PERFORMANCE MEASUREMENT INFORMATION SYSTEM AND COMPETITIVE CAPABILITIES IN RELATION TOWARDS ORGANIZATIONAL PERFORMANCE

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PERFORMANCE MEASUREMENT INFORMATION SYSTEM AND COMPETITIVE CAPABILITY IN RELATION TOWARDS ORGANIZATIONAL PERFORMANCE

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Thesis submitted in fulfillment of the requirements for the award the degree of Doctor of Philosophy

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ABSTRACT

The aim of this study is to examine the role of a Performance Measurement Information System (PMIS) in improvement of organisational performance via competitive capabilities. This study focuses on Performance Measurement System (PMS) design which is defined as an information system with dimensions of information characteristics, and from Strategic Management Accounting (SMA). Prior studies have examined the effects of Performance Measurement Systems (PMSs) by looking into the measures of structure and design of a PMS or the usage of a PMS.

However, there is a scarcity of empirical evidence regarding the effects of a PMS on organisational performance. This study extends the previous research by examining the impact of a PMIS on organisational performance through the support of competitive capabilities. The conceptual model of this study is based on Chenhall's (2003) study suggesting an appropriate design of PMIS supports business strategies, taking into consideration factors such as the external environment, technology, organisational structure, and size of the company, and Otley's (1980) contingency theory framework highlighting three variables known as environmental, organisational characteristics and competitive capabilities.

This study investigates the mediating effect of competitive capabilities in the relationship between a PMIS and organisational performance. The main research question addressed by this study is whether a PMIS enhances organisational performance directly and indirectly through the support of the competitive capabilities.

A total of 651 questionnaires were sent to companies listed in the Federation of Malaysian Manufacturing Directory (FMM, 2011). The number of usable questionnaires was 118 responses, yielding an 18 % response rate.

Based on multiple regression analysis, the results indicate that a PMIS is positively related to competitive capabilities. The results also reveal that the relationship between a PMIS and organisational performance is direct and indirect through its ability to enhance competitive capabilities. The findings contribute to the body of the knowledge by identifying the important role of PMIS from an information system and an information characteristic's perspective underlying the contingency theory. Overall, this study demonstrated the importance of a PMIS as an information system which can be used to enhance competitive capabilities and organisational performance.

ABSTRAK

Tujuan kajian ini adalah untuk melihat hubungan di antara Sistem Maklumat Pengukuran Prestasi (PMIS), keupayaan yang kompetitif dan prestasi organisasinya. Kajian ini memberi tumpuan kepada reka bentuk Sistem Pengukuran Prestasi (PMS) yang ditakrifkan sebagai sistem maklumat dengan dimensi ciri-ciri maklumat, dan daripada perakaunan pengurusan strategik (SMA). kajian sebelumnya telah memeriksa tentang kesan Sistem Pengukuran Prestasi (PMSs) oleh mencari ke dalam langkah-langkah struktur dan reka PMS atau penggunaan sesuatu PMS.

Walau bagaimanapun, terdapat kekurangan bukti empirik mengenai kesan PMS dalam prestasi organisasinya. Kajian ini memanjangkan penyelidikan sebelumnya dengan memeriksa kesan PMIS pada prestasi organisasi melalui keupayaan berdaya saing. Model konseptual kajian ini adalah berdasarkan kepada Chenhall (2003) mencadangkan suatu reka bentuk PMS yang sesuai menyokong strategi perniagaan dengan mengambilkira faktor-faktor seperti persekitaran luaran, teknologi, struktur organisasinya, dan saiz syarikat, yang Otley (1980) teori luar jangka mengetengahkan tiga pembolehubah dikenali sebagai alam sekitar, ciri-ciri organisasinya dan keupayaan yang kompetitif.

Kajian ini mengkaji kesan pengantara keupayaan yang kompetitif dalam pautan antara PMIS dan prestasi organisasinya. Soalan penyelidikan utama yang ditangani oleh kajian ini ialah sama ada PMIS meningkatkan prestasi organisasi secara langsung dan tidak langsung melalui sokongan keupayaan berdaya saing.

Sebanyak 651 soal selidik telah dihantar kepada syarikat-syarikat yang disenaraikan di Direktori Federation Manufacturing Malaysian (FMM, 2011). Bilangan soal selidik dapat digunakan adalah 118 jawapan, iaitu 18% pada kadar sambutan.

Berdasarkan analisis regresi berganda, keputusan menunjukkan bahawa PMIS berkait positif dengan keupayaan daya saing. Keputusan juga menunjukkan bahawa hubungan antara PMIS dan prestasi organisasi langsung dan tidak langsung melalui keupayaan nya untuk meningkatkan keupayaan berdaya saing. Hasil penemuan menyumbang kepada badan pengetahuan dengan mengenal pasti peranan reka bentuk PMS canggih daripada sistem ciri maklumat yang perspektif yang mendasari teori kontingensi. Secara keseluruhannya, kajian ini menunjukkan betapa pentingnya sebuah PMS sebagai sistem maklumat yang boleh digunakan untuk meningkatkan keupayaan daya saing dan prestasi organisasi.

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LIST OF ABBREVIATIONS

Acronym	Description
PMIS	Performance Measurement Information System
PMS	Performance Measurement System
MAS	Management Accounting System
MCS	Management Control System
BSC	Balanced ScoreCard
AIS	Accounting Information System
SMA	Strategic Management Accounting
ROI	Return on Investment
E&E	Electrical and Electronic
GDP	Gross Domestic Product
SPSS	Statistical Parcel for Social Science
KMO	Kaiser-Meyer-Olkin
MSA	Measure of Sampling Adequacy.
SEM	Structural Equation Models
FMM	Federation of Malaysian Manufacturing
CEO	Chief Executive Officer

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CHAPTER 1

INTRODUCTION

1.1. BACKGROUND OF THE STUDY

The contemporary business environment requires management accounting information to grant appropriate measures and manage of performance in order to reflect the strategic goals of modern companies. Thus, management accounting systems (MASs) have developed more strategic orientation to provide information to support the competitive capabilities (Ittner, Larcker and Randall, 2003b; Chenhall, 2003). The studies in MAS and management control system (MCS) area have found that the formulation of strategies as a priority is required but on their own is not enough to gain competitive advantages to ensure a higher level of organisation's performance. It must be supported by a fitting control system, organisational structure, and information system (Shank and Govindarajan, 1993; Johnson and Kaplan, 1987; Chenhall and Langfield-Smith, 1998).

Whereby, MAS is considered as one of the keys provision of information to assistant organisations with decision-making in the long-term, and the impetus for improved organisational performance by providing external and internal information, and the provision of information for strategic purposes, i.e. defining the strategic competitive position, formulating strategy and managing and controlling the organisational performance (Shank and Govindarajan, 1993). Performance Measurement System (PMS) is described as an integral part of the

MAS providing information to encourage managers to think strategically about how their activities units align within the organisation, and to help them in managing their organisation's operations (Malina and Selto, 2001; Lillis, 2002; Fullerton and McWatters, 2002; Ittner and Larcker, 1998b; Ittner, et al., 2003b; Choe, 2003; Ullrich and Tuttle, 2004).

According to Jusoh (2006), the compression from domestic and global competitors and customers requests for quality products, high expectations from the stakeholders and using a new and an advanced manufacturing technology all contribute as a major drive for devising and implementing high level of PMS design for an organistion to be able to meet its objectives. However, regarding to the design of performance measurement systems (PMSs), there are some systems still relied on short-run profit measures, those systems are not sufficient to reflect the organisation's effectiveness in the contemporary business environment profit measures (A. Neely, 1999; Phillips, 1999). Whereby, currently focus is on managing assets that are intangible such as customer needs, innovative products and services and internal operating processes, which are non-financial in nature, rather than managing those assets that are tangible such as; fixed assets and inventory, which are financial in nature. (Kaplan and Norton, 2001). As a result of the changing nature within organisations with the creation of an organisation's values, the performance measurement process has become more complex than ever before. While there have been considerable efforts in area of strategic management accounting to improve and implement strategic PMS, and further development of PMS is required.

Previous studies showed that MASs assist companies to implement strategic plans, enables them to achieve operational objectives, and to gain a competitive advantage in European countries (Szychta, 2002; Haldma and Lääts, 2002), in Asian countries (Skousen and Yang, 1988; Zhou, 1988; Hoque and Hopper, 1994; Firth, 1996; S.W. Anderson and Lanen, 1999; Jaruga and Ho, 2002; O'Connor, Chow and Wu, 2004), and in African countrie (Waweru, Hoque and Uliana, 2004; Alkizza, 2006; Ajibolade, Arowomole and Ojikutu, 2010). The common characteristic of these studies, which distinguish them from those conducted in the developed economies (western) is the focus on the change in the broad political and economic systems considering them as the main factors causing change in management within accounting practices. For example, Hoque and Hopper (1997) concluded that macro-context factors such as government regulations, political climate, competition, industrial relations and aid agencies influenced factors related to the budgetary procedures in a Bangladesh Company. Thus, a strategy or practice to manage change in manufacturing environment is critical in allowing the organisation to best utilise its competencies relative to opportunities in the external environment. In other side, the right strategy or practice is requirement for improving performance. This means that organisation's internal environment, in terms of the PMS design could provide the basis for the strategy or practice and ultimately affects organisational performance (Hitt, Hoskisson and Ireland, 1994).

The importance of PMSs in the management processes in organisations has been regularly noted whereby it has been observed as:

• a vital role in promoting positive employee attitudes and productivity; and

• as a periodic measurement of progress toward explicit short and long-run objectives, including the reporting of the results to decision-makers in an attempt to improve program performance.

Many of the studies focused upon Western approaches with reliance upon case methods, see, e. g.: (Dixon, Nanni and Vollmann, 1990; Ghalayini, Noble and Crowe, 1997; A.D. Neely, Adams and Kennerley, 2002; Medori and Steeple, 2000). A common understanding has developed that there exists a traditional approach which exhibits reliance upon financial measures and a more balanced or modern approach, which acknowledges a wide range of non-financial and financial measures (Kaplan and Norton, 1992).

