004).

The importance of top management is argued by Shields (1995, p. 120) who asserted

> Top management support can focus on resources (e. g, money, time and talent), goals, and strategies on initiatives they deem worthwhile, deny resources for innovations they do not support, and provide the political help needed to motivate or push aside individuals and coalitions who resist the innovation.

Top management support has been associated theoretically and empirically with activity management success (Anderson, 1995; Foster and Swenson, 1997; Malmi,

1997; Krumwiede, 1998b). If activity management practices are to succeed, top management must commit to them and provide adequate levels of resources to sustain them. It must also communicate the objectives and benefits of the practices to employees, and use authority when needed to overcome obstacles to their success (McGowan & Klammer, 1997).

In addition, Taba (2005) concluded that top management support is the most crucial factor in the success of ABC implementation among South African Post Office. In the same research, Taba (2005) also proposed that top management should commit resources and develop goals and strategies to enable the implementation of ABC and top management should use ABC as the basis for decision-making. He further stressed that top management should also commit to a change in the cost accounting system. This change program requires top management to provide suitable guidance, motivation and financial and technical support to encourage the implementation of ABC. (Gunasekaran, 1998).

Brown *et al*. (2004) highlighted that if ABC is initiated by lower level management, the risk of ABC failure would be very high. However, if top management support the ABC system, the risk and uncertainty of the project could be reduced, so ABC could be successfully adopted and implemented in a similar note.

Based on a study in Saudi Arabia's largest 100 firms in 2003, Khalid (2005) concluded that if top management is not fully enthusiastic to support ABC, the possibilities of encountering problems during ABC implementation would be very high. Hence, it

could be argued that top management support may be one of the most important factors influencing ABC implementation in the Chinese manufacturing sector.

Training:

Another factor that could influence ABC success is training. According to Chongruksut (2002), training could come in various forms, such as reading, lectures, as well as on-the job training. Training is crucial to educate employees to understand the knowledge about how ABC works, how to analyze and how to apply ABC information for product design, price setting and process improvements, and how the compensation packages would be accommodated to integrated the performance evaluation (Chongruksut, 2002). Training also could reduce employees' resistance to ABC and prevent them from feeling stressful during the ABC implementation process (Chongruksut, 2002).

Training is essential to ensure that employees understand activity management practices, to reduce resistance to change and to sustain successful performance (Norris, 1994; Krumwiede, 1998b, Chongruksut, 2002). Associations between training and activity management success have frequently been found in several studies (Foster and Swenson, 1997; McGowan and Klammer, 1997; Krumwiede, 1998a; Chongruksut, 2002).

According to Shields (1995), an important way to link ABC to strategy, performance evaluation, and compensation and ABC objectives is training in designing, implementing and using ABC. Training also provides a method for employees to understand and accept ABC as well as to feel comfortable with it. Furthermore, training

is also an effective method for producing non-accounting ownership due to information provided by ABC is used by a variety of employee for analysis and action.

Gunasekaran (1998) highlighted that organizations should equip concerned employees with the knowledge of ABC and the benefits that could be derived from them. Under this circumstance, it is necessary to arrange seminars to teach and discuss the concepts of ABC and its implementation issues in manufacturing factories. Gunasekaran (1998) also stated that empowering the employees in the change efforts with objectives to motivate them in the implementation process is another aspect of the implementation of ABC.

Link to Performance Evaluation and Compensation:

The link to performance evaluation and compensation is based on the argument that if evaluation and compensation are connected directly to the information produced by the activity management system, employees would apply that information. This, in turn, will improve the information decision usefulness and increase the possibility of activity management success (Drake *et al.*, 2001; Chongrukut, 2002). This argument rested on the argument that employee behavior is influenced by the way in which their performance is evaluated and rewarded (Langfield-Smith *et al.*, 1998), and has been demonstrated for activity management success by Anderson (1995), Shields (1995) and Foster and Swenson (1997) who has documented ABC‘s efficacy as a profit-enhancing tool.

Shields (1995) also found evidence that an important factor for ABC success is the degree of integration between ABC and performance evaluation and compensation. Employees pay more attention to those measures of performance that affect their personal welfare. Swenson (1997) confirmed that the typical "best practices firms" studied are those who use ABC for both decision making and performance measurement. Similarly, Gunasekaran (1998) argued that organization should formulate a suitable incentive scheme for both the accounting personnel and the people from other functional areas such as marketing, design and engineering and production with an objective to obtain the cooperation for the implementation of ABC in manufacturing.

Integration with Competitive Strategy:

ABC system's linkage to competitive strategy means integrating ABC with quality and speed strategy. ABC can help a company to improve competitive position and profitability, so it is necessary to link ABC with competitive strategy. If a firm adopts cost leadership strategy, ABC is a powerful tool to provide designers with accurate evaluation of product costs and process costs. Meanwhile, decision-makers can have a precise understanding of cost customization (Chongrukut, 2002). Also, Shields and McEwen (1996) highlighted that the closer the linkage between ABC and competitive strategy, the higher level of ABC success would be.

The adoption of quality initiatives will make activity management more successful. Consequently, firms that have adopted quality initiatives would have a greater chance of achieving the objectives of activity management than non-adopter. (Krumwiede, 1998b).

Non-Accounting Ownership:

Chongruksut (2002) defined non-accounting ownership as the commitment of non-accounting staff to use ABC information. Chongruksut (2002) claimed that non-accounting ownership is also an important factor to determine whether ABC can be implemented successfully or not. If non-accountants, such as marketing employees, human resource officers or top executives have committed themselves to ABC system, the level of ABC success will be much higher. Shields (1995) also pointed out that non-accounting ownership is the result of top management support for ABC and integration of ABC with competitive strategy, performance and compensation.

Consistent with this argument, Shields and McEwen (1996) stated that there is danger when only accountants own ABC as they might use ABC to satisfy their professional needs only. Similarly O'Guin and Michael (1991) identified another important reason why some firms could not implement ABC successfully is that only accounting staff retain ownership and fail to share ownership with non-accountant. In this regard, with the participation of non-accountants, the chance that ABC will be supported and promoted and be committed to use success will increase (Shield and McEwen 1996).

Internal Resources:

The stages of ABC implementation and adoption require a company which possesses adequate internal resources. According to Shields (1995, p. 150), the internal resources embrace time and commitment of top management, managers, accountant and operating employees. Adequate resource is very important for ABC implementation as they create "ownership, leadership and action within the company". Employee will be more receptive of ABC when the adequate internal resources are given to them, which

will help them to understand the fundamentals of ABC. Therefore, they will receive the full benefits of ABC and there would be less resistance towards it.

This is supported by Shields and McEwen (1996) who stressed that having adequate resources especially adequate employee with knowledge of ABC can have an impact on ABC success significantly. However, the other types of resources, such as commercial or custom-made software and external consultants do not have significant relationship with the success of ABC implementation. In the same research, Shields and McEwen (1996) considered that the choice of software as a technical innovation system is important for accountants and Management Information System (MIS) specialists, but this choice is relatively unimportant to non-accountants or for the ultimate success of an ABC project in the long run.

