Asian Journal of Accounting and Governance **1**: 79-104 (2010) ISSN 2180-3838

Determinants of Management Accounting Control System in Malaysian Manufacturing Companies

TUAN ZAINUN TUAN MAT*

University Teknologi MARA, Malaysia

MALCOLM SMITH AND HADRIAN DJAJADIKERTA

Edith Cowan University, Western Australia

ABSTRACT

This study examines the level of changes in management accounting practices (MAP) in Malaysian manufacturing companies and investigates the factors determining the change in management accounting and control systems (MACS). The data are collected using a mailed questionnaire survey to manufacturing companies in Klang Valley. Results of this study showed that, the level of management accounting practices in Malaysian manufacturing companies were consistent with the International Federation of Accountants (IFAC) frameworks on the management accounting evolution. The results also identified technological advancement and strategic change as important predictors of change in MACS. Taken together, these research outcomes make an incremental contribution to the existing management accounting change literature by providing useful insights into our knowledge of management accounting innovation specifically for developing economies.

Keywords: Management accounting and control systems, change, intensity of competition, advanced manufacturing technology, organizational structure, strategy, contingency theory.

INTRODUCTION

In the quest to understand management accounting in competitive environments and advanced technologies, change has increasingly become a focus for

* Tuan Zainun Tuan Mat, Faculty of Accountancy, Universiti Teknologi MARA, Malaysia. e-mail: tuanz693@salam.uitm.edu.my *or* ttuanmat@our.ecu.edu.au

research. Many firms have experienced significant changes in their organizational design, business strategy, competitive environments and technologies. Business environments exhibit a variety of structures and processes, including flat and horizontal organizational forms, multidimensional matrix structures, networks of "virtual organizations and self-directed work teams. When business organizations respond to challenges by embarking on a change management path, they are faced with choices of which one of the management methods, techniques, and systems would be most effective (Waldron, 2005).

This study examines companies in the Malaysian manufacturing industry which respond to the rapid changes in technological and competitive environment arising as a result of globalization. Globalization has changed the environment surrounding organizations operating in developing countries with an increase in uncertainty, intensified industry competition and advanced technology. According to Kassim, Md-Mansur and Idris (2003) globalization brings in new technology and makes a developing country open to greater competition. These changes may affect the choice of management accounting practice in an organization and also may result in the need for the firm to reconsider its existing organizational design and strategies in order to fit with the changing environment. This argument is supported by Burns and Scapens (2000) and Shields (1997). They suggest that changes in environment cause changes in organizations, which in turn cause changes in management accounting practices.

As the firm strives to achieve a better fit with its environment, and to be more successful, sustaining, and improving current performance will become critical. However, very limited research has taken place into how changes in technological and competitive business environments have caused management accounting and organizational change in developing countries. Most empirical evidence in this area originates from research in developed countries (Baines & Langfield-Smith, 2003; Burns, Ezzamel & Scapens, 1999; Chenhall & Euske, 2007; DeLisi, 1990; Innes & Mitchell, 1990; Libby & Waterhouse, 1996; Ling-Yee & Ogunmokun, 2007; Lucas & Baroudi, 1994; Luft, 1997; Macy & Arunachalam, 1995; J. A. Smith, Morris & Ezzamel, 2005).

The business environment in a developing country differs from that within a developed country with regards to market size, access to manufactured inputs, human capital, infrastructure, volatility and governance. Even though Malaysia is categorised as a developing country, it has advanced infrastructure and technology compared to most other developing countries. Malaysian manufacturing industries are also more concentrated than those of most developed countries (Bhattacharya, 2002). With globalization, the application of technology in Malaysia has increased, especially through foreign investment (Kassim et al., 2003). Changes in business environment in Malaysia arising from a market-oriented economy and government policies that provides

businesses with the opportunity for growth and profits, have made Malaysian manufacturing industry export based.

On the whole, manufacturing industries are the most active and important contributors to the Malaysian economy after services sector. In 2006 the manufacturing sector contributed 31.1% of the total GDP, and 29.1% of total employment.† In addition, Malaysia's rapid move from a production-based economy (p-economy) towards a knowledge-based economy (k-economy) allows companies to do business in an environment that is geared towards information technology.‡ The advance of technology through ICT and computerization has also made management accounting information flow within organizations in this country more useful, timely, accurate, and relevant (Omar, Abd-Rahman & Sulaiman, 2004).

Moreover, the introduction of fast information technology within which firms in manufacturing industries in Malaysia operate has greatly affected the technological environment. Much literature has identified technological advancement, active competitors and demanding customers as potential predictors of organizational and management accounting change (Baines & Langfield-Smith, 2003; Dibrell & Miller, 2002; Innes & Mitchell, 1990; Kaplan & Norton, 1996; Shields, 1997; Waweru, Hoque & Uliana, 2004). This aspect is important because the management accounting system (MAS) requirement can vary significantly depending on how well known the causes of change in the external environment and their indicators are to the organization. This argument is supported by Waweru et al. (2004), who found that an increase in global competition and changes in technology were the two main contingent factors affecting management accounting change in South Africa.

Unlike developed countries, management accounting practices (MAP) in developing countries may be gained through "importing" management accounting systems in the manner adopted by foreign companies establishing operations in developing countries (Abdul-Rahman, Omar, & Taylor, 2002; Chow, Shields, & Wu, 1999). For example in Malaysia, local manufacturing companies are still using traditional methods compared to multinational corporations such as Japanese-owned companies, which mainly use new management accounting techniques (Abdul-Rahman et al., 2002). Furthermore, little research has been done in developing countries (see for example, Hoque & Hopper, 1994; Waweru et al., 2004) and even fewer studies in Asian countries like Malaysia (e.g., Abdul-Rahman, 1993; Nor-Aziah & Scapens, 2007). These factors provide further motivation to carry out this research in Malaysia so that it can contribute to a better understanding of the adoption of changes in MAS in a developing country context.

† Source: FMM directory 2008 Malaysian Industries.

‡ Source: Malaysia Industrial Development Authority (MIDA), http://www.mida.gov.my.

Contingency researchers have also argued that not only the external factors may affect the management accounting to change; contextual variable factors inside organization also may have a connection to management accounting change (Moores & Yuen, 2001). Theorists of revolutionary change have advocated that all organizational elements such as strategy, structures, people, systems, and culture, have to be changed simultaneously to achieve maximum organizational alignment and effectiveness (Huy, 2001). Strategy and structures have also been identified in the previous literature as the most important factors in management accounting change. Thus this study is carried out to further investigate these relationships.

This study examines changes in MAP which respond to the rapid changes in the internal as well as external organizational factors as a result of globalization. The identification of contextual variables in this study is traced from original structural contingency frameworks developed within organizational theory. Contingency perspective suggests that effective management accounting systems should align with both internal and external factors. Drawing upon the management accounting change and contingency theory literatures, this study extends prior management accounting research in Malaysian manufacturing industry. This study intends to investigate whether changes in internal organizational factors; namely strategy and structure, and external environmental factors; namely intensity of competition and manufacturing technology, influence organizations to change their MACS.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

The approach of this study is to consider a theory that explicitly examines different modes of change (contingency theory). This theory is used to develop a framework for conceptualizing management accounting and organizational change, which not only stresses the stability embodied in rule-based behaviour and routine of organizational systems and practices, but also recognizes that rules and routines can change (see, Burns & Scapens, 2000; Huy, 2001; Lapsley & Pallot, 2000; J. A. Smith et al., 2005).