Given curent shifts in manufacturing away from more developed countries such as the United Kingdom (UK) towards newly industrialised and developing countries (Martin, 2001), particularly those located in South-East Asia, this study seeks to extend our knowledge of PMSs within a developing country setting. Despite similarities between developing countries with respect to their need to develop and use of a management accounting system (MAS) to further their development needs, this study sets out to establish that there are unique environmental factors that pertain to individual countries (Shareia, 2006). Accordingly, in the Malaysian context, for instance, whereby there some studies confirm and offer valuable insights; it is one case in point and attention needs to be exercised when applying its results to other developing countries.

The Malaysian economy has achieved notably in the latest years, because of the country's political stability, the sound financial and economic policies adopted by the government, and the effective management of its natural resources, which includes oil and gas. Furthermore, Malaysian economic growth was attained within an environment of relatively low inflation “Malaysia Productivity Corporation” (MPC, 2011). With the outlook for the worldwide economy becoming increasingly optimistic, the Malaysian context is selected for this study for various reasons as follows:

- It is representative of this emerging region in terms of its economy and manufacturing capacity “Malaysian Industrial Development Authority” (MICA, 2004).
- Although it has a reasonably high Gross Domestic Product (GDP) it is still comparable with other developing countries within the region, and it was reported it was expected the Malaysian economy would streng then further in 2010, and real GDP growth to expand by (-1.7%; 7.2%) (MPC, 2011), and Malaysia’s productivity performance grew by 5.8% to RM51,591 in 2010. The productivity growth was driven mainly by both the manufacturing (9.4%) and services (4.7%) sectors in 2010.

As anticipated, the manufacturing sector recorded a much higher growth than the national growth of 5.8% due mainly to improved industrial production. The sector also recorded a significant increase in the manufacturing index from 101.0 in 2009 to 112.2 in 2010, registering a growth of 11.1% (MPC, 2011).

This study concentrates on one subsectors of manufacturing sector. The Malaysian manufacturing sectors are growing and playing a dominant role in the Malaysian economy by being the second largest sector, after the services sector, in terms of its callable contribution to the GDP. Due to the recent emergence of various factors impacting on manufacturing industry, such as of the use of a new advanced manufacturing technology and present trends of measuring manufacturing performance, the manufacturing sector is seemed as a particularly relevant area of this study. Furthermore, the using the performance measures are expected to be more diverse and extensive in manufacturing industry compared to other service industries. Further, the Malaysian manufacturing sector is growing and plays a vital role in the Malaysian economy by being the second largest sector (after services sector) in terms of its share in total GDP, which is estimated at 27.7% for 2010 and 29.8% for 2008, compared to 30.1% for 2007, as well as in terms of its occupation to labour force, where it is estimated at 28.8% for 2008, compared to 28.9% for 2007, while exports of manufactured goods make up 78.4% of the country’s total exports (MPC, 2011).

This study focuses limitedly on the one sub-sector of the Malaysian manufacturing sector, that is electric and electronic (E&E) manufacturing, which is considered one of Malaysia’s pivotal high technology and more developed in industries. The electric and electronic manufacturing companies contribute more than 10% of the GDP (MICA, 2004; MPC, 2011).

In terms of contribution, electric and electronic products the largest contributor to added value (24.1% of total manufacturing added value in 2010). The electric and electronic products as Malaysia’s leading export earner valued at RM271.3 billion or representing 42.4% of total export among the major products. The E&E sub-sector experienced an increase of 9.9% compared to the volume exported during 2009. The principal export markets for electronic products were China (19.7%), Singapore (16.5%), United States (12.7%) and Hong Kong (11.6%) (MPC, 2011).

As one of the leading exporters of electronics in the world-wide Malaysian markets' electric and electronic components and consumer and industrial electric and electronic products. The biggest export item is semiconductor material devices used in a diverse range of industries, such as those in the telecommunications sectors and automotive. Malaysia's electric and electronic products comprise household appliances, wires and cables, electric and electronic industrial equipment, dry cells and batteries and other electric and electronic apparatuses and supplies. As the electric and electronic industry is obviously the key contributor to the Malaysian economy, focus has to be placed on it to develop the business processes and to create a relationship between its players (MICA, 2004; MPC, 2011).

However, within the manufacturing sector, E&E manufacturing will remain the most important sub-sector in 2010 even though its lower productivity growth was lower than other industries. Its great contribution to export, and foreign direct investment are two main reasons indicating that this sector must be emphasised and remain important “Ministry of Finance Malaysia” (MPC, 2011; MFM, 2011). Additionally, the finding of Pandiyan’s study (2003) indicated that, there is a comparative advantage in Malaysian E&E manufacturing companies. It might be debated that high-technology industries are likely to be more receptive to adopting innovative methods such as high level of PMS design whilst conversely, it could be advanced that developing countries are less exposed to such developments, which arise in more developed economies.

The link between performance measurement system and performance management, even so, has been difficult to explain, and nowadays it remains one of the most pressing modern difficulties in the field. In this study, the researcher takes a step towards addressing this difficulties by proposing a model that explain the mechanism of the key impacts of PMIS on organisational performance. Currently, the evidence is combined at best on whether the significance placed on PMS beneficially impacts organisational performance (Wouters, Kokke, Theeuwes and Van Donselaar, 1999). However, it has been mentioned that there is significant relationship between the importance of PMIS and organisational performance (Widener, 2006). For example, some researchers debate that gaining a competitive advantage lead to higher performance (Raduan, Jegak, Haslinda and Alimin, 2009; Bustinza, Arias-Aranda and Gutierrez-Gutierrez, 2010). Other researchers, debate that to improve competitive capabilities and achieve high performance must have a clear strategy; that is a necessary requirement, but not an effective condition. The organisation's strategy should be supported by appropriate regulative factors and the process of actual production of the organisational structure and accounting systems (Shank and Govindarajan, 1993; Jermias and Gani, 2004; Johnson and Kaplan, 1987). Chenhall (2005) has investigated the role of SPMS (integratveness information) in gaining of competitive advantage as a strategic outcome and indicators of competitive strategies' implementation in the areas of product differentiation and low cost product. On the other side, in the long-term the competitive strategy should be considered as a tool of organisation's competitive capabilities to meet the competitive environment and to improve organisational performance not as a goal per se.

Bustinza, Aranda and Gutierrez (2010) stated that competitive capability to adapt with changing market conditions and competition, and a mechanism to reduce uncertainty, this capability could be as catalysts to gain a competitive advantage and to achieve a superior performance. Even so, there is some ambiguity regarding to the relationship between organisations' competitive capabilities and the performance of the organisation (Ma, 2000). Ma (2000) has noted three observations regarding to the concept of competitive advantage and performance in that competitive advantage does not necessarily equal to high performance, but it is a relational term; and context-specific. In addition, the link between the different competitive strategies and various measures of organizational performance, such as financial and non-financial, are still unconvinced, in performance of the organisation (Menguc, Auh and Shih, 2007). Despite, there are some studies have attempted to determine the properties of the theory for PMIS (Chenhall, 2003, and Ittner, et al., 2003b). Cadez and Guilding (2008) referred to that the studies that develop and test hypotheses concerning factors relating to strategic management accounting adoption are still imperfect and thus, further studies ought to be encouraged. Ittner (2008) also recommends that future research needs to pay closer attention to these research design issues to improve the current understanding of the impact of PMIS on organizational performance. The numerous studies already conducted have inconclusive findings, whereby it was evident that some studies claimed that their findings were conflicting, at the same time as others inappropriately claimed that their observations were supported by earlier studies.

So-far, little consideration has been given to characterising PMS in terms of information output and to identify the underlying information characteristics (Marchand and Raymond, 2008). Further, the earlier studies on information characteristics of management accounting and control system have focused on MAS as a whole; e.g.: (Mia and Chenhall, 1994; Mia and Patiar, 2001; Bouwens and Abernethy, 2000) and a few of researchers are focused on PMS information characteristics, e.g.: (Chenhall, 2005; Hall, 2008, 2011). Consequently, there is a little known about the characteristics of strategic PMS and what characterises them from other PMSs (Hall, 2008). As such, the study investigates empirically the organisational role of PMS information characteristics. Moreover, the PMS literature indicates that most empirical evidence has been done in developed countries such as the United States of America (USA) and the United Kingdom (UK). Thus, there is a need for ways of renewed conceptualisation and better definition of PMIS design, in terms of their vital characterisation as information systems, which might assist explain how the PMIS have direct and indirect effects on organisational outcomes. Although the studies of performance measurement and management systems have collected a great knowledge of the effects of the PMS on organisational performance, but the actual mechanism of these effects is not fully understood (Pavlov and Bourne, 2011).

The PMIS is designed to provide management with the financial and non-financial indicators, which covers four different perspectives: financial perspective, customer perspective, internal business process perspective, and learning and innovation perspective. In addition, PMS provides a translation of strategy into a comprehensive set of performance measures. The nature of PMS is ranging from mixtures of financial and non-financial measures, for an integrative long-run strategy and operational goals, and linking of operations of different perspectives of performance and strategies. Additionally, the finding of Malina and Selto's (2001) study has defended the role of PMIS in providing a comprehensive measure of an organisation's performance, which management perceive as important beneficial information made available for managing their organisations' performance. Furthermore, in this study, the characterising the level of PMIS design from an information system perspective refers to a range of information available for management, is perceived as being a beneficial tool.