Clarity of ABC Objectives:

Clarity of ABC objectives among ABC designers and users is essential to ensure that the success and effectiveness of ABC implementation (Shield, 1995). Chongrukut (2002) also stressed that once the objectives of ABC, such as providing more accurate costing information are understood by employees; they would have a conception of how ABC is designed and how it can be implemented successfully.

2.4.2 Technical Factors

Information Technology:

Gurse (1999) pointed out that for most companies information technology is the crucial factors in achieving the usage stage of ABC. Cooper (1988) stated that information technology could reduce the measurement of costs, so managers with a higher level of

information technology would generally feel more comfortable with ABC compared to those with a lower level of information technology.

According to Krumwiede (1998), a high quality of information technology, such as convenience of information, user outgoingness of the information system, ease of use of detailed information, the diversity of cost data, as well as the suitability of information supplied by the system could make ABC success accomplish the highest level.

Consultant:

Research showed that there is an increasing trend with companies using outside experts or consultants to help deal with organizational changes (Cohen, 1999). Anderson (1995) stated that the influence of external experts become an important factor as soon as the problem with current costing system has been identified. He further argued that the option for adopting ABC is profoundly determined by opinions of external experts once identifying problems with the previous costing system have been identified.

Friedman and Lyne (1999) argued that strong supports for ABC by external consultants results in the adoption of ABC by firms, companies which hire consultant are more likely to implement ABC successfully than those that do not employ consultants.

Bjornenak (1997) carried a survey to examine the diffusion of ABC in Norway. The findings showed that firms which implemented ABC had used external consultants. He also concluded that the assistance of consultants leads to ABC success.

2.4.3 Strategy

Strategy refers to how firms compete to accomplish their goals (Miles & Snow, 1978; Gosselin, 1997). Strategy is suggested by literature on strategic management as an essential factor influencing the design of management control system. Strategy also plays a key role in forming the management control and performance measurement system (Burn & Stalker, 1961; Miles & Snow, 1978, Simons, 1990; Jusoh & Parnell, 2008).

Different studies categorized strategy into different types according to the characteristics, attributes, or key variables identified or analyzed by each researcher (Simons, 1990; Jusoh & Parnell, 2008). Simons (1990) summarized major classifications for strategy. They are: prospector, defender, analyzer, and reactor based on the rate at which they change their products and markets (Miles & Snow, 1978); Entrepreneurial, adaptive, planning mode (Mintzbery, 1973); Differentiation, cost leadership, focus (Porter, 1980); Entrepreneurial and Conservative (Miller & Friesen, 1982); and finally, Build and harvest (Gupta & Govindarajan, 1984).

This study employed the Miles and Snow's (1978) typology to represent the strategy variables. Gosselin (1997) outlined four reasons why this type of typology was chosen. First, Miles and Snow's taxonomy of strategic orientation is one of the most widely used and empirically tested in both management and accounting research (Sim & Teoh, 1997), and well accepted internally (Gosselin, 1997). Second, an organization's ability to innovate is the key aspect of this typology (Gosselin, 1997). Thus, this typology is more appropriate for examining its relationship with the ABC success as the latter is considered as new innovation in management accounting system. Third, prospectors

and defenders are long overdue and have abilities to make contribution to the strategic theory in this field (Segev, 1989). Fourth, this typology shares the similar characteristics and attributes with other typologies, such as differentiation and low-cost strategies (Porter, 1980), entrepreneurial and conservative strategies (Miller & Friesen's, 1982), and build and harvest strategies (Govindarajan, 1985). Gosselin (1997) also employed Miles and Snow's (1978) typology to examine the effect of strategy on between the performance measurements and type of strategy among Canadian manufacturing businesses.

The organization' rate of product-market change is the primary dimension which underlies Miles and Snow typology. Miles and Snow (1978) state that prospectors tend to de-emphasize their control system based on financial measures, and they often adopt decentralized organizational structures and planning to be wide. Gosselin (1997) stated that prospectors are always aggressive when penetrating into new markets and developing new products to meet customers' needs. They compete in the market by new product-market innovations. They invest considerable amount of financial resources in research and development. These firms normally operate in a dynamic industry where monitoring of external environment and organizational flexibility are crucial to ensure responses to market change timely. Moreover, Jusoh and Parnell (2008) highlighted that prospector organizations are being 'first-in' new product and market areas. Their product-market domain is broad and subject to periodical redefinition, and they respond rapidly to early signs of opportunity. Therefore, prospectors have characteristics of organic structure due to the strong concern for new product and new market. However, they are normally highly inefficient (Gosselin, 1997).

However, defenders have different characteristics from prospectors. Unlike prospectors, defenders that compete in un-dynamic environments, its major concerns are price, quality and service, tight control and cost efficiencies (Miles & Snow, 1978; Simons, 1980). Defenders engaged in a relatively narrow product-market domain are characterized by high production volume, low product diversity, and compete aggressively on price, quality, and customer service (Gosselin, 1997). Defenders have a tendency to conduct relatively less product-market innovation, and have abilities to uphold and protect a secure position for relatively long periods (Miles & Snow, 1978; Jusoh & Parnell, 2008). Therefore, defenders adopt formalized and centralized structure (Govindarajan *et al.*, 1986; Gosselin, 1997).

Analyzers have the characteristics of both prospectors and defenders (Gosselin, 1997). They tend to compete in stable product-market and also take opportunities to selectively penetrate into new market. Analyzers adopt different strategy for different market. For established market, they tend to concentrate more on production and cost efficiencies, while for new market, they implement innovations (Miles & Snow, 1978; Simons, 1980). Moreover, Miles and Snow (1978) proposed that analyzers are likely to sustain stabilities in their key activities by providing a limited scope of products or services, at the same time, respond quickly to reproduction others' innovations in their non-core activities. Miles and Snow (1978) also described analyzers as hardly ever "first-in", but frequently "second in". Due to the characteristics mentioned above, the organizational structure of analyzer is more complex than prospector and defender, and it possesses the features of both centralization and decentralization (Miles & Snow, 1978; Gosselin, 1997).

Compare with prospectors and defenders, reactors are considered as the weakest type of strategy. Reactor firms are unstable type of organizations and lack consistency in strategy, technology, strategy-structure relationship, and lack of aggressiveness. Thus, are usually unable to respond effectively to environmental change. For the purpose of this research, only the main types of strategic types: prospector, defender, and analyzer strategies are taken into consideration (Simons, 1980; Gosselin, 1997; Jusoh & Parnell, 2008). The research by Gosselin (1997) in Canadian business units and Jusoh and Parnell (2008) in Malaysian manufacturing sectors also excluded reactor from Miles and Snow's (1978) reactor strategic type from their studies.