Prior literature has identified that changes in external environment factors as well as internal factors cause management accounting practices to change (e.g., Baines & Langfield-Smith, 2003; Chenhall & Morris, 1986; Chong & Chong, 1997; Libby & Waterhouse, 1996; Mia & Clarke, 1999; Pratt, 2004; Waweru et al., 2004). Hypotheses are formulated in this study using the contingent theoretic arguments that changes in management accounting practices are contingent on the "fit" with changes in the internal operations of organizations and external environment that surrounds it.

An organization is often interpreted as a configuration of different characteristics. Numerous dimensions of external context (such as

environments, industries and technologies) and internal organizational characteristics (such as strategies, structures, cultures, processes, practices and outcomes) have been said to cluster into configurations (Moores & Yuen, 2001). In a changing environment, markets have become more competitive, mainly in respect of an increased level of high quality and competitively priced products. Organizations may respond to this change by reorganizing their work processes through adopting organizational design and strategy that have a stronger customer orientation. In order to compete, many organizations made considerable investments in advanced manufacturing technology such as computer-integrated manufacturing and just in time systems (Baines & Langfield-Smith, 2003), which in turn can increase quality, productivity, flexibility as well as reducing cost.

Moreover, organizational structural arrangements can be successfully changed through incremental or radical adaptive strategic change (see, Sisaye, 2003). Theories of revolutionary change advocate that all organizational elements such as strategy, structures, people, systems, and culture, have to be changed simultaneously to achieve maximum organizational alignment and effectiveness (Huy, 2001).

Management Accounting Change Process

Management accounting change is not a uniform phenomenon. Consequently one might expect the causal factors of change to be varied and this has indeed been confirmed by management accounting researchers. It is evident that both the external factors (environmental) and internal factors (relating to the organization concerned) have influenced the recent development of new management accounting systems and techniques. According to Shields (1997), the potential change drivers are competition, technologies, organizational design and strategies. These drivers of change also indicate the differing roles which causal factors can have in the process of change. Change in environment also implies uncertainty and risk which create a demand for further management accounting change in the form of 'non-financial' measures (Vaivio, 1999). Less attention has been given by researchers to the management accounting change process. Burns and Scapens (2000, p. 4) observed that, "Little research attention has been given to understanding the processes through which new management accounting systems and practices have emerged (or failed to merge) through time".

To promote a better understanding of the changes in management accounting practices, the International Management Accounting Practice Statement (1998) by International Federation of Accountants (IFAC), provides a framework explaining the development of management accounting. This framework explains the evolution in management accounting through four recognisable stages. As explained by Omar et al. (2004, p. 27), the primary focus of each stage are:

Stage 1 (prior 1950)

During this period, most companies were focusing on cost determination, which was related to stock valuation and the allocation of overheads. Some of the management accounting techniques that were developed for cost estimation were Last In First Out (LIFO) and First In First Out (FIFO). Cost estimation was justifiably emphasised because by estimating the cost, managers were able to control their financial position.

Stage 2 (1965-1985)

By 1965, companies had moved into generating information for the purpose of management planning and control. This was important because only valuable information could induce managers to make correct decisions. Management accounting techniques such as marginal costing and responsibility accounting were introduced during this stage to help managers to choose the correct course of action or create strategic business units respectively.

Stage 3 (1985-1995)

Increased global competition accompanied by rapid technological development in the early 1980s affected many aspects of the industrial sector. During this stage, the management focus remained on cost reduction, but more process analysis was made possible by cost management technologies. The aim was basically to reduce waste when processing the product because this could reduce the expenses incurred, thus increasing expected profit. Some of the techniques popularly practiced by companies at this stage include Just in Time (JIT) and Activity-Based Costing (ABC).

Stage 4 (1995 onwards)

In the 1990s world-wide industry continued to face considerable uncertainty and unprecedented advances in manufacturing technologies, which further increased and emphasised the challenge of global competition (Abdel-Kader & Luther, 2008). In this stage, companies focused on enhancing the creation of value through the effective use of resources. Basically, managers tried to identify factors (or drivers) that could potentially increase shareholder value. As such, non-value added activities were deliberately eliminated. Among the popular techniques introduced during this stage were Total Quality Management (TQM), Activity-Based Management (ABM), Benchmarking and Reengineering.

Even though the management accounting evolution can thus be distinguished into four stages, it is important to note that the techniques used in previous phases continued to be used in subsequent stages. This is consistent with a view that traditional and advanced management accounting

practices tend to complement each other (Chenhall & Langfield-Smith, 1998b). Drawing upon a structural contingency theory of management accounting change, this study examines how the external and internal organization factors determine the degree of changes in MACS.

Changes in External Environmental Factors

Environment can be broadly characterized as phenomena that are external to the organization and which have either potential or actual influence on the organization (Macy & Arunachalam, 1995, p. 67). The external environment may thus relate to technology, law, politics, economics culture, and demographics. In this section, the literature that examines how changes in competitive environments and advanced manufacturing technology cause changes in management accounting practices is reviewed.

Globalization has changed external environmental factors in developing countries, which in turn affect the internal operations of organizations as well as their management accounting practices. This relationship is explained using contingent theoretic arguments that changes in management accounting practices and internal operations of organizations are contingent on the "fit" with changes in the external environment that surrounds them (for a review, see Abdel-Kader & Luther, 2008; Haldma & Laats, 2002; Macy & Arunachalam, 1995). Competitive environment and technology advancement have generally been assumed in the literature to influence the manufacturing company to change its management accounting practices, as well as its organizational design and strategies. However, there is little empirical research to support such relationships and little, if any, research has been conducted in the context of developing countries.

As compared to a developed country, Malaysia is categorized as an uncertain country, with rapid pace of change and has the opportunity for economic growth. Fluctuating interest rates, inflation, exchange rate and stock exchange indices, are evidence of a business environment in Malaysia which is volatile. Increased economic uncertainty is an important cause of changes in management accounting practices[§] (Luther & Longden, 2001). Mia and Clarke (1999) found a positive relationship between the intensity of market competition and the usefulness of management accounting information.

The pressure of management accounting and organizational change may come from the environment of the firm. The most obvious environmental factor

[§] Luther and Longden found that the mean responses to the importance of increased uncertainty of the economic environment as a cause of changing management accounting practices in South Africa (high economic uncertainty) is higher than UK (more certain economic).

is market competition (Hoque, Mia & Alam, 2001; Libby & Waterhouse, 1996; Mia & Clarke, 1999). Literature has identified that organizations operating in competitive business environments tend to change their management accounting practices, organizational structures and strategy in order to succeed (e.g., Baines & Langfield-Smith, 2003; Chenhall & Morris, 1986; Chong & Chong, 1997; Libby & Waterhouse, 1996; Luther & Longden, 2001; Mia & Clarke, 1999; Pratt, 2004; Waweru et al., 2004). For example, Luther and Longden (2001) found evidence that, where the organization was able to sell abroad and compete against imports, then changing managerial and business practices was forcing change in management accounting.