Based on these descriptions PMIS design, it can be discussed that an information characteristic of PMS is comprehensiveness; whereby it is defined here as the extent to which a PMIS provides managers with comprehensive performance information. Numerous authors agree about a range of characteristics, which enhance PMIS comprehensiveness, relevancy and, ultimately therefore, effectiveness, such as: balanced measures such as financial and non-financial (Feurer and Chaharbaghi, 1995), and external and internal (Kaplan and Norton, 1992), and linking to the business strategy (Dixon, et al., 1990), linking measures hierarchically from strategy through to operational detail (Dixon, et al., 1990; Lynch and Cross, 1995). The PMIS should be simple to use, be easy to understand, and provide timely information (Dixon, et al., 1990; Lynch and Cross, 1995); and provide comparative information (Mia and Clarke, 1999), which mean PMIS should come with the following dimensions (performance information characteristics):

1. Broad scope of information with the provision of performance information in areas of financial, customers, internal business processes and long-term innovation and growth (Hall, 2008);
2. Integration of information with performance information that involves an understanding of cause-effect linkages between operations, strategies and goals (Chenhall, 2005; Gimbert, Bisbe and Mendoza, 2010);
3. Timeliness of information with the provision of timely performance information upon request including frequency, speed of reporting, systematically collected information and the orientation of the information (e.g. short or long run) which allowing for rapid performance feedback (Belkaoui, 1980; Chenhall and Morris, 1986); and

4. Benchmarking of information with the provision of comparative performance information which is related to trends in performance of the organisation during previous years and its explanation, as well as comparing the organisation's performance with similar performance of organisation within the industries (Mia and Clarke, 1999).

Even so, there are overlaps between the information characteristics; for example, the broad scope, integrated and timeliness of information can vary along with the benchmarking of the information, as well as, the broad scope, integrated and benchmarking information can vary along with the timeliness of the information. The information characteristics of PMIS, involving the broad scope, integration, benchmarking and timeliness of information, are seen to provide managers with information with the potential to assist them in managing their organisations with developing its competitive capabilities and performance.

In short, this study seeks to extend the investigation of the impact of Performance Measurmenet Information Systems (PMIS) on organisational performance through the competitive capabilities by utilising the application of the contingency theory framework. That approach has tried to build structural models that assist explain how accounting systems have effects on organisational outcomes. In addition, this study looks into the PMIS design as an information system rather than focus on particular techniques of the PMIS. The main idea of the study rose from the basic assertion that the appropriate design of PMIS supports competitive strategies in ways that increase organisational performance (Chenhall, 2003). In that vein, the PMIS ought to common strategic capabilities to achieve greater performance. The capabilities under investigation in this study is known as competitive capabilities. The concept of capability, is in terms of ability to represent the actual strength of an organisation rather than an objective, goal and plan to be achieved, thus, competitive capabilities are defined as an organisation’s ability and willingness to provide customer needs and to improve its position into marketplace. The reasons for selecting competitive capabilities as the organisation's strategic capabilities or condition position is due to its linkage with organisational performance (Rivard, Raymond and Verreault, 2006; Menguc, et al., 2007).

Organisational performance is affected by an organisation's strategic position in the industry (M.E. Porter, 1991; Ma, 2000; Spanos and Lioukas, 2001), and its importance to the organisations in the manufacturing industry (Chenhall, 2005).

1.2. STATEMENT OF THE PROBLEM

Due to global instability, this competitive environment and pressure on all industries, particularly in the manufacturing sector of high technology, with the fast-moving nature and the need to constantly improve their performance. Companies have continuously to deal with changing markets that are unpredictable and varied, and increased competition and changing ever, and developments of customers' desires and needs (Ong and Teh, 2008). All of these changes became the biggest challenge to organisations' survival, and growth, particularly, in the high-technology manufacturing companies, such as Malaysian E&E manufacturing industry. For E&E manufacturing companies in Malaysia to survive in a global economy in the new millennium, they ought to take advantage of all available resources as a means of achieving the high competitive capabilities to improve and keep performance at a high level. Even so, the major challenge is for Malaysia to sustain and enhance its competitiveness in the electrical and electronics (E&E) products competition from those from higher quality and lower cost countries (Rajagopal, 2006).

Although, the multi-dimensional performance measures is widely used and common in the manufacturing sector, that is compared with other sectors (Anthony and Govindarajan, 1998; C.M. Lau and Eggleton, 2003). The organisational performance measures in Malaysian manufacturing sector relatively still relies on financial measures more than non-financial measures as Ruzita, Daing Nasir and Yuserrie (2006) found, in that the majority of manufacturing companies used a greater extent of financial measures, followed by customer measures, internal business process measures, and learning, innovation and growth measures, which suffer from a few limitations (see Chapter 2, Section 2.2).

This study looks into PMS as one of the factors that is assumed to contribute in improvement of organisational performance. Based on the issues of designing and implementing PMS to manage organisational performance it was realised that the survival and growth of organisations required an improvement of its competitive capabilities, and success in gaining competitive advantages, such as low cost advantage and high quality advantage as being necessary to achieve higher performance.

In this context, there are two issues related to improvement in organisational performance. Firstly, in order to improve the organisational performance, using PMS would contribute and play a major role (Chenhall, 2005). Therefore, Paladino (2001) noted that the PMS relied on fewer appropriate measures and not to link measures with priority strategies would have a negative impact on organisational performance. Secondly, the organisational performance is closely related to strategy as well (Y.J. Kim, Song and Koo, 2008; Bisbe and Malagueño, 2010). Hence, Micheli, Mura and Agliati (2011) mentioned that the lack of PMIS design appeared to have negative impacts on both the formulation and implementation of strategy. Further, Kuwaiti and Kay (2000) stated that the organisational performance depended on the strategy or practice of the organisation to create value for its customers.

Empirical studies have shown a significant relationship between competitive capabilities and performance (M.E. Porter, 1991; Ma, 1999; Bustinza, et al., 2010). Kaplan and Norton (1996) reported that measurement using only financial measures might damage an organisation's capabilities, and they propose that a combination of financial and non-financial measures are better suited for assessing performance.

The PMIS design as seen as an information system ought to provide information that assists to enable the performance management process to function effectively and efficiently. This means that an organisation's internal environment, in terms of capabilities, could provide the basis to ultimately influence the organisational performance (Bustinza, et al., 2010), and strategic capability is the basis for superior performance (M.E. Porter, 1991; Ma, 1999). Thus, enhancement in organisational performance is estimated to be explained by PMS and competitive capability. Hence, the adoption of a multi-dimensional performance measurement system can improve competitive capabilities and organisational performance (Fitzgerald, Brignall, Silvestro, Voss and Robert, 1991; Kaplan and Norton, 1996; Simons, 1990). However, the nature of relationships among these elements has not been fully understood and in particular, where there is some ambiguity about the relationship between competitive capabilities and its higher performance (Ma, 2000).

The scarcity of studies that analyses the role of competitive capabilities in the practice, and organisational performance relationship expands the study opportunities. Competitive capabilities based on product quality, and product costs are two main areas of competitive advantage, and it is an important capability for an organisation to survive and succeed in a competitive market, to cope with the market competition (M.E. Porter, 1985), and to enhance organisational performance (Day and Wensley, 1988; M.E. Porter, 2001; Hawawini, Subramanian and Verdin, 2003; Y.J. Kim, et al., 2008). Thus, the competitive capabilities are expected to mediate the PMIS and organisational performance relationship. To the researcher's knowledge, this mediation effect of competitive capabilities has never been investigated by previous studies.

In summary, organisational performance, and particular poor organisational performance could be improved by implementing PMIS with the desired effect to improve organisations' competitive capabilities.

This research investigates and examines the link between PMIS, competitive capabilities and organisational performance in E&E manufacturing companies and within the Malaysian context. Because of intense competition and lack of confidence in the manufacturing environment (as debated above), this study suggests the competitive capability as strategic capability, which is expected to mediate the relationship between PMIS and organisational performance. Thus, this study seeks to clarify the following:

- the extent of the role of PMIS in improving organisational performance; and

- to answer the question, can competitive capabilities explain the variation of the role of PMIS in improving organisational performance?'.

1.3. RESEARCH QUESTIONS

In line with the underlying of the problem statement, the study attempts to answer the following questions:

1. What are valid measurement of PMIS and extent the level of PMIS design, level of competitive capability and performance among E & E manufacturing companies in Malaysia?;
2. Is there a direct relationship between PMIS and the organisational performance?;
3. Is there a relationship between PMIS and competitive capability?;
4. Is there a relationship between competitive capability and organisational performance?;
5. What extent does competitive capability mediate of the relationship between PMIS and the organizational performance?.

1.4. RESEARCH OBJECTIVES

The purpose of this study is to investigate from a contingency theory perspective, the role of PMIS in improvement of organisational performance through its contribution to improve competitive capability. To study the relationships between PMIS, competitive capabilities (quality capability and cost capability), and organisational performance, this study validates a scale of measurement of PMIS, and investigates how the PMIS can affect and support competitive capabilities and improve organisational performance into two facets to reflect the nature of competitive strategies: financial (pertaining to maintaining and lowering costs) and non-financial (pertaining to growth). Particularly, the objectives of this study are:

1. To validate a measure scale of PMIS, and identify the level of PMIS design, level of competitive capability and performance among E & E manufacturing companies in Malaysia;
2. To measure the relationship between PMIS, and organisational performance;
3. To investigate the relationship between PMIS and competitive capability;
4. To examine the relationship between competitive capability, and organisational performance; and
5. To investigate the extent of competitive capability is mediating the relationship between PMIS, and organisational performance;
6. To develop the model explain the mechanism of the variables' relationships.

1.5. SCOPE OF THE STUDY

The management accounting technique, according to Cadez and Guilding (2008) has five main categories, as follows: Strategic costing; strategic decision making; competitor accounting; customer accounting, and strategic planning, control, performance measurement and management.

With respect to strategic planning, control, performance measurement and management has two sub-groups, and they are benchmarking, and strategic performance measurement and management system. This study focuses on the PMIS from the information system perspective, which considers PMIS as an information system, (i. e. characterising PMIS in terms of information availability), and limits the scope of study in terms of basic information characteristics as dimensions of PMIS: (1) broad scope (2) integration (3) timeliness (4) benchmarking.