2.4.3.1 Strategy and Management Control Systems

According to the strategy literature, strategy is regarded as a central contingent variable in management control and accounting systems (Burn & Stalker, 1961; Simons 1990, 1994; Langfield-Smith, 1997; Jusoh, 2006). Due to its significant impact on the choice of performance measures, the design of accounting control systems should take the business strategy of the firm into consideration (Burns & Stalker, 1961; Miles & Snow, 1978; Govindarajan & Gupta, 1985; Simons, 1990, 1994; Langfield-Smith, 1997; Otley, 1999; Jusoh, 2006).

The early study about the association between management control system and strategy was conducted by Burns and Stalker (1961). The study of Burns and Stalker (1961) showed that strategy of innovation could be facilitated at unstructured organic firms with less formalized control system. Khandwalla (1972) highlighted that only by adopting competitive strategy and sophisticated management control system can make a firm stand out in competitive environment.

Simons (1987) concluded from a study about the relationship between MCS and strategy that prospectors always pay close attention to control systems, such as prediction of data, rigid budget management, and strictly supervision of outcome. Simons (1987) stated that defenders normally adopt formal accounting and cost control system. Furthermore, defenders make changes in control systems less frequently as prospectors. Slater and Narver (1993) stressed that prospectors adopt more flexible control system than analyzers and defenders. Agbejule and Jokipii (2009) also expressed the similar arguments.

Miles and Snow (1978) expressed that compare to prospectors, defenders focus more on efficiency and constant cost supervision, while, prospectors are more outcome oriented.

Otley (1980) stated that strategy could determine the effectiveness of management control system. Otley (1980) also stressed that in order to implement management control system more successfully, a firm needs to link its strategy closely to management control system.

Chenhall (2003, p. 150) stated that:

> Strategy is somewhat different from other contingency variables. 'It is not an element of context, rather it is the means whereby managers can influence the nature of the external environment, the technologies of the organization, the structural arrangements and the control culture and the MCS.

After reviewing the previous studies, Agbejule and Jokipii (2009, p. 505) summarized that:

> Prospectors are more likely to have flexible and strong controls to enable quick adaption to fast changing environments. Firms with defender strategy use less flexible controls because they might hinder maximum efficiency and cost control. Prospectors are the most flexible in modifying their internal control activities according to users' needs and are followed analyzers and then defenders.

As mentioned earlier, prospectors organizations tend to focus on innovation, and they usually create changes and uncertainty in their industries. Compare with companies adopting defender strategy, prospectors confront less certain and less predictable environment. Prospectors should adopt a structure where numerous and diverse operations could be facilitated and coordinated. Hence, innovation could be much easier in prospectors than defenders (Gosselin, 1995, 1997).

Gosselin (1995) argued that the nature of innovation may moderate the relationship strategy and innovation. Prospectors place emphasis on new processes, products and services. However, defenders tend to focus on cost efficiency and control. Miles and Snow (1978) stated that prospectors are likely to implement organic structures and defenders may choose mechanistic structures. Govindarajan (1986) presented that centralization structure can be successfully implemented in defenders, while, decentralization could be more effective in prospectors. These propositions are outlined in Table 2.3.

Table 2.3: Strategy, Structure and Effectiveness

	Prospectors	**Defenders**
Centralization	Lower effectiveness	Higher effectiveness
Decentralization	Higher effectiveness	Lower effectiveness

Source: from Gosselin (1995)

According to Gosselin (1997), organic organization are more likely to adopt technical innovation, while administrative are privileged by mechanic organizations. Miller (1987) also concluded that innovation was strongly and positively associated with organic variables. Thus, Gosselin (1997) proposed that dual-core model can be applied to take these strategies into consideration, and also suggested that the adoption of technical innovation might be more successful for prospectors, and administrative innovation may be facilitated for defenders. Table 2.4 presents the situation.

Table 2.4: The Dual-Core Model and Business Strategy

	Prospectors	**Defenders**
Administrative	More difficulty	Easier
Technical	Easier	More difficulty

Source: Gosselin (1995)

Moreover, in Gosselin (1997) it was reported that strategy does influence, to a certain extent, decisions to adopt and implement activity-based costing (ABC) where a prospector strategy found to be significantly positively associated with the adoption of ABC.

In summary, strategy plays an important role in the diffusion process for innovation. The type of strategy an organization follows influences the extent to which it needs to be innovated. In this study, different types of strategy and their effect on ABC success implementation were examined. ABC is characterized by Gosselin (1997) as an administrative innovation, so this research expects that defenders would have the highest level of ABC success in contrast to prospectors and analyzers.

2.4.4 Organizational Structure

In this study, three organizational models are examined; they are Mechanistic and Organic model; Dual-Core model; and ambidextrous model. According to Gosselin (1997) all these three models rest on the differences between mechanistic and organic organizations, administrative and technical innovations, as well as initiation and implementation of any innovations, such as ABC.

2.4.4.1 Mechanistic and Organic Model

Whether an innovation can be successfully adopted or implemented is influenced by organizational structure (Damanpour, 1991). Organizations can be classified into two groups based on the abilities of adapting to technological and commercial change, namely, mechanistic and organic organizations. Gosselin (1997) suggested that the adoption of innovations is easier in organic organizations, while the implementation of innovation is easier in mechanistic organizations. French and Bell (1984, p. 261), listed seven main attributes of organic organization as follows:

- Continuous re-examination of tasks through interaction with others and a great attention is paid to utilizing expertise that can help to solve problems faced by the organization;

- A network authority, control and communication based on expertise and commitment to the total task rather than on hierarchical authority;
- Communications are more widespread and open and frequently compare to limited and controlled;
- Communications are encouraged to be conducted between people of different rank and functional groups;
- A greater emphasis on commitment to the organization's task, growth and progress than on obedience or faithfulness;
- High value placed on expertise relevant to the technological and commercial context of the organization;
- Team leadership style which emphasizes consultation and substantial attention to interpersonal and group processes, such as decision-making by consensus.

French and Bell (1984, p. 259) summarized the seven characteristics of mechanistic organizations, the details are as follows:

- A high degree of task differentiation and specialization, a more accurate description of rights, responsibilities and methods to be used;
- Greater reliance on top hierarchy to control incoming and outgoing communications and greater conservatism in dispensing information throughout the organization;
- Greater dependence on each hierarchical level for task coordination, control and communication;
- High degree of emphasis on vertical interactions between superiors and subordinates, subordinates' main activities are controlled by these interactions;
- Emphasis on loyalty to the organization and hierarchical superiors;

- Higher value given to internal knowledge, skill, and experience compared to more general knowledge and experience;
- One-to-one leadership style prevails. Minimal attention is given to group processes and the informal system. Relationship between superiors and subordinates occur mostly in private discussion and consist mainly of telling reporting patterns.