It might also be argued that with an increase in uncertain environments, managers need specific forms of management accounting information to support their decision needs and to assist them in monitoring progress against strategies. This is supported by a contingency style of management accounting research which assumes that an appropriate fit between the environment and organizational system is needed for management accounting systems to change, and to support managers' new information requirements (see for example, Chenhall, 2003; Gerdin & Greve, 2004; Haldma & Laats, 2002; Lapsley & Pallot, 2000; Waweru et al., 2004). Literature also suggests that changes in environmental factors surrounding an organization can have a significant impact on its accounting and control systems (Baines & Langfield-Smith, 2003; Hoque & James, 2000; Innes & Mitchell, 1995; Libby & Waterhouse, 1996; Scapens, 1999; J. A. Smith et al., 2005; Waweru et al., 2004). For example Waweru et al. (2004) had identified factors which facilitate change in the organizations examined in the face of competition, technology, new shareholders, new customers, new accountants, and poor financial performance.

Market competition and technology advancement have been identified as major triggers for management accounting change (Askarany & Smith, 2008; Baines & Langfield-Smith, 2003; Libby & Waterhouse, 1996; Waweru et al., 2004). In response to the changes in competitive environment and advancement in technology, most previous management accounting change research has focused on changes in advanced management accounting techniques such as activity based costing (ABC) and total quality management (TQM) (e.g, Abdul-Aziz, Chan, & Metcalfe, 2000; Chenhall, 1997; Choe, 2004; Innes & Mitchell, 1995; Kaynak & Hartley, 2006; Sisaye, 2003; Soin, Seal, & Cullen, 2002). Few research projects have studied changes in traditional management accounting techniques such as budgetary controls, standard costing and cost-volume-profit analysis (e.g., Abernethy & Brownell, 1999; Libby & Waterhouse, 1996; Waweru et al., 2004). It is argued that with the introduction of new technologies in manufacturing operations, the structure of manufacturing costs has changed.

Manufacturing technologies, such as computer integrated manufacturing and just in time systems, emphasize the way in which direct labour and inventory are vanishing from the factory, so that speed of operation is determined by the

type of automation and manufacturing system used, and not determined by how fast the operators can work. Consequently, a traditional cost control system itself cannot effectively help managers to manage resources as well as identifying relevant costs. Choe (2004) in his study on Korean manufacturing firms, found a significant positive relationship between the level of advanced manufacturing technology and the amount of information produced by the management accounting information system. Thus, it can be concluded that competitive environment and technological developments in organizations are likely to have a positive influence on MACS change. This leads to the hypotheses:

H_1: Firms facing a more competitive environment are more likely to change their MACS.

H_2: Firms adopting advanced manufacturing technology are more likely to change their MACS.

Changes in Internal Organizational Factors

The management of change suggests how management accounting change is intertwined with a changing organizational structure and strategy; these have been the most consistently used organization characteristics and variables in past research (e.g., Chenhall, 2003; Lapsley & Pallot, 2000). Literature suggest that the designers of MACS should consider both the strategy pursued and structure adopted before providing information for decision makers, to ensure organizational effectiveness. Several empirical studies have tested the contingent relationship among MAS, organization structure and strategy, and have found a match among them (e.g., Baines & Langfield-Smith, 2003; Chenhall & Langfield-Smith, 1998b; Moores & Yuen, 2001). Further analysis on change in management accounting practices, organizational structure and strategies is reviewed below.

Changes in Organizational Structure and Management Accounting Practices

Literature revealed that the design of MAS and the control process depend on the context of the organizational setting in which these controls operated. The MAS of an organization is seen to be both one element of organizational structure and a consequence of the chosen structure (Luther & Longden, 2001). However, Baines and Langfield-Smith (2003) found no direct relationship between structure and MACS.

Abdel-Kader and Luther (2008) suggest that firms confronted with high uncertainty required a decentralised structure and more sophisticated MAS. There are different views of whether the centralized or decentralized structure is the most prominent structural issue in designing MAS. However Matejka and

De Waegenaere (2000), and Chenhall (2008) both agreed that decentralized organizations tend to implement changes in their management accounting systems in order to link various activities across the organization.

Many management accounting innovations associated with the changing nature of operations and competition rely on promoting a high degree of employee involvement, often using work-based teams (Chenhall & Langfield-Smith, 1998a). The role of management accounting in a structural changed is not simply to deliver cost data, but to provide a service that empowers team members to make the best decision in the light of current changing conditions (Gordon & Miller, 1976). Thus, changing the organization design, including the use of teams and employee empowerment, will result in changed employer and employee expectations, including increased access to relevant information, particularly, management accounting information (Scott & Tiessen, 1999). Therefore, the following hypothesis is proposed:

H_3: Changes in organization structure will result in changes in MACS.

Changes in Organizational Strategy and Management Accounting Practices

In pursuing competitive advantage, organizations may implement management accounting systems that support their particular strategic priorities. This argument is supported by several empirical studies. For example Baines and Langfield-Smith (2003) found a significant relationship between changes in strategy and management accounting practices and Chenhall and Langfield-Smith (1998b) found that practices such as quality improvement programs and benchmarking can support firms pursuing a differentiation strategy. It is argued that, the use of management accounting techniques, especially advanced techniques, can assist employees to more easily focus on achieving differentiation priorities, such as quality, delivery, customer service, as it highlights the need to satisfy customer requirements. For example target costing allows managers to focus on low cost while simultaneously maintaining customer expectations in areas of quality and functionality. According to Seal (2001), the management accounting system is presented as *system differentiation*. From the perspective of business policy, system differentiation may be the basis of a successful competitive strategy.

Miles and Snow (1978) developed four types of strategy typologies: prospector, defender, analyser and reactor, whereas, Porter (1980) proposed two different type of strategy, i.e., low cost strategy and product differentiation strategy. The typology developed by Miles and Snow (1978) is based on how companies respond to a changing environment and align environment with their companies. According to Govindarajan and Gupta (1985) the prospector and defender classifications of Miles and Snow closely parallel with Porter's differentiation and cost leadership strategies. Empirical evidence indicates that

strategies of defend/cost leadership do not require sophisticated information systems, while those of prospect/product differentiate do (Chenhall, 2003; Langfield-Smith, 1997). Based on this argument, differentiation strategy is used as part of the contextual factors in management accounting change.

Strategy represents a very important contingency variable. MACS which is tailored to support strategy can lead to competitive advantage and superior performance (Langfield-Smith, 1997). Chenhall and Langfield-Smith (1998b) found that high performing product differentiator strategy firms are associated with management techniques of quality systems, integrated systems, team-based human research structure, and MAPs incorporating employee-based measures, benchmarking, strategic planning and activity-based techniques. Therefore, it can be concluded that strategy is an important factor in the design and use of MACS. This conclusion is congruent with the suggestion by Simons (1987) where MACS have to be modified in accordance with the strategy of a company.