In addition this study concentrates on Malaysian manufacturing companies within E&E Manufacturing. The E&E Manufacturing companies have been selected because they have in common that, if they have not already, they are likely to be more receptive to adopting the PMIS, as these high-technology industries in emerging countries may be less exposed to such advancements of

PMIS, and the lack of such developments poses a greater affair in manufacturing sectors than in other types of industries. Moreover, the companies in manufacturing industries have more formal, interactive management control systems compared to other industrial sectors (Anthony and Govindarajan, 1998).

1.6. SIGNIFICANCE OF THE STUDY

The significance of study came from the issue of addressing the linkage between performance measurement and performance management, whereas this has been difficult to explain, and nowadays it remains one of the most pressing current challenges in the field. In this study, it would take a step towards addressing this challenge and difficult by suggesting a model that explains the mechanism of the major impacts of PMIS on organisational performance. Which would be bridge gaps in literature as well as providing direction for future research. Thus, the expected contributions of this study are divided into two categories; theoretical and practical contributions.

1.6.1. Theoretical Contribution

The theoretical contribution of the study can be considered in terms of the following areas of knowledge:

1. The study introduces a new concept that from an information system perspective for characterising PMIS, a definition of PMS as a performance measurement information system (PMIS) would be enunciated, and a classification scheme developed for PMIS. In addition, A new measurement for PMIS measured extent of the information availability, considered as a provision of information, measure the ability of the PMIS in providing information that is characterization by a broad scope, integration, benchmarking and timeliness. The study validates the scale of measurement for PMIS, as well. In sum, this study adds a new measurement of PMIS to the existing literature on the PMISs and MASs.

2. The study identifies the level of PMIS design in the Malaysian E&E manufacturing companies, in terms of information characteristics: broad scope, integration, timeliness and benchmarking. Given, that in general, there is a scarcity of empirical researches that explore even the existence of the PMS from the information system perspective, particularly in the context of a developing country, this study adds considerable knowledge in this area and provides a base for future research on the issue.
3. The study examines the relationship between PMIS and organisational performance. Given that the contribution of the PMIS provides the opportunity to enhance performance, this study grants additional knowledge in the relationship between the PMISs, and organisational performance assisting in solving, in part, the reasons for the contradictory findings in previous studies.
4. The study investigates the extent of mediating effect of competitive capabilities as a new variable, and is expected to mediate the relationship between PMIS and organisational performance. This is an empirical investigating of the mediating relationship might, at least, provide a partial explanation for the past conflicting findings of studies that have examined the direct relationship between MAS and organisational performance in general and PMS in particular. In addition, as this study is considered as a continuation of Chenhall's (2005) study that idantfied one information characteristic of PMIS (integrativeness) and investigated the relationship of PMIS and strategic outcomes in Australian manufacturing companies. The outcomes of that study indicate other information characteristics ought to be investigated to determine key information characteristics. Thus, this study would provide few suggestions for future research.

1.6.2. Practical Contributions:

Several practical contributions are expected to emerge from the current study. These practical contributions are as follows:

1. This study introduces and identifies four dimensions of the PMIS that is an indicator ability of PMIS to provide information to management needs. These

dimensions involve: broad scope, integration, timeliness, and benchmarking. Particularly, this study proposes that an improvement in the organisational performance might be obtained by using the higher level of PMS design that is measured by extent of the information characteristics' availability. The present study examines the concept of PMIS. Therefore, it could advance managers' understanding of the importance of performance information to manage and improve their organisations' strategic outcomes..

2. This study attempts to validate the new measurement scale for performance measurement system within Malaysian E&E manufacturing companies. Therefore, validating such a parsimonious instrument can help managers to better realise the importance of the PMIS. It could also assist to pinpoint areas of weakness and enable them to be proactive and take corrective action. In other words, it helps them in managing their companies' performance.
3. This study attempts to provide an operational framework for the relationship of the PMIS, competitive capabilities, and organisational performance. This framework can serve as a practical guide for mangers by enhancing their understanding of the mechanism of PMIS to assist them in managing and improving the performance through increasing their competitive capabilities.
4. The PMIS index might be utilize as a diagnostic tools in evaluating its ability to provide information that is useful for managers, including senior ones. In addition, the competitive capabilities' index could inform the organisations of their market position compared with its competitors in terms of quality and cost capabilities level. Therefore, necessary improvements for each organisation might be implemented based on the score of the index. Finally, this study empirically investigates those relationships in the Malaysian context.

1.7. DEFINITION OF VARIABLES

1.7.1. Performance Measurement Information System

Performance measurement system refers to the essential part of management accounting and management control system and information system. Companies with a better developed and higher level of PMIS design providing management with information about scopes of the organisations' operations (Lillis, 2002; Fullerton and McWatters, 2002), assists companies to attain its objectives and goals. The level of a sophistication information system refers to a range of information available for management, which is sensed as being useful (Gul and Chia, 1994; Choe, 2004). Moreover, the study identifies PMIS in terms of essential information characteristics, which further heightens our conceptual understanding the nature of information characteristics of PMIS. These characteristics are broad scope, integration, timeliness and benchmarking information. In addition, PMS is conceptualised in terms of a continuum from low level of PMIS design to high level of PMIS design. High level of PMIS design provides performance information with a high level for the four dimensions of scope, integration, timeliness and benchmarking.

a) Broad Scope of PMIS

Broad scope refers to performance information that is focusing on the future versus historical events or external versus internal events and to the extension of PMIS in time and space (Chenhall and Morris, 1986; Gul, 1991). Broad scope of PMIS is considered as having an aspect involving a broader scope of performance information, including financial and non-financial information, internal and external information which is useful in the prediction of future events (Mia and Chenhall, 1994). The high level of PMS design involves the inclusion of a more diverse set of performance indicators (Kaplan and Norton, 1996; Malina and Selto, 2001; Malmi, 2001; El-Shishini, 2001; Ittner, et al., 2003b; Hall, 2008). This dimension is measured by indicators that to the extent of information are provided by the PMIS about key performance areas and different dimensions of organisation's performance, critical and areas of importance in the organisations's operations, as well as, lagging and leading indicators, and financial and non-financial indicators (i.e. financial indicators and customer indicators, internal business processes indicators, and learning, innovation, and growth indicators).

b) Integration of PMIS

Integration refers to integrated information that is reflecting the interaction and coordination of effects of several functions within the organisation (Chenhall and Morris, 1986; Gul, 1991). This dimension of PMIS is considered as an aspect including information that grants an understanding of cause-effect linkages between operations, strategies and goals, and among various aspects of the value chain, involving suppliers and customers (Stivers and Joyce, 2000; Kaplan and Norton, 2001; R. Banker, Janakiraman, Konstans and Pizzini, 2001; Malina and Selto, 2001; Chenhall, 2005; Gimbert, et al., 2010). Integration of information assists in the coordination between segments within an organisation and between sub-units (Chenhall and Morris, 1986). This dimension is measured by the indicators that advice to the extent of the PMIS providing information for links with operating performance and long-term strategies, and indicates how business unit activities affect other units within the organisation, links activities to goals and objectives, and links to customers and suppliers.

c) Timeliness of PMIS

Timeliness refers to the frequency, speed of perfromane reporting and the orientation of the information (e.g. short or long-term) (Belkaoui (Belkaoui, 1980; Chenhall and Morris, 1986; Gul, 1991). The Timeliness of PMIS is considered as an aspect involving information, which refers to frequency and age of the information relevant to changes in the environment, that is involved of change's consumer tastes, market developments and competitor activities. This is useful information, given management need to respond rapidly to changes in the environment (Gul, 1991). Timeliness of information is essential for improving the process of efficiency and the decrease of wastage (Mia and Patiar, 2001). This dimension is measured by the indicators that to the extent of the PMIS, provides performance information that it needs systematically (how often the information is provided to managers, and the time-lag between the request and provide of information).

d) Benchmarking of PMIS

Benchmarking refers to comparative information that is assistance in comparing performance against their competitors' performance which in turn helps in the process of evaluation of the organisation's course of action (Mia and Clarke, 1999). The benchmarking of PMIS is considered as an aspect involving information related to the process of continuous measuring, comparing organisational performance elements with those best practices of relevant organisations (i.e against similar organisations or its competitors in the industry), and comparing trends and its explanation in organisation’s performance elements during past years, to obtain information, that would assist identify its strengths and weaknesses, and to implement improvement (H.C. Lau, Lau, Fung, Chan and Ip, 2005; Akdeniz, Gonzalez-Padron and Calantone, 2010; Mia and Clarke, 1999). This dimension is measured by the indicators that to the extent of the PMIS, provides perfomance comparative information related to trends in performance of the organisation during past years and its explanation, and comparing an organisation's performance with similar organisation’s performance in industry as well as relevant business units within the organisations.

1.7.2. Competitive Capabilities

Competitive capability is the extent of an organization capable of creating a market position over its competitors, and it includes the ability that will enable the organization to differentiate itself from its competitors, that is results of critical management decisions (M.E. Porter, 1985). Moreover, the competitive capability is defined as the organisation's ability to gain the competitive advantages to improve its performance. According to Porter (1991) the organisation's competitive capability in the industry is a function of competitive strategy. This study focuses on two of Porter's (1985) suggestion types as dimensions of competitive capability, that of quality and cost capability.

a) Quality Capability (Quality-based)

Quality capability within an organisation is identified to the extent of the organisation's capability of offering product that is highly reliable, durable and of a high quality to customers, offering products according to customer demands, and the ability to respond well to customer in the marketplace that creates a higher customers' value. Quality capability is measured by the indicators that to the extent of an organisation's capacity to compete based on quality.

b) Cost Capability (Cost-based)

Cost capability is an organisation's ability to offer products at low-cost prices, with low manufacturing costs and high efficient of the internal operation system; high economy of scale, and high human capital in the marketplace that creates higher value for customers. Cost capability is measured by the indicator that to the extent of an organisation's ability to compete based on cost.