Based on French and Bell (1984), Gosselin (1995) summarized the characteristics of mechanistic and organic organizations. The details are presented in Table 2.5.

Table 2.5: Mechanistic and Organic Organizations

	Mechanistic	**Organic**
Centralization	Higher	Lower
Formalization	Higher	Lower
Specialization	Lower	Higher
Horizontal Differentiation	Lower	Higher
Professionalism	Lower	Higher
Vertical Differentiation	Higher	Lower
Communication	Lower	Higher

Sources from: Gosselin (1995)

Hence, in comparison to organic organizations, mechanistic organizations possess high levels of formalization, centralization and vertical differentiation. According to Damanpour (1991), centralization stands for the centralization of decision-making authority at a specific level in hierarchy. Burns and Stalker (1961) stated that the degree

of centralization in mechanistic organizations is higher, while organic organizations are more decentralized. Damanpour (1991) found centralization produces a negative impact on innovation. Vertical differentiation represents the number of hierarchical levels between the CEO and first-line workers. Vertical differentiation is higher in mechanistic organizations than that of organic organizations.

Aiken *et al*. (1980) found when the level of vertical differentiation is higher; the innovation process would be facilitated. Gosselin (1997) argued that formalization refers to a degree to which jobs, such as rules, procedures and policies within an organization are standardized. Previous researches suggested that formalization produces a negative impact on innovation (Burns & Stalker, 1961; Gosselin, 1997).

Gosselin (1997) concluded that centralization and formalization have significant relationship with ABC implementation. More centralized and more formalized firms are likely to be more successful in the implementation of ABC, while vertical differentiations are associated with ABC adoption decision.

Organizational structure could be divided into three components: vertical differentiation, centralization and formalization. All these three components were used by Gosselin (1997) to investigate the relationship between activity management and organizational structure among Canadian business units. Gosselin (1997) found that vertical differentiation was associated with ABC adoption, while, centralization and formalization were related to ABC implementation. Since, this study aimed to investigate factors influencing ABC success implementation. Therefore, this study

excluded vertical differentiation from the investigation. This study also predicts that centralized and formalized structure influences ABC success implementation among Chinese manufacturing firms.

2.4.4.2 The Dual-Core Model

Daft (1978) argued that the dual-core model relies on the differences between administrative and technical innovations. Gosseline (1997) stated that organizational structures and administrative processes are influenced by administrative innovation, and administrative innovations focus on changes in goals, strategies, as well as control systems. Dunk (1989) classified innovation in accounting as an administrative innovation. Daft (1978) defined technical innovation as new thoughts of new products, service, and process. Evan (1996) stated that management accepts administrative innovation slower than technical innovation, because administrative innovation is perceived by top management as inconsistent with profit objective of manufacturing firms. Zmud (1982) stated that adoption and implementation of an administrative innovation could be easier in mechanistic organization, while technical innovation could be facilitated by the characteristics of organic organizations. Table 2.6 presents the characteristic of a dual-core model.

Table 2.6: Dual-Core Model

	Mechanistic	**Organic**
Administrative	Easier	More difficult
Technical	More difficult	Easier

Source: Gosselin (1997)

2.4.4.3 The Ambidextrous Model

The ambidextrous model refers to distinctions between adoption and implementation of any innovations (Gosselin, 1995, 1997). Damanpour (1991) stated that the adoption stage is made up of all the actions in the decisions to adopt an innovation, such as the perception of problem, information gathering, attitude formation and valuation and the attainment of resource. According to Rogers (1983), the implementation stage of an innovation consists of adoption and the routinization and adoption. Zmud (1982) highlighted that the adoption stage is easier in organic organizations; however, implementation is harder in organic organizations. Table 2.7 outlines the feature of this model. Hence, in this study, it is expected that ABC implementation success is higher in the mechanistic firms.

Table 2.7: Feature of Ambidextrous Model

	Mechanistic	**Organic**
Adoption	More difficult	Easier
Implementation	Easier	More difficult

Source: from Gosseline (1995)

2.4.5 Organization Culture

Organizational culture has been regarded as an important subject in the business and management literature for decades (McKinnon *et al*., 2003), and also has long been treated as a critical method for organizations to combine internal operation process and to become accustomed to external circumstances (Denison & Mishra, 1995; Tsui, Wang, & Xin, 2006).

It is argued that the success of any business practices is influenced by organizational culture and organizational culture could impact management accounting and control system significantly (Martins & Terblanche, 2003; Hashim *et al*., 2005; Baird *et al*., 2007).

As Flamhotz (1983) stressed that organizational culture plays a vital role in designing the control system. The control system should be compatible with corporate culture, otherwise employees may resist the control system. Therefore, managers should emphasize the importance of organizational culture in the design of control system. ABC as one of the new management accounting and control system should be consistent with corporate culture so that ABC could be successful (Schneider et al., 1996). This view is shared by Swain and Bell (1999), who stated that a new innovation process should share the same value with organizational culture; otherwise, it is unlikely to succeed. Skinner (1998) also pointed out that ABC failed in some organizations due to the unsympathetic culture. Hashim *et al*. (2005) highlighted that various advantages could be provided to a business if the business possesses certain characteristics.

Furthermore, previous research also showed that organizational culture influences the level of innovation. Martins and Terbalanche (2003) stated that organizational culture could either support or inhibit an innovation depending on the way of influencing an individual or group behavioral; hence, top management should pay attention to organizational culture. Hashim *et al*. (2005) conducted a survey among small-medium sized enterprises in Malaysia to examine the relationship between organizational culture and innovation. They found that there is a significant relationship between

organizational culture and innovation activity in terms of improved services and new services. ABC is considered as an innovation in the management accounting field, therefore, its adoption and implementation could be influenced by organizational culture.

Previous research presented numerous definitions for organizational culture. Higginson and Waxler (1993, p.11) defined organizational and business unit culture as a "set of shared values, norms and beliefs that get everybody heading in the same direction, is common to all the companies held up as paragons in the best seller in search of excellence". Organizational culture is defined by Detert *et al*. (2000, p. 854) as "holistic, historically determined, socially constructed, and it involves beliefs and behavior. It exists at a variety of levels, and manifests itself in a wide range of features of organizational life". Furthermore, Mavondo and Farrell (2003, p. 241) viewed culture as "a set of broad tacitly understood rules and procedures that inform organizational members on what, and how to do under a variety of undefined situation"

However, Hashim *et al*. (2005, p. 753) gave the following view on organizational culture: "commonly organizational culture is defined as the underlying values, beliefs, and patterns of behavior that affect how the operations of the organization should be conducted." One of the definitions of organizational culture is given by Higginson and Warder (1993, p. 753) as "a set of shared values, norms and beliefs that get everybody heading in the same direction." This definition was employed by Baird et al. (2004) and (2007) to examine the relationship between ABC implementation and corporate culture. Thus, current study also adopted Higginson and Warder's (1993) to test the association between ABC success and corporate culture among Chinese manufacturing firms.