Kober, Ng and Paul (2007), found that the interactive use of MACS mechanisms helps to facilitate a change in strategy, and that mechanisms change to match change in strategy. Baines and Langfield-Smith (2003) found a significant relationship between changes in strategy and management accounting practices. This finding is also supported by prior research that has found that practices such as quality improvement programs and benchmarking can support firms pursuing a differentiation strategy (see for example, Chenhall & Langfield-Smith, 1998b).

The traditional views of the relationship between MACS and strategy suggest MACS as an outcome of organizational strategy. Thus, it is not surprising that many contingency studies have focused on organizations establishing strategies. However, with an increase in environmental uncertainty, MACS no longer acts as an outcome of strategy alone, but must help facilitate strategic change in a proactive way (Kober et al., 2007). It is also suggested that an accounting system could help to shape the development of an organization through time (Hopwood, 1990). Thus, the following final hypothesis is proposed:

H_4: A change in organization strategy will result in changes in MACS.

RESEARCH DESIGN

Sample

Data is collected by mail questionnaire. The sample was drawn from the various manufacturing companies in Klang Valley, Malaysia. Klang Valley was selected due to the fact that it is the most industrialised area with different types of manufacturing companies operated in this area (FMM, 2008; M. Smith, Abdullah, & Abdul-Razak, 2008), therefore this area is most possibly represent Malaysian

manufacturing industry. Manufacturing companies are chosen because for several reasons management accounting change is likely to occur in this type of company (Sulaiman & Mitchell, 2005). Manufacturing companies are exposed to changes in manufacturing environment such as changes in production cost structure (Innes & Mitchell, 1990) and new high technological manufacturing techniques (Kaplan, 1989). Due to changes in the manufacturing environment, these companies are also commonly associated with innovation in management accounting techniques, such as ABC, JIT and TQM (M. Smith et al., 2008).

The focus for this study is the manager of accounts/finance department from manufacturing companies in Malaysia. The head of accounting/ finance department is chosen because most of the manufacturing companies in Malaysia did not have a separate management accounting unit (M. Smith et al., 2008). As highlighted by Baines and Langfield-Smith (2003, p. 684), managers' perceptions were considered appropriate in this situation, compared to the use of more objective measures because:

1. It is managers' perception of the environment which are of interest, as it is these perceptions that will influence decisions with respect to the choice of strategy and changes in other organizational and management accounting variables.
2. It is difficult to measure objectively variables such as the extent of change in the environment, or change in strategic emphasis.
3. It has been argued that individuals have sufficient understanding of their decision process to be able to give relatively reliable information.

The sample of 200 manufacturing companies, which incorporated before 2003, was randomly selected from the FMM Directory of Malaysian Industries, 2008.[**] This is congruent with the objective of the survey to analyse the changes in manufacturing firm over the five years period from 2003 to 2007 inclusively.The FMM directory was used as the sampling frame for this research. A sampling frame is important to make sure samples adequately represent the intended target population to which the hypotheses- testing results are generalised (Van der Stede, Young, & Chen, 2007). For example Perera, Harrison and Poole (1997) used *Riddell's Business Who's Who Australia 1994* to randomly select 200 managers of manufacturing firms or divisions.

The questionnaire consists of 8 pages (four double sided pages) and included a covering letter explaining the purpose of the study and how to respond. Two pre-paid self-addressed envelopes were included with the questionnaire, one for the return of the questionnaire and a second one is for the respondent to send a contact information form, the latter is used for those

[**] This was the latest edition at the time of study.

respondents who wish to have a copy of the survey result, as explained in the covering letter. A different envelope is used for this purpose in order to maintain the anonymity of the survey. The covering letter also emphasized that the information would be treated in the strictest confidence and that only aggregated findings would be reported in this study.

Following the preparation of the instruments, 200 questionnaires were mailed in November 2008. The contact information of the firms was obtained from FMM Directory, 2008. Within four weeks of mailing, 31 companies had replied to the initial questionnaire. A follow-up letter was sent to all respondents four weeks after the initial mailing as a reminder and seeking their co-operation in completing the survey and forwarding it using a pre-paid envelope provided. This resulted in a further 12 responses. Thus, the total responses to the questionnaires are 43, a response rate of 21.5 percent. However, of the 43 returned questionnaires, 2 responses were not completed and therefore the useable response for this study is 41 (20.5 percent). According to Smith (2003, p. 125), a response rate of less than 25 percent is now common in accounting research. Thus, this rate is considered sufficient for statistical analysis and inferences.

Even though sample bias did not appear to be problematic (Zikmund, 2003), a procedure was utilized to check this error. The sample was divided into two groups according to early and late responses. A comparative analysis between the early and late respondents was conducted to assess for any response bias. The test (mean score) show no significant differences between the two groups of respondents. It indicated that the samples are representative and respondents' error is not an issue in this research.

Measurement of Variables

The questionnaire in this study was designed to capture information on the competitive environment, technologies, MACS, organizational structures and strategies. It aimed to investigate the changes in Malaysian manufacturing firms over a period of five years (2003 – 2007). A structured questionnaire was developed from the existing instruments to enhance the validity and reliability of the measures (Askarany & Smith, 2008; Baines & Langfield-Smith, 2003; Hoque et al., 2001; Hyvönen, 2007; Sulaiman & Mitchell, 2005) (see appendix).

Change in MACS

The items for MACS embrace both traditional and advanced techniques using an instrument developed by Baines and Langfield-Smith (2003). However, instruments by Baines and Langfield-Smith (2003) only covered the advanced management accounting techniques, thus, the traditional management accounting techniques are added to the instruments. In addition to the analysis of aggregate items for MACS, these two types of techniques are also analysed

separately in order to examine if the result is diverse when different accounting techniques are used. Instead of using an 11-point likert scale as measured by Baines and Langfield-Smith (2003), a 5-point Likert scale is used to identify the extent of changes in management accounting practices. The anchors ranging from "used significantly less" to "used significantly more". This modification is made in order to avoid certain problems. First, a wider scale may cause the data normality problem (Gibbons, 1993) and second, wide scale may confuse the respondents, thus these problems may be avoided by collapsed these scales into condensed categories. The sum of the scores assigned to each of the MACS on the list was used to indicate the degree of changes in MACS. The internal reliability (Cronbach alpha) for the MACS measure was 0.88, indicating a satisfactory scale.

Intensity of Competition

To measure competitive environment respondents were asked to indicate the extent to which they believe the competitive environment of their business unit had changed over the past five years using the 5-point Likert scale. The anchors are ranging from "significantly less competitive" (1) to "significantly more competitive" (5). The items for competitive environment are derived from instruments used by Hoque et al. (2001). The sum of the scores assigned to each of the competitive measures was used to obtain the measure of competitive force for each organization. The Cronbach alpha for this scale was 0.82, indicating satisfactory internal reliability of the scale.