1.7.3. Organisational Performance

This study outlook that the concept of organisational performance is related to the survival and growth of an organisation, and to the extent to which the organisation is successful in performing its planned targets, and is able to reflect on the success of the chosen its strategy (Kaplan and Norton, 1992; Laitinen, 2002). Furthermore, organisational performance is a concept based on the use of financial and non-financial indicators to assess the organisational performance. Accordingly, performance is multidimensional in nature, and it is beneficial to integrate different dimensions of performance in empirical studies. There is a large body of argument on what measures are suitable when measuring performance. Historically, the measures have revolved around the usage of financial or non-financial indicators (Johnson and Kaplan, 1987). Hence, this study uses subjective measures to evaluate organisational performance, through these two dimensions of financial and non-financial performance.

a) Non-financial Performance

Non-financial performance refers to how well an organisation achieves its non-financial goals. It measures the achievement of non-financial goals by the indicators in terms of market share growth, sales growth and the measures related to customer satisfaction.

b) Financial Performance

Financial performance refers to how well an organisation achieves its financial goals. financial performance is usually found at the heart of organizational effectiveness, and it is also the most easily quantifiable parameter (Johannessen, Olaisen and Olsen, 1999). It measures achieving financial goals by the indicators in terms of return on investment; return on assets; return on equity; profit margin on sales and profitability.

1.8. ORGANISATION OF THE THESIS

This thesis is organised into five chapters:

- Chapter 1 (Introduction) is an overall view of the research, it consists of the background of the study, provides a statement of the problem, outlines the research questions, provides the research objectives, indicates the significance, scope of the study and outlines the definition of variables.
- Chapter 2 (Literature Review) presents the theoretical perspectives of organisational performance, strategic management accounting, management accounting systems and performance measurement systems through a detailed literature review. The literature review investigates conceptualisation of the main variables of study, and their relationships, with the discussion of the literature rooted in the contingency theory, gaps in literature. Then, this chapter introduces the conceptual framework and hypotheses development, and the summary of chapter.
- Chapter 3 (Research Method) covers methods of data collection, measurement of study variables, methods of data analysis, and the summary of chapter.
- Chapter 4 (data analysis and findings) covers an analysis of the collected data from the survey, presents the results and summary of chapter.
- Chapter 5 (discussion and conclusion) presents a discussion of research implications, managerial insights, limitation and directions for future research and conclusion.

CHAPTER 2

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1. INTRODUCTION

Based on the display in chapter one, it has been established that the level of performance of Malaysian manufacturing companies needs to be improved. This study proposes that organisational performance can be improved by having the appropriate PMS design. The relationship between PMS and an organisational performance is mediated by an organisation's capabilities known as competitive capabilities. The aim of this study is to investigate the relationship between the information characteristics of PMIS design, competitive capabilities and organisational performance. Furthermore, the study of organisational performance relates to the management accounting systems, management control systems, and performance measurement systems. The literature review of this study would cover the literature of organisational performance, performance measurement systems and competitive capabilities, in addition to cover the contingency theory. Thus, this chapter extensively reviews the literature pertaining to the present study, which includes organisational performance, performance measurement systems, and competitive capabilities, as well as, discusses the relationship between these variables, which be the basis for the theoretical framework. Then, hypotheses are developed.

2.2. ORGANISATIONAL PERFORMANCE

If you cannot define performance, you cannot measure, if you cannot measure, you cannot manage (Armstrong and Baron, 1998). The increasing level of environment uncertainty and competition which would be led to some challenges in managing the performance of organisation is considered as one of the reasons of importance of performance measurement systems in the modern business (A. Neely, 1999). As stated in chapter one, the increasing market of internal and external competition among Malaysian manufacturing industry may effect organisational performance. Moreover, the studies on organisational performance should be undertaken to improve the performance, particularly that of poor organisational performance in terms of average occupancy rates. Accordingly, the key objective of this study to explain the way to mange and improve organisational performance. The concept of organisational performance should first be clarified and described

The concept of organisational performance is relevant to the organiatison's survival and success. Although, the literature on performance is very extensive, and the majority of studies have used financial and non-financial indicators to measure performance, there is still a need more of consensus regarding the meaning of the term performance (Johannessen, et al., 1999). The financial and non-financial measures are more suitable to operationalise organisational performance, however, the use of financial measures is more common method for measuring performance within certain organisations. Examples of financial measures are return on investment (ROI) and return on assets (ROA). It is the ease of providing these reports as the financial reports, in some instances, have been produced on a daily basis. According to Johannessen, et al., (1999) the reason is that financial performance is usually found at the core of organisational effectiveness and it the most easily quantifiable parameters as well, however, they highlighted a few limitations to be considered when using and focusing on financial measurement alone. Particularly, the weaknesses of the financial measures used by organisations was identified as follows:

1. Financial measures cannot be used to predict future performance, as they are lagging indicators rather than leading indicators and only partially reflect the effect of past and current activities (Johannessen, et al., 1999);
2. Financial measures are relatively stable over time, and they do not reflect real conditions and goals (R.D. Banker, Chang and Pizzini, 2004);
3. Financial measures do not capture the relevant performance issues necessary for contemporary business environment (Phillips, 1999);
4. Accounts are difficult to interpret, and they do not always reflect actual performance because they can be manipulated (Johannessen, et al., 1999); and
5. A lack of strategic focus and emphasis on short-term financial measures would create a gap between development of strategy and its implementation (Kaplan and Norton, 1996).

Due to the limitations of financial performance pointed out earlier and the effect of globalisation on today's business environment, organisations should rethink their current performance measurement, and rather than a focus on the financial performance move to a more balanced measurement which has both financial and non-financial performance measures (H. Atkinson and Brown, 2001). There is a growing need to evaluate organisational performance through financial and non-financial indicators. The reason is that financial measures provide information only on past of an organisation's performance while non-financial measures indicate the health and wealth-creating potential of an organisation (Kalafut and Low, 2001). Further, Kaplan and Norton (1996) reported that measurement using only financial measures may be damage evaluating of an organisation’s capacities, and they recommend that a combination of financial and non-financial measures are more suited for evaluating performance

The great debate on what measures are preferable when measuring performance has revolved around the use of financial or non-financial measures (Johnson and Kaplan, 1987). Whereas, there are a large number of studies undertaken on non-financial performance measures, these studies indicated that some non-financial performance measures are leading indicators of future financial performance; e.g., (R. Banker, et al., 2001; Ittner and Larcker, 1998a; Said, HassabElnaby and Wier, 2003). Fisher (1995) reported that there are three main reasons behind the emergence of non-financial measures. These have been identified as the limitations of financial measures, competitive pressures, and the growth of other initiatives. Hence, non-financial measures are necessary to provide for ongoing improved performance of organisations. According to Banker, et al. (2004) the reasons for using non-financial measurement are as follows:

1. The non-financial measures reflect the current impact of managerial actions that are not in the financial performance.
2. The non-financial measures contribute to a capacity for an increased level of performance within the manufacturing environment, as they deal with causes instead of effect.
3. The non-financial measures, especially indicators on customers may provide information on how certain organisational properties improve or diminish the reputation of an organisation.

Due to several weaknesses of financial measures and the need to have non-financial measures Fitzgerald, et al. (1991) established a framework in service known as "Result and Determinants Model" that integrated both financial and non-financial measures. The results refer to the performance as three dimensions: financial performance; competitiveness; and quality of service. Further another development in performance measurement is highlighted by Kaplan and Norton (1992), they have introduced a strategic model knows "Balanced ScoreCard" (BSC) which intends to create a balanced performance measurement for an organisation. Their claim is that the measurement based on financial measures alone is unsufficient in assessing competitive position (Kaplan and Norton, 1992). Jusoh, Ibrahim and Zainuddin (2008) also indicated that financial measures alone are inadequate to measure and evaluate the performance and the use of non-financial measures, particularly internal business processes and innovation and learning measures in addition to financial measures, would appear to be more effective in the assessment of organisational performance. Therefore, financial measures equates to the economic performance of activities done by the organisation, whilst customer measure is the performance of those activities done by an organisation to customer and market segments, internal business measures the performance of activities achieved at the level of the business process within the organisation, and learning, innovation and growth measures the level of improvement that has implemented by the organisation (Kaplan and Norton, 1992).

Venkatraman and Ramanujan (1987) added the idea which is implied in the statement that organisational performance is based on organisational effectiveness. Therefore, following Kaplan and Norton (1992), and Lillis (2002) organisational performance is related to the survival and growth of an organisation and the extent to which the organisation is successful in performing its planned targets and to reflect upon the success of the chosen of its strategy.

There are at least two ways to measure organisational performance and they are objective measures and subjective measures. The objective measures use the real figures from an organisation, while the subjective measures use perception of the respondent to assess performance (Johannessen, et al., 1999). The current study uses subjective (cognitive) measures to assess organisational performance for the following reasons:

1. they are more consistent measures of performance, and they do not very broadly in accuracy from the objective measures;
2. asking respondents for specific financial measures might cause respondent anxiety over confidentiality; and
3. the subjective measures might offer greater opportunities for an organisation's effectiveness in the long term (Wall, Michie, Patterson, Wood, Sheehan, Clegg and West, 2004).

This study views that the concept of organisational performance being defined as the extent to which an organisation is successful in achieving its planned targets and reflect the success of the chosen of competitive strategy, and the associated relation to the survival and growth of an organisation. Therefore, the organisational performance, in the context of this study, is assessed based on the use of financial and non-financial indicators to assess the overall of the organisation performance. These two dimensions would be judged and evaluated by the perception of the respondents, that perception being considered as a variable that should reflect the goal or objectives of an organisation. Therefore, the current study uses subjective measures to evaluate organisational performance, through the financial and non-financial measures, as follows:

- **Non-financial performance** refers to how well an organisation achieves its non-financial goals. It is recognised through non-financial indicators such as sales growth, market share growth and the measures related to customer satisfaction; and
- **Financial performance** refers to how well an organisation achieves its financial goals. It is recognised through financial indicators such as return on investment, return on assets, return on equity, profit margin on sales, operating income and generation of cash flow.