O' Reilly (1991) summarized four dimensions for organizational culture: outcome orientation, team orientation, attention to detail, and innovation. All these four components were recently used by Baird *et al.* (2007) to investigate the relationship between organizational culture and the success of activity management practices. Therefore, this study also adopted these four dimensions of organizational culture to examine whether there is a significant relationship between ABC success and organizational culture.

According to O'Reilly et al. (1991), the outcome orientation represents the extent to which an organization highlights the actions and results, and has high anticipation on performance. If an organization focuses more on outcome orientation, it is more likely to emphasize on practices, such as Activity-Based management, which is claimed to improve the internal business process and to enhance an organizations' performance and competitiveness (Baird *et al*., 2004, 2007).

The second dimension of organizational culture is team orientation. Cross-functional activities are needed by activity management and teamwork can facilitate cooperation and information sharing among organization members (Baird et al., 2007). Thus, team orientation is crucial for activity management practices to succeed (Baird *et al*., 2007; Drake *et al.*, 2001).

Organizations, which pay excessive attention to details, are more likely to implement activity management practices successfully (Baird *et al*., 2007). These organizations are more likely to assess the information generated by activity management due to the

preference for accuracy and detail. On the contrary, business units, who pays less attention on details, might ignore the time or resources which are necessary for the success of activity management practices (Baird *et al.*, 2007). Gosselin (1997) stated that Activity-based costing is the highest level of activity management practices. In order to implement ABC successfully, great attention are needed to track cost pools and activity drivers to product or service.

The four dimensions of organizational culture: outcome orientation, innovation, team orientation, as well as attention to details were adopted by Baird *et al*. (2007) to investigate the association between organizational culture and ABC success among Australian business units. These four dimensions of organizational culture were also employed in this study to examine whether there is a significant relationship between ABC success and organizational culture in the Chinese context.

2.5 Prior Research

In this section, selected ABC implementation of empirical studies, which spanned between 1995-2008 are discussed. Factors adopted by previous research to investigate the effect on ABC success implementation are highlighted, and stages of ABC implementation are also outlined. Finally, research gaps are also addressed.

2.5.1 Technical Variables

Early studies on ABC adoption and implementation undertaken by previous researchers concentrated on technical factors, such as identification of main activities, selection of cost drivers, and problems in accumulating cost data. Examples of these

research are recorded in Cooper (1990), Morrow and Connelly (1994) who found that technical factors affecting ABC success significantly.

However, technical factors alone may not be adequate to explain the factors influencing ABC success implementation. Cooper et al. (1992) argued that the key problem during ABC implementation stage is that companies only focus on technical factors. They suggested that to make ABC implementation more effective, non-technical factors such as involvement of non-accounting in ABC implementation process, top management championship, adequate training program for employees about the objectives and benefits of ABC should be emphasized as well.

Similar opinions were expressed by Shields (1995) and Shields and McEwen (1996). Shields (1995) found no significant relationship between technical factors and ABC success. Shields and McEwen (1996) also highlighted that the sole emphasis on the architectural and software design of ABC systems leads to the failure of ABC implementation. Therefore researchers have suggested that new variables should be considered to investigate factors influencing ABC success.

2.5.2 Contextual, Behavioral and Organizational Variables

Recognizing the research gaps in identifying other factors that may affect ABC success, academicians shifted their focus from technical factors to other variables, such as contextual, behavioral and organizational, culture, as well as an organizational structure. Anderson (1995) conducted a longitudinal investigation of ABC process in General Motor (GM) from 1986 to 1993. In his research, he examined the effects of

organizational variables and contextual variables, and segmented ABC implementation into four major stages, initiation, adoption, adaptation and acceptance. He found that organizational factors, such as top management support and training for the ABC system affected various stages of ABC significantly, while contextual variables, such as competition, relevance to managers' decisions and compatibility with existing systems produced a different degree of impact on different stages of ABC.

Shields (1995) examined the relationships between diversity of behavioral, organizational and technical factors and the success of ABC implementation. He employed Shields and Young's (1989) framework and summarized behavioral and organizational variables as top management support, adequate resources, training, link ABC system to performance evaluation and compensation, non-accounting ownership, link ABC to competitive strategies as well as clarity of ABC objectives. He found that top management support, linkage to quality initiatives and to personal performance measure (pay/appraisal), implementation of training and resource adequacy were the significant predictors in explaining ABC success. He also found that technical variables were not associated with ABC success.

Shields's (1995) findings are supported by other researchers, such as Shields and McEwen (1996), who argued that a significant cause for unsuccessful implementations of ABC of several companies could be due to the emphasis of architectural and software design of the ABC system and less attention given to behavioral and organizational issues, which were identified by Shield (1995). Krumwiede and Roth (1997) also stated that barriers of ABC implementation can be overcome if firms could give importance to behavioral and organizational variables. Similarly, Norris (1997)

agreed with Shield's (1995) findings that the association between ABC success and behavioral and organizational variables is stronger than with technical variables.

An Interest to examine the impact of behavioral and organizational variables on ABC success has resulted in many empirical studies. McGowan and Klammer (1997) conducted a survey of 53 employees from 4 targeted sites in the U.S to examine whether employees' satisfaction levels are associated with ABC implementation. They also measured their perceptions on the factors associated with the degree of satisfaction, such as top management support; the degree of involvement in the implementation process; objectives clearly stated; objectives shared; training; linkage to performance evaluation system; adequate resources; information quality and preparer over user. Their results indicated that the employees' satisfaction with ABC implementation was positively related with clarity of objectives and quality of ABC information.

Gosselin (1997) carried out a survey of 161 Canadian manufacturing companies to examine the effects of strategic posture and organizational structure on adoption and implementation of general forms of ABC. He segmented the ABC implementation stage into adoption and implementation. The research findings showed that a prospector strategy was associated with manager decision to adopt ABC, while centralization and formalization were significantly associated with ABC success implementation.

Van-Nguyen and Brooks (1997) surveyed 120 manufacturing firms in Australia to examine whether a firms' characteristics and business environment variables, such as cost structure, production complexity and diversity, firms' size and level of competition

are associated with ABC adoption. The results suggested that production complexity, firms' size and level of competition were associated with ABC adoption significantly.

Krumwiede (1998a) surveyed U.S manufacturing firms to study how contextual factors, such as the potential for cost distortion or size of firms; organizational factors, such as top management support, training or non-accounting ownership, affect each stage of ABC implementation process. His findings showed that the different factors affected the various stages of implementation of ABC and the degree of importance of each factor varies according to the stage of implementation. Contextual factors, such as usefulness of cost information, IT existence, less task uncertainty and large organizations were related to ABC adoption. Moreover, organizational factors, such as top management support, non-accounting ownership, and implementation training affected ABC success implementation.