Change in Manufacturing Technology

As for the advanced manufacturing technology, respondents were asked to indicate the extent to which they believe the advanced manufacturing technology of their business unit had changed over the past five years. The anchors of the 5-point scale are "used significantly less" to "used significantly more". The items for advanced manufacturing technology are derived from instruments used by Askarany and Smith (2008). An overall technological development score was derived by summing all the scores assigned to each item on the list. The Cronbach alpha of 0.89 indicated satisfactory internal reliability for this instrument.

Change in Strategy

The measures for organizational strategy are adopted from an instrument used by Baines and Langfield-Smith (2003). This instrument has also been used by Hyvönen (2007). The 5-point Likert scale ranges from "emphasized significantly less" to "emphasized significantly more". The sum of the scores assigned to each of the organizational strategies on the list was used to indicate the level of

changes in strategy within the organization. A cronbach alpha statistic of 0.89 was obtained. Thus, internal reliability for this instrument is acceptable.

Change in Structure

The items for organizational structure are derived from the instruments used by Baines and Langfield-Smith (2003). The 5-point Likert scale ranged from "used significantly less" to "used significantly more". The sum of each score assigned to organizational structure was used to indicate the level of changes in organizational structure. The cronbach alpha for this measurement scale was 0.83, which indicated satisfactory internal reliability.

FINDINGS

Profile of Responding Firms

A profile of the participating organizations is presented in Figures 1 and 2. The majority of the respondents are from the electrical and electronics industry (17.1 percent), followed by basic metal products (14.6 percent). Companies from other industries ranged between two to ten percent in terms of their level of responses. The majority of the respondents (68 percent) are local companies. The number of employees for these participating companies ranged from as low as less than 50 to in excess of 1,000 employees. The majority (68 percent) indicated that the total number of employees was ranged from 101 to 300, which are designated as medium-sized organizations.

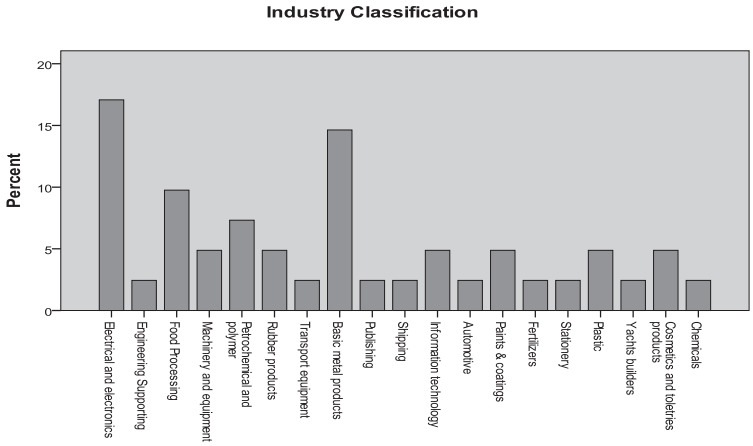

Figure 1 Industry Classification

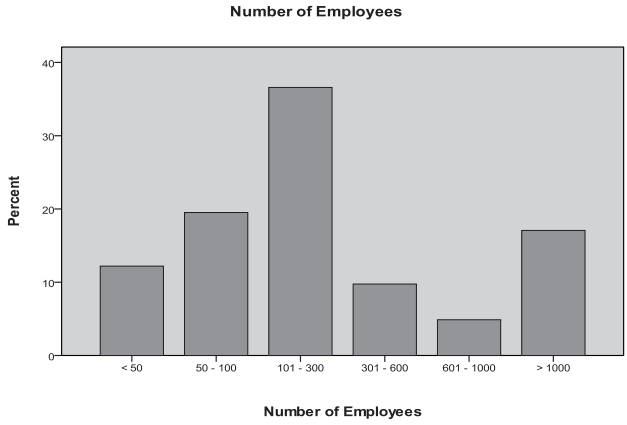

Figure 2 Number of Employees

Level of Changes of MACS in Malaysian Manufacturing Firms

The data in Table 1 details the overall mean score for each of the operational measures. The overall mean for changes in MACS in the sample organization was 4.00. It indicates that these organizations have largely used the numbers of listed MACS. The mean score for traditional management accounting techniques (4.16) was slightly higher than the advanced techniques (3.92).

The IFAC framework on the evolution in management accounting suggested that stages 3 and 4 show a tremendous change in management accounting practices caused by the increases in competition and advances in manufacturing technology. The intensity of competition and the level of adoption in advanced manufacturing technology in the sample companies were mostly higher with the overall mean score of 4.29 and 3.63 respectively.

These results could be used to explain the level of management accounting practice in the sample companies. It has been noted previously that in the IFAC framework, the management accounting techniques used in previous stages continued to be used in the later stage. A high mean score for traditional and advanced management accounting practice is consistent with stages 3 and 4 in the IFAC frameworks, which is caused by an increase in competition and advanced manufacturing technology. This result is also supported by the correlation coefficients among MACS, intensity of competition and technological development (presented in Table 2), which shows that the association among them was positive and significant. These results are consistent with the view that traditional and advanced management accounting practices tend to complement each other (Chenhall & Langfield-Smith, 1998b).

Table 1 Descriptive Statistics

Variable	Mean	Median	Standard Deviation
Changes in MACS	4.00	3.96	0.44
Changes in Traditional MA techniques	4.16	4.20	0.54
Changes in Advanced MA techniques	3.92	3.90	0.43
Competition	4.29	4.50	0.57
Technology	3.63	3.61	0.52
Structure	4.03	3.99	0.48
Strategy	4.21	4.33	0.53

Table 2 Correlation Matrix and Reliability Coefficients

Variable	Changes in MACS	Competition	Technology	Structure	Strategy
Changes in MACS	1				
Competition	0.42***	1			
Technology	0.57***	0.21*	1		
Structure	0.57***	0.44***	0.51***	1	
Strategy	0.68***	0.65***	0.54***	0.69***	1

Correlation is significant at the ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$; Cronbach alpha reliabilities appear in the diagonal cells.

Correlation Matrix for Operational Measures

Pearson correlation coefficients (and levels of statistical significance) for pairs of operational variables is presented in Table 2. As can be seen from the table, change in MACS is positively and significantly associated with the changes in competitive environment and manufacturing technology ($r = 0.42, p < 0.01$; $r = 0.57$, $p < 0.01$). Changes in organizational structure and strategy are also positively and significantly associated with changes in MACS ($r = 0.57$, $p < 0.01$; $r = 0.68$, $p < 0.01$). Furthermore, the correlations among structure and strategy with competition and technology were positively significant. The correlations between changes in competition and manufacturing technology are also positive and marginally significant ($r = 0.21$, $p < 0.1$). The statistical significance of these associations permitted a test of the hypotheses.

Determinants of Changes in MACS

To test the expected relationships between the change in MACS and the factors outlined above, the following regression model was run:

$$Change\ in\ MACS = \alpha_0 + \beta_1 Comp + \beta_2 Techn + \beta_3 Struct + \beta_4 Strat + e$$

Where:
Comp = intensity of competition
Techn = change advanced manufacturing technology
Struct = change in organizational structure
Strat = strategic change

Before embarking on the hypotheses testing, a series of statistical analysis have been conducted. Multicollinearity, i.e., correlation between three or more independent variables was less than 0.5, shows that the relationships among independent variables were not highly correlated. The differences between the obtained and predicted dependent variable scores were normally distributed. There is also no multivariate outlier among the independence variables. Therefore the data meets the eligibility for multiple regressions.