Organisations needs to undertake performance measures in their day-to-day activities and the implementation of such measures will better place an organisation to get the benefit and success of being in the best placed condition to compete with other organisations and thereby not being in a lower position in comparison to their competitors. Hence, an organisation's management is looking forward to building and creating a system of measurement and control of the organisation's performance (R. Jusoh, 2008).

The literature of the PMS and MAS is a focus on a greater understanding for each of the drivers and measures of organisational success, and both academics and managers' effort to identify the levers as a tool that could be used to improve organisational performance and how the implementation of strategy could be more effective. The focus, therefore, is on the characteristics of superior organisational performance and the identifiable features of strategic management accounting and PMSs that could be the driver of improved performance.

2.3. PERFORMANCE MEASUREMENT SYSTEM

The present literature on performance measurement and management (Flapper, Fortuin and Stoop, 1996; Bourne, Kennerley and Franco-Santos, 2005; A. Neely, 2005; Franco-Santos, Lucianetti and Bourne, 2012) has progressed from providing recommendations on improving performance to designing PMS frameworks (Folan and Browne, 2005) and lastly to the issues of implementing and PMIS usage to manage organisational performance. The argument of performance measurement, nevertheless, continues to occupy a vital area in that literature. PMIS has always been considered as one of the most important tools of performance management, as it provides and integrates all the information relevant for making decisions related to the function of managing performance (U.S. Bititci, Carrie and McDevitt, 1997). The researching in the field of PMSs has been shaped in numerous ways by the progress within the field of SMA and MCSs (A. Neely, Gregory and Platts, 1995, 2005; A. Neely, 2005). Within the last two decades, PMS is considered as a part of the contemporary MASs providing information to encourage managers to think strategically about how their activities fit with other parts of the organisation (Malina and Selto, 2001; Lillis, 2002; Fullerton and McWatters, 2002; Choe, 2003; Ittner, et al., 2003b; Ullrich and Tuttle, 2004).

2.3.1. Management Accounting System

A Management Accounting System (MAS) is defined as a formal system designed for providing information to support an organisation's decisions in the long term, and is linked to an organisation’s performance by providing internal and external information to managers which can assist with decision making (Bouwens and Abernethy, 2000). Furthermore, Kaplan (1983) described MAS as the integral part of the MCS the function of which is to improve organisational performance by providing valuable information for management planning and control (Ajibolade, et al., 2010). MAS is expected to add value to organisations, by ensuring the effective utilize of resources to gain a competitive advantage and continuous improvement of organisational performance (Shank and Govindarajan, 1993; Chenhall and Langfield-Smith, 1998), and as a significant element of a stategic process (Puolamäki, 2006). MCS is the formalised procedures and systems that use information to maintain or modify patterns within the organisations (Simons, 1987).

Past literature contained references to certain identifiable management accounting (MA) concepts. According to the American Accounting Association (1972), it identified MAS as valued added for continuous improvement in the process of planning, designing, measuring, and operating a non-financial and financial information system (Belkaoui, 1980). This system would be as guidance's management reaction, supports and creates cultural values and motivates behavior to achieve the strategic, tactical and operating goals. Furthermore, Anthony (1989) said that the objectives of MASs are to assist managers and to affect their behavior to achieve goal consistency (R Jusoh, 2006). Hence the use of these controls is necessary and already embedded in management accounting.

Since the 1980's, following on from the Johnson and Kaplan (1987) work on the book of "Relevance Lost: The Rise and Fall of Management Accounting", there has been much debate on traditional management accounting. Numerous researchers, practitioners in accounting appear to support Johnson and Kaplan's claims and contentions with regard to the traditional management accounting developed during the industrial age. According to Johnson and Kaplan (1987) from the early 1900s to the lately 1920s, accounting measurement and control procedures were developed to meet a required for information about the profitability of internally activity and efficiency. Since 1925, a subtle change occurred in the information used by the management whereby there was a reliance on financial measures alone prepared for external financial reports for decision making. Until the 1980s, many practitioners and accounting experts have realised that MAS devised for the 1925 environment were no longer suitable, and in fact, were less useful in today's environment. Johnson and Kaplan (1987) criticised traditional management accounting and control systems for focusing too greatly on the financial based measures, which tended to ignore the non-financial measures. Financial-based measures are criticised for their short-run orientation and ex-post evaluation in nature, for they focus lone on efficiency, promote data manipulation and thus are not adequate for ex-ante evaluation and for controlling and decision-making processes. Other than Johnson and Kaplan (1987), those who criticised the traditional management accounting and control systems involve (Shillinglaw, 1989; McNair, Lynch and Cross, 1990; Nanni, Dixon and Vollmann, 1992; Langfield-Smith, 1997; D. Otley, 1999), that is only to name a few.

Shillinglaw (1989) argued that the traditional approaches to management accounting seem to focus on the departmental cost effectiveness rather than cost effectiveness, cost control rather than cost reduction, and cost as an ex-post evaluation rather than the cost as an ex-ante issue. Farther, McNair, et. al., (1990) reported that standard costing system focuses mainly on labour and production efficiency, and its variance reporting system appears to remove problems rather than to solve them. More recently, Nanni, Dixon and Vollmann, (1992) argued that management accounting being viewed as only providing cost data, does not seem to support strategies and actions. Otley (1999) stated that the select of a suitable system and control techniques is dependent upon the circumstances' environment surrounding a specific organisation. Further, Maskell (1991) has mentioned several shortcomings of the traditional management accounting which is defined as follows:

1. A lack of relevance in today's manufacturing industry without meeting the strategic goals of non-financial measures, such as customer satisfaction, quality and flexibility. These strategic goals cannot be monitored with traditional reports, which are mainly financial, and accordingly, are not related to operational control;
2. A distortion of cost in that the allocation of overhead costs based on the content of direct labour will lead to a distortion of the cost when they represent a major cost of direct labour is less than only 10% of the total costs;

3. Presents as inflexible as accounting limits itself to statements of measurable, objective and produces static reports, these features enabled accounting reports which are inflexible for manufacturing management. Whereas, manufacturing management should be able to modify the measures as the needs of performance measures vary between factory sites (suggest 'factory sites' instead of 'plants' here, or could use 'between work sites' or between 'business sites') and products, processes and departments;
4. An obstacle to progress in manufacturing excellence as a higher focus on efficiency of work.

According to Belkaoui (1980) MA techniques may differ from generally accepted accounting techniques from one organisation to another, and he concludes that the frame of reference used in MA is much broader than that used in financial accounting. Furthermore, he postulates that there are objectives of MA as provided by the American Accounting Association (1972). These four objectives as follows:

1. MA should be related to the planning functions of the managers;
2. MA should be related to the management control functions of managers;
3. MA should be related to the operational system management, by function, product, or other segmentation of operations; and
4. MA should be related to the organisational problem areas.

It is widely agreed that the business environment within which organisations operate, affects MAS used in these organisations (Amat, Carmona and Roberts, 1994; Hoque and Hopper, 1997; S.W. Anderson and Lanen, 1999; Haldma and Lääts, 2002; Alkizza, 2006). The change in the broad business environment, such as growth of privatisations, deregulation of the economy, liberalisation of the market and increased competition generally, as a result, has led to changes in the MAS used by organisations operating in this environment (Anderson and Lanen, 1999; Jaruga and Ho, 2002; Alkizza, 2006, and Baines and Langfield-Smith, 2003).

2.3.2. Types of Information Produced by Management Accounting Systems

A MAS collects, classifies and summarises and reports information to managers to assist them to plan, control and evaluate production activities (Bruggeman and Slagmulder, 1995). The planning is the basis for the process of deciding about the objectives of the organisation, and means to achieve those goals as well. The control refers to the process of influencing people's behaviour to increase the probability that people would act in ways that lead to the achievement of organisational objectives. The evaluation refers to the mechanisms for assessing the performance and evaluation (Choe, 2004). However, the planning stage in a process is a prior form of control, since without planning and production control activities cannot proceed. Planning is the beginning or the basis of control. Thus, the MAS provides information for strategic purposes, i.e. defining the formulating strategy, strategically positioning and controlling the strategic performance of an organisation (Shank and Govindarajan, 1993).

The development of MASs responded to the need for strategic information, to ensure an alignment between information and changing market conditions. The information produced by MASs generally can be classified into two types: planning and control information, and performance evaluation information. Typical types of planning and control information of MASs include cost planning and control information to monitor and coordinate the activities of production (McNair, et al., 1990, and Choe, 2004). The performance evaluation information can be grouped into financial and non-financial performance information (Abernethy and Brownell, 1997). The financial performance information represents the actual degree of achievement of organisational financial goals, such as return on assets (ROA), return on investment (ROI) and return on sales (ROS) (Govindarajan and Gupta, 1985; Chenhall and Langfield-Smith, 1998, and Choe, 2004). And the non-financial performance information refers to the non-monetary and qualitative indicators, such as customer satisfaction and market share and sales growth (Perera, Harrison and Poole, 1997; Choe, 2004).

2.3.3. Performance Measurement System Design

There is no single definition of the PMS in the literature. The definition outlooks the PMSs as performing a supporting role for a broad range of managerial activities, involving strategic processes, which involve strategic formulation and strategic implementation and ongoing management (Ferreira and Otley, 2009). Furthermore, Mintzberg (1978) said that a PMS can support or foster emergent strategies through its role in learning and change facilitation (Ferreira and Otley, 2009). A comprehensive definition of PMS according to Franco-Santos, et.al. (2007) is “the PMS is a set of processes an organisation uses to manage its strategy implementation, communicate its position and progress, and influence its employees' behavior and actions. It requires the identification of strategic objectives, multidimensional performance measures, targets, and the development of a supporting infrastructure”. Garengo, Biazzo and Bititci (2005) concluded that the PMS design must be able to evaluate the organisation as a whole, and to integrate all of the dimensions/functions with all the importance attached to it (in the light of the organisation’s strategic goals). The PMS must necessarily involve various types of indicators, managed in a coordinated way, multi-dimensional, integrated or balanced models of performance measurement are developed from such a holistic perspective. Whereas, the PMS is defined as a tool used to quantify the actions of an organisation as well. (Neely, et al., 1995/2005).