In another study by Anderson and Young (1999), the relationships between organizational and contextual variables, such as organizational structures, task characteristics, management support, information technology and ABC success were examined. The results confirmed the importance of organizational factors (top management support and adequacy resources) during the ABC implementation stage. In the UK, Innes and Mitchell (1995, 2000) surveyed the extent of ABC adoption among largest firms. The studies aimed to find out the factors influencing ABC success by using behavioral and organizational variables, and it was found that top management influenced ABC success significantly.

Empirical studies on ABC have also been conducted in non-western countries. In South Africa, Sartorius *et al*. (2000) carried out a mail survey among firms to investigate the effect of organizational factors such as top management, adequate resources, coherence with organizational goals and strategy on ABC success. They found that top management support and resources were the crucial factors in explaining ABC success.

Brown, Booth and Giacobbe (2004) conducted a cross-sectional survey of Austrian business units to test the influence of technological factors, such as the level of overhead, product complexity and diversity, as well as relative advantage and organizational factors, such as top management support, internal championship, size and the involvement of consultants. They found that in the initial stage of ABC, the top management support, internal championship and size of organizations were associated significantly with ABC, and internal champion support influenced the decision about whether to accept or reject ABC systems.

In Asia, Khalid (2005) conducted a questionnaire survey among the largest 100 firms in Saudi Arabia, and found ABC adoption to be positively related to diversity of products. In Malaysia, Maelah *et al*. (2006) conducted a mail survey and a case study to examine the factors influencing ABC success, especially at adoption stage. They found that the significant factors affecting ABC adoption were cost distortion, decision usefulness, information technology and organizational factors. In addition, the findings showed that decision usefulness, top management support, link ABC to performance measure and compensation influenced the ABC success adoption significantly.

A case study of one Chinese manufacturing firm was carried by Lana and Fei (2007) in China. Their research aimed to examine some key success factors pertinent to ABC implementation within a Chinese organizational and cultural setting. They concluded that top management support, hierarchical and communication structure and high proportion of dedicated professionals were the significant factors in determining ABC success implementation.

Majid *et al.* (2008) used a case study approach to describe the process of ABC implementation in a Malaysian service company and a Malaysian manufacturing company. In this research, they categorized ABC implementation into initiation and adoption, design, implementation and use of information. The purpose of the research was to find out the problems faced during ABC implementation. They found that the factors determining ABC success were top management support, suitable ABC software, and finally, ensuring that all affected employees understand and participate in the ABC implementation stage. They also found that at different stages of ABC, the dominant factors influencing ABC success were also different.

Mohammed and Drury (2008) adopted behavioral and organizational factors summarized by Shields (1995) to examine factors influencing the adoption and degree of success of ABC systems and determinants of the success. In their research, the targeted research population was manufacturing and service firms in the UK. They found that top management support, non-accounting ownership, adequate training provided to ABC determined the ABC success.

2.5.3 Cultural Factors

The effect of corporate culture factors on ABC were also examined by two prior studies. Baird *et al*. (2004) conducted a study to investigate the relationship between the extent of ABC adoption and the organizational variables of size and decision usefulness of cost information and business unit culture. In their research, data were collected by a mail survey questionnaire and samples were randomly selected from business units in Australia. The research finding showed significant relationships between ABC adoption and decision usefulness, cultural dimensions of outcome orientation and tight verses loose control. Baird *et al*. (2007) examined the relationship between the success of activity management practices and organizational factors (top management support, training, link to performance evaluation and compensation, and link to quality initiatives), and organizational culture **(**outcome orientation, team orientation, attention to detail, as well as innovation). They adopted a survey questionnaire method on randomly chosen business units in Australia. The findings showed that two organizational factors (top management support, link to quality initiatives) explained the variations in the success of activity management practices, such as ABC, and outcome orientation and attention to detail of organizational culture were associated with ABC success. They also stressed that compared with organizational culture; organizational factors had stronger associations with the ABC.

As discussed above, this study expects that a positive and significant relationship could be found between ABC success and organizational culture among Chinese manufacturing firms.

2.6 ABC success

This section discusses the measure used by previous researches to measure ABC success. There can be a diverse number of variables that measure ABC success, but how to define success depends on the individual value placed on the ABC system. Examples of ABC success measures tested in prior research included were showed, the limitations for each measure were outlined, and measures for ABC success adopted by this research were also presented.

2.6.1 Single Measure

Anderson (1995), Gosselin (1997), Krumwiede (1998) and Shields (1995) used management evaluation to measure ABC success. In their research, they requested the respondents to rate the degree of success using a single item. However, this measure for success is problematic, as Anderson and Yong (1999, p. 526) highlighted that

> What is meant by success" A danger of asking managers to rate ABC implementation success without specifying the definition of success is failure to detect cases in which individuals hold different views on the definition of success but share views on attainment of a particular dimension of success.

Shields (1995) also provided suggestions for future research. He suggested that future research should adopt a multiple-item instrument to measure key variables.

MoGowan and Klammer (1997) adopted the employees' satisfaction to test the degree of success of ABC implementation. In their survey, employees were required to state the level of satisfaction toward ABC implementation. The limitation of their research was similar with Shields's (1995) research that there is only one-single item to measure ABC success. They also suggested that future research should use better and more accurate measures.

Supitcha and Frederick (2001) stated that the participants' attitude towards ABC is another criterion for ABC success. In their study, respondents were asked to use self-reported measure to determine the overall success of ABC implementation. If participants have positive attitude towards ABC that indicates ABC is successfully implemented in the organization. Nevertheless, Supitcha and Frederick (2001) also claimed that the use of self-reported measure is a limitation. As Brewer (1994, p. 17) pointed out that "Subject will only report what they know and choose to relate about their beliefs…… [That] does not necessarily correlate with an individual behavior".

2.6.2 Multiple Measures

Foster and Swenson (1997) was the first one to adopt multiple-item to measure ABC success The measure were usage, decision action, dollar improvement, as well as management evaluation. However, these measures of ABC success such as "dollar improvements" or "increase in firm value" are also criticized as they are extremely difficult to control (Byrne & Stower, 2008). For example, dollar improvements or an increase in firm value are affected by many factors, such as increased in revenue, and an increase in market share. It is therefore very hard to specify how much of the improvement in performance are contributed by ABC success implementation. Furthermore, Kennedy and Affleck-Graves (2001, p. 20) admitted that "despite the strong and robust evidence in this paper, it is not possible to prove definitely that there is a causal link between ABC implementation and subsequent increases in shareholder".

Brewer (1998) defined ABC success as defensive routines and ABC data usage. It means that in order to make ABC success, two situations have to be satisfied. First of all, management must recognize the social-technical context of ABC by addressing and

overcoming employees' defensive and routines (Argyris and Kaplan, 1994), Secondly, employees must actually use data from the ABC system to help make decisions (Argyris & Kaplan, 1994). Anderson and Young (1999) used overall accuracy as the criteria for ABC success. These measures include overall value of ABC, perceived accuracy of ABC data, and perceived use of ABC data.