The regression results presented in Table 3 indicate that the entire set of predictor variables accounted for 48 percent (Adjusted $R^2 = 0.48$) of changes in MACS in the sample companies. The result for traditional and advanced management accounting techniques were almost the same with the overall MACS (Adjusted $R^2 = 0.42$ and Adjusted $R^2 = 0.43$ respectively). From the table, changes in advanced manufacturing technology and strategy were the best predictors of changes in MACS.

Table 3 Regression Coefficients

Variable	MACS (Composite)		Traditional Techniques		Advance Techniques	
	Beta	*t*	Beta	*t*	Beta	*t*
Competition	0.03	0.18	0.06	0.37	0.01	0.04
Technology	0.28*	1.93	0.16/	1.02	0.33**	2.21
Structure	0.13	0.79	0.15	0.87	0.11	0.62
Strategy	0.42**	2.09	0.44**	2.04	0.38*	1.80
R^2	0.53		0.47		0.49	
Adj. R^2	0.48		0.42		0.43	
F Value	10.13		8.09		8.67	

Level of significance: $*p < 0.10$; $**p < 0.05$ (Two-tailed)

Association Between Change in MACS and Intensity of Competition (H_1)

Regression for the association between the overall change and the intensity of competition is 0.03. Even though the result shows a positive association between these variables, it is weak and not significant. Thus, it is not one of the important predictor of changes in MACS, and therefore H_1 is not supported.

The association between changes in traditional and management accounting practices with intensity of competition were also not significant (Beta = 0.06 and 0.01 respectively).

Association Between Change in MACS and Advanced Manufacturing Technology (H_2)

The results of the regression analysis presented in Table 3 indicated the association between change in MACS and technological development was positive and significant (Beta = 0.28, $p < 0.1$). These result support H_2 that changes in MACS is significantly associated with the technological development. Interestingly, the result shows the association between the technology and traditional management accounting techniques was not significant (Beta = 0.16, $p > 0.1$), but in contrast, the interaction with advanced technique was highly significant (Beta = 0.33, $p < 0.05$). Therefore it can be concluded that technological development is one of the important predictors of change in MACS ($t = 1.93$).

Association Between Change in MACS and Organizational Structure (H_3)

The regression analysis in Table 3 shows that the regression coefficients for the association between change in MACS and organizational structure was not significant (Beta = 0.13, $p > 0.1$). The same result appeared for traditional and advanced management accounting techniques. The results of this analysis show that organizational structure is not an important predictor of change in MACS and provide no support for the hypothesis (H_3).

Association Between Change in MACS and Strategy (H_4)

The result of regression analysis presented in Table 3 indicate a high significant association between the overall changes in MACS and strategic change (Beta = 0.42, $p < 0.05$). Surprisingly, the same significant result was obtained for association between traditional and advanced management accounting techniques with strategic change (Beta = 0.44, $p < 0.05$; and Beta = 0.38, $p < 0.1$ respectively). These results explained strategy as the best predictor of change in MACS ($t = 2.09$) in the sample companies, and provide support for the hypothesis (H_4).

DISCUSSION

This study provides empirical evidence about the level of changes in MACS in developing economies setting, more specifically Malaysia. The level of management accounting practices in Malaysian manufacturing companies is

consistent with the IFAC framework. This result supports a view that competition and technological advancement were the major contributors for management accounting change (Baines & Langfield-Smith, 2003; Libby & Waterhouse, 1996; Waweru et al., 2004). In response to these changes, most firms focus on integrating advanced management accounting techniques such as ABC, TQM and benchmarking to complement with traditional techniques (Chenhall & Langfield-Smith, 1998b).

Some distinctive findings resulting from the regression analysis in this study provide some additional insights into existing body of management accounting research. As mentioned above, most empirical evidence in this field originates from research in developed countries. Thus, the results in this study provide quite different evidence. Most studies conducted in developed countries showed that competitive environment has a significant impact on MACS (for example, Baines & Langfield-Smith, 2003; Hoque & James, 2000; Innes & Mitchell, 1995; Libby & Waterhouse, 1996; Scapens, 1999; J. A. Smith et al., 2005; Waweru et al., 2004). However, this study shows that the intensity of competition was not significantly associated with change in MACS. As discussed earlier, business environment in developing country, specifically in Malaysia is more volatile compared to a developed country. The manufacturing sector often receives preferential treatment from policy makers which makes these companies reliant on government incentives (Tybout, 2000) and therefore less competitive. Furthermore, most manufacturing companies in Malaysia are export-based (Rasiah, 1995), thus the intensity of the competition is not strong. This issue could be another reason contributing to this result. For that reason, we conclude that the different result obtained in this study is due to the distinctive features between Malaysia with other developed countries.

The findings presented in Table 3 revealed that technological advancement is an important predictor to a change in MACS. This result supports a view that the technological advancement has made management accounting information flow within organizations more useful, timely, accurate, and relevant (Omar et al., 2004). This result is similar with the study by Choe (2004). It has been evident that a new technology will lead to a change in cost structure (Haldma & Laats, 2002). Since manufacturing technology becomes more advanced, the MACS also become more complex and sophisticated to cope with the manufacturing process precisely. Tight global competition associated with advanced manufacturing technologies has prompted the need for a better cost management which can be achieved by adopting appropriate MACS. This view is supported by the result in this study where the association between technological advancement and change in MACS was highly significant.

Other determinants of change in MACS investigated in this study are the internal organizational factors; i.e. organizational structure and strategy. The result presented in Table 3 indicates that organizational structure was not a significant predictor to the change in MACS. This result supports the finding

by Baines and Langfield-Smith (2003). On the other hand, association between strategy and change in MACS was highly significant. This result supports other studies which found the strong relationship between strategy and MACS (for example, Baines & Langfield-Smith, 2003; Chenhall & Langfield-Smith, 1998b; Kober et al., 2007). Strategy is the best predictor of change in MACS compare to other factors investigated in this study. This result also supports a view that MACS is presented as *system differentiation* and this system differentiation can be the basis of a successful strategy (Seal, 2001). Many scholars suggest that a congruent match between strategy and MACS is essential to performance (Govindarajan & Gupta, 1985; Simons, 1987). Therefore, it can be concluded that strategy is an important factor in the design and use of MACS. This conclusion is consistent with the suggestion by Simons (1987) where MACS have to be modified in accordance with the strategy of a company.

CONCLUSION

This paper provides evidence to shed additional light on management accounting change in a developing economies context. By exploring this topic, the current study provides valuable insights into the factors that contribute to the change in management accounting practices in Malaysian manufacturing companies. The findings reported in this study suggest that change in MACS is highly associated with adoption of advanced manufacturing technology and strategic change. These findings will be of significant value to practitioners and decision makers in organizations as they will enable them to make better decision with regard to management accounting innovations.