Accounting-based performance measures are dominant because they are relatively objective, reliable and veritable, and it is quite natural to measure performance in financial terms as a strategy typically intended at financial success. The cost of implementing financial indicators is low, because they are produced for external reporting purposes anyway. Financial controls are rather unobtrusive allowing a significant amount of autonomy and stimulating creative thinking (Merchant, 1985). Nevertheless, the short comings of financial performance measures are well documented. Merchant (1985) lists myopia, excessive risk aversion, and games-man-ship as potential problems with the utilize of financial measures (Simons, 1994). Johnson and Kaplan (1987) debate that the management accounting system derives from financial accounting systems cannot provide the basis for sound decision making, since it is too late, too aggregated, and too distorted. Further, Ittner and Larcker (1998a) identified several shortcomings of the traditional financial/accounting-based measures as follows:

1. too historical and "backward-looking";
2. lack of predictive ability to explain future performance;
3. reward short-term or incorrect behaviour;
4. lack of action ability;
5. lack of timely signals;
6. too aggregated and summarised to guide managerial action;
7. reflect functions instead of cross-functional processes; and
8. do not give adequate guidance to evaluate intangible assets.

Utilising non-financial in addition to financial performance indicators (i.e measurement diversity) is required. Measurement diversity is a broad concept that relates to various dimensions: internal versus external measures, operational versus managerial measures, economic versus ecological measures, process versus result measures, and input versus output measures, etc. (Scott and Tiessen, 1999; Ittner, et al., 2003b).

There is already considerable work being carried out by the accounting profession on performance measurement. In fact, most manufacturing companies have extensive PMSs based on cost and financial accounting practices. Recent innovations, such as activity-based costing, overcome some of the difficulties associated with traditional methods, but still do not promote continuous improvement and strategic orientation. There is a need for alignment of financial and non-financial measures that fit within a strategic framework because the performance measurement systems relying on fewer appropriate measures and not to link measures with strategic priorities can lead to a negative impact on an organisation's performance (Paladino, 2001). Furthermore, Venkatraman and

Ramanujan (1987) proposed that strategy-level performance measurement should include both financial and non-financial measures. PMS design involves the choices of performance measure, which is based on the strategy being followed by organisations. The choice of performance measure refers to a variety of metrics adopted by an organisation. However, choosing a suitable measurement technique depends on a number of factors involving: the purpose of the measurement; the level of detail required; the time available for the measurement; the existence of available predetermined data; and the cost of measurement (Tangen, 2004).

The literature of PMS design categorised two types of performance measure, either financial or non-financial, e.g., see: (Fitzgerald, et al., 1991; Kaplan and Norton, 1992; Gosselin, 2005). Over the last two decades, the PMS has experienced a lot of changes. In the past, organisations had put a greater reliance on traditional financial measures such as return on investment, return on asset, residual income and profit. In addition the focus has moved from structure design of PMISs (A. Neely, et al., 1995, 2005) to the PMiSs' design and deployment (A. Neely, 2005), with interest of researchers and managers in the PMIS, there has spawned to literature for the design (Kaplan and Norton, 1992; U. Bititci, Carrie and Turner, 1998), implementation (Bourne, Neely, Mills and Platts, 2003a, 2003b; Bourne, et al., 2005; U.S. Bititci, Mendibil, Nudurupati, Garengo and Turner, 2006), and use of the PMS to manage performance (Bourne, et al., 2005; Widener, 2006; Wouters and Wilderom, 2008; Hall, 2008).

In the 1990s, a new development arose in the performance measurement literature. Since academics started to discuss the need for PMSs with the approaches to performance measurement in the 1990s, performance measurement evolved from loose ideas including both financial and non-financial measures to more complex frameworks based on a balanced suite of measures that explicitly link those measures to strategy. According to Chenhall (2005) a PMS is designed to present managers with financial and non-financial indicators covering different perspectives which, in combination, provide a way of translating strategy into a coherent set of performance indicators.

Strategic PMS has been in vogue for over a decade. Strategic PMSs are designed based on the strategic options adopted by organisations, and amongst the prominent examples of strategic PMSs are the Balanced ScoreCard (BSC) concept (Kaplan and Norton, 1992), the results and determinant framework (Fitzgerald, et al., 1991) and the performance pyramid system (Lynch and Cross, 1995). Another example is the performance prism (A.D. Neely, et al., 2002) consisting of five aspects. The top and bottom aspects are stakeholder satisfaction and stakeholder contributions, respectively, while the three side aspects are strategies, processes, and capabilities.

Kaplan and Norton (2001) built the BSC architecture to develop an PMS to link business strategies to measures. They have stated that financial indicators like the return on investment (ROI) offer a restricted and incomplete picture of performance, and that in turn will hinder the creation of future value. The BSC arose out of the need to improve the planning, control, and performance measurement functions of management accounting, and as a tool to explicitly link PMISs to strategy, and emphasize the need for balance between short-term and long-term measures across the various strategic dimensions of organisations. The BSC approach not only includes financial indicators but also includes three other non-financial indicators such as: customer satisfaction; internal business processes; and learning and growth indicators. Whereby, the indicators including the correlation between the number of customers in different segments, customer attrition, and level of assets under management for each customer or customer segment, suggest financial indicators should be supplemented with additional ones that reflect customer satisfaction, internal business processes, and the ability of learning and growth.

According to Martinsons, Davison and Tse (1999) the BSC has emerged as a decision making support tool at the strategic management level and can be an information system that measures and evaluates information system activities from the following perspectives: business value, user orientation, internal process, and future readiness. The BSC consists of performance measures that address a range of perspectives: financial and non-financial; external (financial and customer) and internal (business processes, innovation, learning and growth); drivers and outcomes, objectives and subjective measures (Kaplan and Norton, 1996). Thus, the BSC model identifies four related perspectives on activities that are likely to be vital to almost of organisations and to all levels within organisations:

1. increasing financial success;
2. providing customer value;
3. improving internal process efficiencies; and
4. investing in learning and growth (Kaplan and Norton, 1992, 1996, 2001).

Even so, Kaplan and Norton do not specify how these financial and non-financial; external (financial and customer) and internal (business processes, innovation, learning and growth); drivers and outcomes; objectives and subjective measures are weighted or aggregated in evaluating managerial performance.

On the other side, Ittner, et.al., (2003b) investigate how different types of performance measures were weighted and used BSC bonus plan of a financial service company. Senior managers introduced subjectivity into the plan by placing a greater weight on financial measures, including factors outside of the BSC in their performance evaluation, changing the evaluation criteria each quarter, ignoring BSC measures that were drivers of future financial performance, and placing reliance on measures that were not predictive of desired results. According to Kaplan and Norton, (1996) there are three ways in which a sophisticated PMS design translates strategy by:

1. describing the organisation's vision of the future to the entire organisation, thus creating a shared understanding;
2. creating a holistic model of strategy; and
3. focusing on change efforts.

It is relatively certain that all managers strive for their own organisation to gain benefits and to succeed to become the best or to have the best placed conditions within the marketplace. In order not to be in a lower rated position than their competitors, management within organisations must build and create measurement systems and control their performance. Henri (2008) stated that there are three patterns reflecting the role and importance of PMS within organisations:

1. PMS as a control mechanism;
2. PMS as a management tool support; and
3. PMS as an institutionalised organisational process.

According to Jusoh (2008) organisations require performance measurement systems in their day-to-day implementation for several reasons, as follows:

1. It needs to support better and faster decision-making processes, control processes and planning processes;
2. It allows an organisation to align its strategic activities with its strategic plan and permit real deployment and implementation of the strategy on a continuous basis and also provide feedback to guide planning efforts;
3. Performance measurement will provide a rational basis for selecting what business process improvement must be reviewed and rectified;
4. It will provide accountability and incentive based on real data and not on anecdotal and subjective judgment;
5. It can allow a manager to identify the best practice within their organisation and expand their usage to any department that needs it as reference;
6. It could permit benchmarking of process performance against an outside organisation.
7. Organisations can reduce their process costs and improve productivity and mission effectiveness.
8. They also could eliminate any waste and inefficiencies in operational activities.

   This can be detected from analysing the measurement of organisational performances.

Addational, regarding to importance of performance measurement, Kueng and Krahn (1999) stated the 'measurements were key. If you cannot measure it, you cannot control it. If you cannot control it, you cannot manage it. If you cannot manage it, you cannot improve it'. Therefore, now that this information is available, managers in organisations can use this information to understand that measurement is important for them to determine the success of their activities.

2.3.4. Performance Measurement System and Strategy

Most of the quantitative MCS strategy studies up to the mid-1990s related MAS/PMS design to business strategies. And a contingency perspective was adopted to study the fit between MCS design and strategy. Therefore, the organisations which focus on the using information of MAS to help managers as basic of decision-making capability to achieve the objectives of the organization. The PMS is one of the main functions of strategic management accounting, as it is operated to evaluate, control and improve processes through comparing the performance of different organisational levels (Fakhri, Menacre and Pegum, 2009). Business strategies were identified in generic terms of differentiation versus cost leadership, prospector versus defender or build versus harvest. This was followed by studies which focused on the operational strategies and MAS, including quality (Ittner and Larcker, 1997), manufacturing flexibility (Abernethy and Lillis, 1995), and new product development (Davila, 2000).

Studies in the early 1990s adopted different views of strategy as either cost leadership or differentiation, or prospector or defender. More recently, studies have acknowledged that organisations may pursue business strategies characterised by several aspects of differentiation or cost leadership (Chenhall and Langfield-Smith, 1998; Chenhall, 2005). Whereby, Puolamaki (2006) noted that the new approaches of Management Accounting is strategic undertone, their implicit or explicit purpose is to serve the formulation of competitive advantage and development of the organisation. Meanwhile, the main purpose of PMS is to help organisations to build organisational capabilities to sustain their competitiveness within an ever increasing competitive market (Mohamed, Wee, Rahman, Kamal and Abdul Aziz, 2008; Feurer and Chaharbaghi, 1995).