In summary, the measure for ABC success, which was used by prior researches are mainly "Financial benefit", "satisfaction with ABC", or "use of ABC system for decision-making". But the definition of ABC success has often been vaguely defined in terms of subjective beliefs regarding this measure (Banker *et al.*, 2009). They also argued that a more rigorous approach is needed to measure ABC success.

2.6.3 Measure for ABC Success in This Research

McGowan (1998, p. 30) argued that if users' attitudes toward a system are unfavorable, it is likely that they will not accept it. McGowan cited that "measures that describe the users' reactions to the innovation, such as attitudes and satisfaction, are appropriate surrogates for assessing the success of an information system". This view of success has provided the most robust basis for ABC success measurement in research to date (Byrne, Stower & Torry, 2009), and therefore the one adopted in this study. The indicators for this measure are user attitude, technical characteristics rating, perceived usefulness in improving job performance and organizational process impact (McGowan, 1998).

2.6.3.1 User Attitude

Numerous measures can be used for the success of an innovation. When the system is accepted and applied (Robey, 1979) or when users' resistance decreases (Bailey & Pearson, 1983; McGowan, 1998), a system implementation can be considered as success.

This research focuses on the organizational members' attitude towards ABC implementation. According to McGowan (1998), attitude is the affective evaluation directed toward an object or event. Attitude plays an important role in implementing a new system (McGowan, 1998). Barki and Huff (1985) also held the same view that whether a new system can be successfully implemented or not in a firm is determined by attitude towards the system, and only when users have a positive attitude toward a system, can the system be accepted (McGowan, 1998). Evidence shows that if ABC is perceived by users as success, both the firm's manager (Swenson 1995) and employees (McGowan and Klammer, 1997) showed positive attitude toward ABC system and claimed ABC is more superior to the predecessor system. Argyris and Kaplan (1984) suggested that in order to make ABC successful, education and sponsorship are needed, Shield's (1995) research findings highlighted that it is necessary to focus on behavioral variables in the ABC implementation process.

Previous researches showed that if ABC is successful, individuals would report positive attitudes toward the implementation of ABC (McGowan, 1998; Byrne et al., 2009).

2.6.3.2 Technical Characteristics Rating

Traditional cost systems have been subjected to lots of criticisms due to failure to provide accurate product costing information (Kennedy & Affleck-Graves, 2001) and

also failed to provide appropriate level of information to aid decision-making *(Byrne et al*., 2009). In order to make effective decision, information generated by costing system should be accurate (Argyris & Kaplan, 1994; Bailey & Pearson, 1983; Billington, 1999; Cooper & Kaplan, 1998), timeliness and reliability (Bailey & Pearson, 1983), understandability (McGowan, 1998; Turney, 1996), and accessibility (Bailey & Pearson, 1983, Byrne *et al*., 2009).

The past literature stressesed that in contrast to conventional costing system, information generated by ABC is more accurate (McGowan, 1998), more reliable (Innes & Mitchell, 1995; McGowan, 1998), more timely (Bailey & Pearson 1983; McGowan, 1998), more accessible (Bailey & Pearson, 1983), easier to use (McGowan, 1998) and fostered a better apprehending of business process (Turney, 1996).

After surveying ABC implementation among Australian manufacturing firms, Byrne and Stower (2009) concluded that if ABC is successful, individuals would perceive the technical characteristics of the information generated by ABC as superior to those of their predecessor system.

2.6.3.3 Perceived Usefulness in Improving User Job Performance

Davis (1989, p. 319) defined perceived usefulness as "the degree to which a person believes that using a particular system would enhance his or her job performance." He also highlighted that if users are more satisfied with a system, they would use it more extensively. Numerous research asserted the same opinion with Davis (1998)'s argument. For example, Leonard-Barton (1988) stated that the acceptance of an

innovation by its users in organization can influence the success implementation of that innovation and Robey (1979, p. 319) concluded that "a system that does not help people perform their jobs is not likely to be received favorably in spite of careful implementation efforts".

Past research shows that ABC is capable of assigning costs to cost objects more accurately and reliably (McGowan, 1998; Byrne, Stower & Torry, 2009); promoting a clearer understanding of the activities performed, and enhancing organizational performance (Turney, 1996). Geishecker (1996) and McGowan (1998) argued that ABC users are able to analyze and extract relevant information at the appropriate level in the necessary time frame.

However, ABC may impact organizations negatively. According to McGowan (1998), ABC implementation lengthens the decision-making time and decreases confidence. Byrne, Stower & Torry (2009) stated that because of the analysis of activities and the collection of data at each stage of ABC implementation, ABC system may be more complex. They also believed that with the advancements in hardware and software technology. ABC implementation will be fewer complexes and less time consuming, and eventually, will produce relevant and timely information through ABC implementation.

McGowan (1998) concluded that if ABC is implemented successfully, individuals may perceive ABC results in improvements in the quality of their work, great control over their work, accomplishing task more quickly, increasing job productivity, improving job productivity, enhancing effectiveness on the job, making jobs easier and useful in

their jobs. Byrne *et al*. (2009) also presented that users perceived ABC is more useful in improving their job performance than that of a traditional cost system.

2.6.3.4 Impact on Organizational Process

The effectiveness of an innovation implementation could be evaluated by the impact produced on the organization (McGowan, 1998). Traditional costing system fails to smooth the progress of the implementation of cross-functional approaches, and under traditional costing system, some necessary information, such as time, quality, capacity, flexibility, and cost are obscured (Byrne *et al*., 2009).

ABC is regarded as an effective tool to highlight efficiencies, reduce waste, increase innovation, and improve relationship and communication across department, and increase focus on the attainment of goal (Cooper & Kaplan, 1998; McGowan, 1998).

Byrne *et al*. (2009) proposed that ABC success can lead users to perceive that the implementation of ABC results in more improved organizational processes.

2.7 Performance

Researchers believe that ABC success implementation is able to enhance a firms' overall performance. In this section, the previous research related to the association between ABC success and firms' performance are presented, the limitations of previous research are outlined, and the suggestions for this study are also provided.

Kennedy and Affleck-Graves (2001) conducted a mail survey to examine the relationship between ABC adoption and a firms' financial performance in terms of

firms' value and stock price. In their study, they randomly selected firms listed on the London Stock Exchange (LSE) and separated respondents into ABC adopters and non-adopters. The findings showed that ABC produces a significant impact of shareholders' value. However, they also concluded after further analysis that ABC impacts firms' value indirectly, and ABC could only increase firms' value by better cost control, asset utilization, as well as greater application of financial leverage. They also concluded that there is no causal association between ABC adoption and shareholders' value.