There are a number of limitations to these research findings. First, due to the relatively small sample size, any generalization of the study's results to non-manufacturing organization or beyond cannot be made without considerable caution. Such a low response rate is consistently a major limitation in accounting research. Second, the findings from this quantitative study do not captured an in-depth understanding of the subject phenomena. Thus, a different approach such as qualitative case study may shed further light on this issue. Despite these limitations, these research outcomes make an incremental contribution to the existing management accounting change literature by providing useful insights into our knowledge and offering in depth future research in management accounting and organizational change in Malaysia. More research is needed to study the interaction between strategy and MACS, as literature has also suggested an interrelationship between these variables. Further research could also benefit by investigating a three-way interaction involving contextual factors, MACS and the effect on performance.

REFERENCES

Abdel-Kader, M. and Luther, R. (2008). The impact of firm characteristics on management accounting practices: A UK-based empirical analysis. *The British Accounting Review*, 40(1), 2-27.

Abdul-Aziz, Z., Chan, J. F. L. and Metcalfe, A. V. (2000). Quality practices in the manufacturing industry in the UK and Malaysia. *Total Quality Management*, 11(8), 1053-1064.

Abdul-Rahman, I. K. (1993). *Privatisation in Malaysia with Special Reference to Changes in Accounting System.* Unpublished PhD, University of Hull.

Abdul-Rahman, I. K., Omar, N. and Taylor, D. W. (2002). The migration of a government trading enterprise's accounting system during privatization with reference to Japanese management accounting. *Asian Review of Accounting*, 10(1), 22-48.

Abernethy, M. A. and Brownell, P. (1999). The role of budgets in organizations facing strategic change: An exploratory study. *Accounting, Organizations and Society*, 24(3), 189-204.

Askarany, D. and Smith, M. (2008). Diffusion of innovation and business size: A longitudinal study of PACIA. *Managerial Auditing Journal*, 23(9), 900-916.

Baines, A. and Langfield-Smith, K. (2003). Antecedents to management accounting change: a structural equation approach. *Accounting, Organizations and Society*, 28(7,8), 675-698.

Bhattacharya, M. (2002). Industrial concentration and competition in Malaysian manufacturing. *Applied Economics*, 34(17), 2127-2141.

Burns, J., Ezzamel, M. and Scapens, R. W. (1999). Management accounting change in the UK. *Management Accounting*, 77, 28-30.

Burns, J. and Scapens, R. W. (2000). Conceptualizing management accounting change: An institutional framework. *Management Accounting Research*, 11(1), 3-25.

Chenhall, R. H. (1997). Reliance on manufacturing performance measures, total quality management and organizational performance. *Management Accounting Research*, 8(2), 187-206.

Chenhall, R. H. (2003). Management control systems design within its organizational context: Findings from contingency-based research and directions for the future. *Accounting, Organizations and Society*, 28(2,3), 127-168.

Chenhall, R. H. (2008). Accounting for the horizontal organization: A review essay. *Accounting, Organizations and Society*, 33(4-5), 517-550.

Chenhall, R. H. and Euske, K. J. (2007). The role of management control systems in planned organizational change: An analysis of two organizations. *Accounting, Organizations and Society*, 32(7/8), 601-637.

Chenhall, R. H. and Langfield-Smith, K. (1998a). Factors influencing the role of management accounting in the development of performance measures within organizational change programs. *Management Accounting Research*, 9(4), 361-386.

Chenhall, R. H. and Langfield-Smith, K. (1998b). The relationship between strategic priorities, management techniques and management accounting: an empirical investigation using a systems approach. *Accounting, Organizations and Society*, 23(3), 243-264.

Chenhall, R. H. and Morris, D. (1986). The impact of structure, environment, and interdependence on the perceived usefulness of management accounting systems. *The Accounting Review*, 61(1), 16-35.

Choe, J. (2004). Impact of management accounting information and AMT on organizational performance. *Journal of Information Technology*, 19, 203-214.

Chow, C. W., Shields, M. D. and Wu, A. (1999). The importance of national culture in the design of and preference for management controls for multi-national operations. *Accounting, Organizations and Society*, 24(5-6), 441-461.

DeLisi, P. S. (1990). Lessons from the Steel Axe: Culture, technology, and organizational change. *Sloan Management Review*, 32(1), 83-93.

Dibrell, C. C. and Miller, T. R. (2002). Organization design: The continuing influence of information technology. *Management Decision*, 40(5/6), 620-627.

FMM. (2008). *FMM Directory 2008: Malaysian Industries* (39 ed.). Kuala Lumpur: Federation of Malaysian Manufacturers.

Gerdin, J. and Greve, J. (2004). Forms of contingency fit in management accounting research - A critical review. *Accounting, Organizations and Society*, 29, 303-326.

Gordon, L. A. and Miller, D. (1976). A contingency framework for the design of accounting information systems. *Accounting, Organizations and Society*, 1(1), 59-69.

Govindarajan, V. and Gupta, A. K. (1985). Linking control systems to business unit strategy: impact on performance. *Accounting, Organizations and Society*, 10(1), 51-66.

Haldma, T. and Laats, K. (2002). Contingencies influencing the management accounting practices of Estonian manufacturing companies. *Management Accounting Research*, 13(4), 379-400.

Hopwood, A. G. (1990). Accounting and organization change. *Accounting, Auditing & Accountability Journal*, 3(1), 7-17.

Hoque, Z. and Hopper, T. (1994). Rationality, accounting and politics: A case study of management control in a Bangladeshi Jute Mill. *Management Accounting Research*, 5(1), 5-30.

Hoque, Z. and James, W. (2000). Linking balance scorecard measures to size and market factors: Impact on organizational performance. *Management Accounting Research*, 12, 1-17.

Hoque, Z., Mia, L. and Alam, M. (2001). Market competition, computer-aided manufacturing and use of multiple performance measures: An empirical study. *The British Accounting Review*, 33(1), 23-45.

Huy, Q. N. (2001). Time, temporal capability, and planned change. *Academy of Management. The Academy of Management Review*, 26(4), 601-623.

Hyvönen, J. (2007). Strategy, performance measurement techniques and information technology of the firm and their links to organizational performance. *Management Accounting Research*, 18(3), 343-366.

Innes, J. and Mitchell, F. (1990). The process of change in management accounting: Some field study evidence. *Management Accounting Research*, 1, 3-19.

Innes, J. and Mitchell, F. (1995). A survey of activity based costing in the UK's large companies. *Management Accounting Research*, 6(2), 137-153.

Kaplan, R. S. and Norton, D. P. (1996). *The Balance Scorecard: Translating Strategy into Action.* Boston, MA: Harvard Business School Publishing

Kassim, M. Y., Md-Mansur, K. and Idris, S. (2003). Globalization and its impact on Malaysia economy. *Reinventing Sabah: Global Challenges and Policy Responses*, 95-111.

Kaynak, H. and Hartley, J. L. (2006). Using replication research for just in time purchasing construct development. *Journal of Operation Management*, 24, 868-892.

Kober, R., Ng, J. and Paul, B. J. (2007). The interrelationship between management control mechanisms and strategy. *Management Accounting Research*, 18(4), 425-452.

Langfield-Smith, K. (1997). Management control systems and strategy: A critical review. *Accounting, Organizations and Society*, 22(2), 207-232.

Lapsley, I. and Pallot, J. (2000). Accounting management and organizational change: A comparative study of local government. *Management Accounting Research*, 11(2), 213-229.

Libby, T. and Waterhouse, J. H. (1996). Predicting change in management accounting systems. *Journal of Management Accounting Research*, 8, 137-150.

Ling-Yee, L. and Ogunmokun, G. O. (2007). An empirical study of manufacturing flexibility of exporting firms in China: How do strategic and organizational contexts matter? *Industrial Marketing Management, (In Press)*, 27-40.

Lucas, H. C. and Baroudi, J. (1994). The role of information technology in organization design. *Journal of Management Information Systems*, 10(4), 9-23.

Luft, J. L. (1997). Long-term change in management accounting: Perspectives from historical research. *Journal of Management Accounting Research*, 9, 163-197.

Luther, R. and Longden, S. (2001). Management accounting in companies adapting a structural change and volatility in transition economy: A South Africa study. *Management Accounting Research*, 12, 299-320.

Macy, G. and Arunachalam, V. (1995). Management accounting systems and contingency theory: In search of effective systems. *Advances in Management Accounting*, 4, 63-86.

Matejka, M. and De Waegenaere, A. (2000). Organizational design and management accounting change. *Center for Economic Research, Tilburg University, Netherlands*.

Mia, L. and Clarke, B. (1999). Market competition, management accounting systems and business unit performance. *Management Accounting Research*, 10, 137-158.

Miles, R. E. and Snow, C. C. (1978). *Organizational Strategy, Structure and Process*. New York: McGraw Hill.

Moores, K. and Yuen, S. (2001). Management accounting systems and organization configuration: A life-cycle perspective. *Accounting, Organizations and Society*, 26, 351-389.

Nor-Aziah, A. K. and Scapens, R. W. (2007). Corporatisation and accounting change: The role of accounting and accountants in a Malaysian public utility. *Management Accounting Research*, 18, 209-247.

Omar, N., Abd-Rahman, I. K. and Sulaiman, S. (2004). Management accounting in Malaysia - Has relevance been lost? *Accountants Today, November*, 26-28.

Perera, S., Harrison, G. L. and Poole, M. (1997). Customer-focused manufacturing strategy and the use of operations-based non-financial performance measures: A research note. *Accounting, Organizations and Society*, 22, 557-572.

Porter, M. E. (1980). *Competitive Strategy*. New York: The Free Press.

Pratt, Z. L. (2004). *An Investigation of the Relationships Between External Environment, Mission and Strategy, Leadership, Organizational Culture, and Performance.* Unpublished Ph.D., Michigan State University, United States – Michigan.

Rasiah, R. (1995). *Foreign Capital and Industrialization in Malaysia.* (Vol. xvi). New York: St. Martin's Press.

Scapens, R. W. (1999). Broadening the Scope of Management Accounting: From a Micro-economic to a Broader Business Perspective. Unpublished Working Paper. Working Paper, University of Manchester, Manchester, September.

Scott, T. W. and Tiessen, P. (1999). Performance measurement and managerial teams. *Accounting, Organizations and Society*, 24, 263-285.

Seal, W. (2001). Management accounting and the challenge of strategic focus. *Management Accounting Research*, 12(4), 487-506.

Shields, M. D. (1997). Research in management accounting by North Americans in the 1990s. *Journal of Management Accounting Research*, 9, 3-61.

Simons, R. (1987). Accounting control sytems and business strategy: An empirical analysis. *Accounting, Organizations and Society*, 12, 357-374.

Sisaye, S. (2003). Process innovation and adaptive institutional change strategies in management control systems: Activity based costing as administrative innovation. *Advances in Management Accounting*, 11, 251-285.

Smith, J. A., Morris, J. and Ezzamel, M. (2005). Organisational change, outsourcing and the impact on management accounting. *The British Accounting Review*, 37(4), 415-441.

Smith, M. (2003). *Research Methods in Accounting.* London: SAGE Publications Inc.

Smith, M., Abdullah, Z. and Abdul-Razak, R. (2008). The diffusion of technological and management accounting innovation: Malaysian evidence. *Asian Review of Accounting*, 16(3), 197-218.

Soin, K., Seal, W. and Cullen, J. (2002). ABC and organizational change: An institutional perspective. *Management Accounting Research*, 13(2), 249-271.

Sulaiman, S. and Mitchell, F. (2005). Utilising a typology of management accounting change: An empirical analysis. *Management Accounting Research*, 16(4), 422-437.

Tybout, J. R. (2000). Manufacturing firms in developing countries: How well do they do, and why? *Journal of Economic Literature*, 108, 11-44.

Vaivio, J. (1999). Exploring a 'non-financial' management change. *Management Accounting Research, 10*, 409-437.

Van der Stede, W. A., Young, S. M. and Chen, C. X. (2007). Doing management accounting survey research. *Handbook of Management Accounting Research*, 1, 445-478.

Waldron, M. (2005). Overcoming barriers to change in management accounting systems. *The Journal of American Academy of Business, Cambridge* (2), 244-249.

Waweru, N. M., Hoque, Z. and Uliana, E. (2004). Management accounting change in South Africa. *Accounting, Auditing & Accountability Journal*, 17(5), 675-704.

Zikmund, W. G. (2003). *Business Research Methods* (Vol. 7th Edition). South Western: Thomson Learning.

APPENDIX

List of Measurement Items:

Variables	Indicators
1. Competitive environment	- Price competition - Competition for new product development - Marketing/distribution channels competition - Competition for markets/revenue share - Competitors' action - No. of competitors in your market segments
2. Manufacturing technology	- Robotics - Flexible manufacturing systems (FMS) - Computer aided manufacturing (CAM) - Computer aided design (CAD) - Computer aided engineering (CAE) - Computer aided process planning (CAPP) - Testing machines - Just-in-time (JIT) - Direct numerical control - Computer integrated manufacturing (CIM) - Numerical control (NC)
3. Organizational structure	- Multi-skilling of workforce - Worker training - Cross-functional teams - Establishing participative value - Management training - Flattening of formal organizational structures - Work-based teams - Employee empowerment - Manufacturing cells
4. Organizational strategy	- Provide on time delivery - Make dependable delivery promise - Provide high quality products - Provide effective after sales service and support - Make changes in design and introduce quickly - Customize products and services to customer need - Product availability (broad distribution) - Make rapid volume/product mix changes
5. Management accounting practices	- Budgetary control - Full/ absorption costing - Cost-volume-profit (CVP) analysis - Variable/ marginal costing - Standard costing - Total quality management (TQM) - Target costing - Activity-based-costing (ABC) - Activity-based-management (ABM) - Value chain analysis - Product life cycle analysis - Benchmarking - Product profitability analysis - Customer profitability analysis - Shareholder value analysis