Another study carried by Cagwin (2002) to examine the association between ABC adoption and firms' financial performance. In Cagwin's (2002) research, the measure for financial performance was Return on Investment (ROI). The result also showed an indirect rather than direct relationship between ABC success and ROI. ROI could be improved by linking ABC to other initiatives, such as Just in time (JIT) and Total quality control (TQC).

Using financial measures, such as ROI or firms' value to examine the association between ABC success and firms' performance has limitations as ROI or firms' value is affected by a number of factors, such as information technology sophistication, importance of cost, complexity, level of intra-company transactions, unused capacity and competition (Gagwin, 2002). It is extremely hard to confirm how much of the improvement in firms' performance are contributed by the ABC success.

Kennedy and Affleck-Graves (2001) highlighted that many factors may drive a firms' performance in terms of stock price performance and shareholder value. Thus, improvements in a firms performance maybe attributed by other variables rather than

ABC only. Shields (2000) also expressed the same view that the effect of ABC system on a firms' performance maybe indirect and mediated by another variables.

Due to the limitations of financial performance, this study recommends to examine the effect of ABC success on a firms' perceived performance, namely, manufacturing performance and business performance.

2.7.1 Manufacturing Performance

Time, quality and cost are the three elements in manufacturing performance (Banker, Bardhan, & Chen, 2008). The manufacturing cycle time is the duration between the times an order is received by manufacturing to the time it becomes a finished good. It equals waiting time plus manufacturing time for an order. While customer lead time is the time when the customer places an order for a product or service to the time the product or service is delivered to the customer. (Horngren *et al.*, 2003), Michael (1999) highlighted that longer time means more handover and incur more non-value added activities of counting, checking, and moving.

Gering (1999b) defined quality as conforming to requirements of service and product specification. Non-conformance often caused non-value added activities, as well as abnormal spoilage, scrap and rework, especially incurred during the cost driver analysis stage. In order to satisfy customers' needs, companies must meet the design and production specifications through improving quality (Horngren *et al.*, 2003).

Reduction in manufacturing cost can be achieved by implementing standard approaches, such as benchmarking, activity analysis and process redesign. All the standards need

cost driver analysis (Michael, 1999). So understanding the details of cost driver can help managers to set the target, identify and eliminate the non-value added activities (Michael, 1999).

Michael (1999) stated that performance enhancement means reduction in manufacturing cycle time, reducing in manufacturing cost and quality cost, as well as the improvement in product quality. Horngren *et al*. (2003) stressed that to satisfy customers, managers need to find out an effective way to reduce cost, improve products' quality and to shorten manufacturing cycle time and customer lead time.

ABC is a powerful tool for improvement in manufacturing performance. According to past literature, ABC can result in higher product quality and significant decrease in manufacturing cycle time. It can also eventually reduce the manufacturing cost through quality and cycle time improvement (Ittner *et al*., 2002).

Armitage and Russell (1993) stated that managers expect the information supplied by ABC system is able to improve quality through identifying the activities created by poor quality and the drivers of these problems. Carolfi (1996) stated that the detailed information about the value-added and non value-added activities conducted by a firm can be generated by ABC, together with the cost related to those activities, as well as the drivers of cost activities. Managers are allowed to reduce cost through redesigning products and processes. This could enhance the efficiency of existing activities, eliminating the non value-added activities to customers, as well as strengthening the harmonization with clients and suppliers by using the information produced by ABC.

Michael (1999) also presented that in order to improve organizations' performance, companies should map the process, identify bottlenecks and non-value added activities, select appropriate cost driver which underpins both ABC and performance improvement. Moreover, he summarized that ABC impacts time moderately, influences quality significantly, and produces substantial impact on cost.

Moreover, ABC could help management to identify quality improvement activities and to allocate resources to highest valued enhancement projects by stressing the cost of quality-related and non-value-added activities (Ittner, 1999; Ittner *et al*., 2002). Furthermore, numbers of non-value-added activities caused by counting, checking and moving or are produced by increase in the duration of business processes. ABC can facilitate the improvement in cycle time and supply the necessary information to minimize the delay through the identification of activities resulting in non-value-added times (Ittner, 1999; Ittner *et al*., 2002).

Past empirical research found that ABC has the potential to improve manufacturing performance by lowering manufacturing cost, improving quality and decreasing manufacturing cycle time (Ittner *et al*., 2002; Banker *et al*., 2008). This study also expects that ABC success could lead to the improvements in manufacturing performance.

2.7.2 Business Performance

For perceived business performance, this study employed Mia and Clark's (1999) definition. Mia and Clark (1999, p. 151) viewed business performance as:

> The extent to which the organization or division has been successful in attaining its planned targets, and examples of performance criteria are: attainment of targets related productivity, costs, quality, delivery, service, sales volume, market share, and profit.

Mia and Clark (1999) commented that the measure for performance is a comprehensive measure that includes all aspects of performance both financial and non financial measures, also both qualitative and quantitative.

Previous research indicates that management accounting and control system (MACS) could assist managers in improving business performance. Mia and Clark (1999) stated that information provided by MACS, especially benchmarking and monitoring information are able to assist managers in enhancing performance. Firstly, MACS play a vital role in supplying necessary information for firms to develop suitable strategies to adapt to the rapid changes in the business environments (Isa & Foong, 2005), Secondly, feedback on all the perspectives of performance, for example, feedback of firms' current cost structure and cost information, the value and level of inventory, changes in market share, changes in sales volume, profitability, as well as productivity (Kaplan, 1983). If firms can make the best use of all those MACS feedback, performance could be improved. And with feedback information supplied by benchmarking and monitoring information, managers could obtain relevant information, which could facilitate them to correct any errors in operation, and reduce task uncertainty. Managers could accomplish the overall goal of the organization by effectively using that information (Ashford & Cummings, 1983).

ABC is an important technique of MACS (Johnson & Kaplan, 1987), ABC could provide managers with more accurate information about costing, time, value added and

non value added activities. This information is crucial for making effective decisions which would eventually lead to enhanced performance. So far, no empirical research has been done to empirically test the association between ABC success and business performance. Due to the benefits of ABC, this study predicts that ABC success could result in business performance both financial and non financial perspectives.

2.8 Summary

This chapter covers a discussion on management accounting and control system (MACS), traditional volume based costing system, the ABC system, previous research on factors influencing ABC success, measures of ABC success, as well as the effect of ABC implementation on firms performance. Section 2.1 discusses the MACS and their weaknesses under today's new manufacturing context, and then followed by a discussion on traditional costing system and its shortcomings in section 2.2. Section 2.3 outlines the features of ABC, including why ABC is needed, benefits and limitations of ABC, the stage and steps of ABC implementation, as well as ABC adoption in various countries. Section 2.4 presents the critical factors influencing ABC success, including behavioral and organizational factors, technical variables, organizational structure, and culture. Prior studies on factors affecting ABC success are presented in section 2.5, then followed by a discussion on measure for ABC success. Finally, section 2.7 discussed the association between ABC success and firms performance.