More complex characterisations of the MCS strategy relation has emerged with the levers of the control framework, which focused on how managers use controls and plan interactively for strategy formation, implementation and change. Hence, the focus has moved from a simple matching of the MCS design and strategy to the use of MCSs to manage behaviour and effect strategic change through interactive controls, and balanced scorecard approaches, which integrate a range of measures to enable strategic outcomes. If organisations pursue a range of strategies, and if the strategy is in continual change, the meeting of strategy and the MAS design might no longer be the driver of competitive capabilities and organisational performance (Langfield-Smith, 2007). The BSC usage is associated with increased organisational performance (Hoque and James, 2000). Simons (1991) and Marginson (2002), have clustered MCSs into three major groups:

1. setting performance standards;
2. measuring performance against the standards; and
3. taking corrective action if the standards are not being achieved.

The PMS framework provides a different perspective for viewing the design of strategically oriented PMSs, and their link with strategy. Thus, the PMSs provide feedback regarding to the efficiency of competitive activities and enable learning from internal and market-oriented practice and provide strategic guidance for change and renewal. Consequently, the PMS represents one important element of MASs, and is described as an integral part of an management control system and primary to the control process in organisations (Olson and Slater, 2002).

Jusoh (2008) argued that the use of multiple performance measures provided by the BSC could play an important role in providing internal and external extensive information. Campbell, Datar, Kulp and, Narayanan (2006) indicated an organisation’s strategically linked performance measures systematically reveal more timely information about problems with their strategy, and distinguish between problems with strategy formulation and implementation. Even so, relative to financial performance measures and non-financial performance measures are unlikely to provide information about the achievement of the short-run financial priorities of organisations. In that situation, non-financial performance measures do not provide information (relative to financial performance measures) which is valuable for strategy implementation (Govindarajan and Gupta, 1985; Said, et al., 2003).

In a holistic view, a PMS design plays a key role in the development of strategic plans, contributes to strategy formulation and implementation by revealing the links between goals, strategy, lag and lead indicators, and assesses the achievement of organisational objectives (Kaplan and Norton, 1992, 1996; Ittner and Larcker, 1998a). A PMS design also provides information that allows an organisation to identify the strategies offering the highest potential for achieving the organisation's objectives and goals (Ittner and Larcker, 1998a; Ittner, et al., 2003b; Feurer and Chaharbaghi, 1995), as well as acting as a signalling and learning device (Simons, 1990), and thereafter, it communicates and operational strategic priorities (Nanni, et al., 1992). According to Nicholls (1992) and supported by Ajibolade, et. al., (2010) the organisations that are able to identify true product costs in a high level of PMS design would be able to price their products more competitively and gain some advantage over their competitors who are unable to do so (Ajibolade, et al., 2010).

Furthermore, the role of the PMS evolution of a simple component of the planning cycle and control of the process assumes the independent monitoring function, as a decision making support tools at the strategic management level and as an information system, that could measure and assess an information system's activities from the perspectives of business value, internal process, user orientation, and future willingness (Martinsons, et al., 1999).

This task requires measuring movement in a strategic direction instead of distance from an objective, which is different from the planning and control cycle (Nanni, et al., 1992). However, according to Kaplan and Norton (1996) and supported by Bourne, Mills, Wilcox, Neely and Platt (2000) the performance measures systems are needed for two main purposes, as follows:

- Firstly, as the measures are derived from strategy, the initial use to which they should be put is that of measuring the success of the implementation of that strategy;

- Secondly, the information and feedback from the measures should be used to challenge the assumptions and test the validity of the strategy; and

An important point to remember is that the PMS should be designed in such a method that information is easily retrieved, usefully displayed and easily understood. Additionally, and according to Tangen (2004) the PMS's central objective is to provide meaningful performance information, at the right time, to the right person. However, providing performance information is not sufficient to improve the performance. The real success white lies in managers' reaction in using this information.

As mentioned above, there are different perspectives in regard to definition and purpose/use of the performance measurement/management system, in table 2.1 below are recapitulated.

Table 2-1: Performance Measurement System Key Perspectives

Year	Performance Measurement/ Management System	Refrence	Main Focus or Purpose
1989	Strategic Measurement analysis and Reporting Technique	(lyuch and Cross, 1991)	A management control system for large business.
1991	World Class Manufacturing	(Maskell. 1991)	Improvement initiative
1991	Performance Pyramid system	(lyuch and Cross, 1991)	A management control system.
1991	Results and Determinants Matrix	(Fitzgerald, et al, 1991)	A model to explain the key dimensions of performance measurement.
1992	Performance Measurement Questionnaire	(Nanni, Dixon, et al.,1992)	An assessment tool for identifying improvement needs in large business.
1992	Balanced Scorecard	(Kaplan and Norton, 1992)	A measurement framework for monitoring performance and strategic management.
1996	Cambridge Perfrmance Measurment Process.	(Neely, Mills et al.,2000)	A management process.
1996	Integrated Dynamic Performance Measurement System.	(Ghalayini and noble, 1996)	An integrated dynmic performance measurement system.

Table 2-1: Continued

1997	Integrated Performance Measurement	(Bititci, Carrie et al., 1997)	A performance management process.
1999	A Framework for Management Control Systems Research	(Otley,1999)	Performance management
2000	Integrated Performance Measurement Framework	(Medori and Steeple, 2000)	A 'how to' approach to designing a system
2000	Dynamic Performance Measurement System.	(Bititci, Turner, et al., 2000)	A 'how to' approach to designing a system
2001	Performance Prism	(Neely, Adams and Crow, 2001)	A performance management tool
2002	Integrated Performance Measurement for Small Firms	(Laitinen, 2002)	Integrated performance framework for small business
2005	Integrated Strtegic Performance Measurement System	(Chenhall, 2005)	Strategic alignment and information provision.
2008	comprehensive Peformance Measurement system	(Hall, 2008)	performance management tool and information provision.
2008	Measuring Intangibles for Management purposes to improve performance.	(Ittner, 2008)	Management purposes
2009	Performance Management Systems Framework	(Ferreira, Otley, 2009)	performance management
2010	Strtegic Performance Measurement System	(Gimbert, et al., 2010)	performance management tool in strategy formulation processes
2012	Using Strategic Performance Measurement Systems	(Bisbe and Malagueno, 2012)	Performance management tool in strategy (re)formulation processes
2012	Contemporary Performance Measurement Systems	(Franco-Santos, et al., 2012)	As control and management tool.

The next section will focus on the performance information characteristics that are provided by PMS design, and will look into the PMS design characteristics from an information system perspective (information characteristics) which will be called performance measurement information system (thereafter referred to as PMIS or so far as performance management informaton systems are concerned, they are referred to as PMISs).

2.4. Performance Measurement Information System (PMIS)

In this context, the concept of PMIS design is defined from an information system perspective (i.e. characterisation as an information system). The literature has identified several important features of strategic PMSs. These include a comprehensive and diverse set of performance measures, the integration of measures with strategy and linked to valued organisational outcomes, and the coverage of performance measures related to different parts of the organisation (Malina and Selto, 2001; Malmi, 2001; Ittner, et al., 2003b; A. Neely, 2005).

A strategic PMS is a subset of PMS. A unique characteristic of PMIS design is the explicit link established between performance measures and organisational strategy (Kaplan and Norton, 1996). According to Chenhall (2005) and Gimbert, et. al. (2010) the strategic PMS design is defined as those PMSs that have special characteristics such as:

1. the linkage of long-term strategy and operational objects;
2. the provision of performance information in the area of multiple perspectives; and
3. the provision of a sequence of objects' strategies for each perspective.

Drawing on these descriptions of PMS as a PMIS design, it is argued that an information characteristic of PMIS is comprehensiveness. It is defined as the extent to which a PMIS provides managers with comprehensive performance information. Even studies on information systems; e.g. Gordon and Narayanan (1984) they proposed that the information need for decision making could be considered in terms of information characteristics. These information requirements are the user specifications of information characteristics included in information seeking, and refer to those qualities of information perceived by managers to be useful to facilitate their decision making.

Research pertaining to the design of MASs and Management Information Systems (MISs) is largely based on the information characteristic continuum advocated by Gorry and Morton (1971) and supported by later studies such as (Gordon and Narayanan, 1984; Chenhall and Morris, 1986). These studies proposed that each item of information has a source (internal or external sources), scope (narrow or broad in its representation), level of aggregation (information might be detailed or aggregated), time-horizon (ex-post post or ex-ante), currency (the most-recent events or be older), required accuracy (high or low in its correctness) and frequency of use (used frequently or infrequently). whereas, the importance of these information characteristics for the design of accounting and management information systems is well documented throughout the literature (Gordon and Narayanan, 1984; Chenhall and Morris, 1986) they cannot be readily translated into implications for the design of PMIS.

The conceptual framework draws on three major literature bases and illustrates three categories of antecedents of the usefulness of performance information characteristics: environmental uncertainty perceptions, decision-maker characteristics, and business environment aspects (Chenhall and Morris, 1986). Environment uncertainty perceptions are drawn from conceptual frameworks and empirical investigations in organization' structure and behavioral decision-making; decision-maker factors are drawn from the personality and cognitive psychology literature; business environment factors are drawn from theories of managerial information processing. However, the considerable emphasis has been placed on the potential benefits of contingency theory applications to accounting studies; relatively few empirical investigations exist. which have examined a sophisticated PMIS design.

The framework recommends that information characteristics which are requirements might depend upon the nature of the external environment and work conditions. The decision-makers have to deal with, and the psychological disposition of the decision-maker. Particularly, the crucial premise, which underlies that study is:

1. perceptions of state, effect and response to the external environmental is linked to the perceived usefulness of information characteristics;

2. decision-makers with different behavioral and psychological profiles would perceive the usefulness of information characteristics differently; and
3. the perceived usefulness of performance information characteristics is influenced by a range of positions environmental factors, involving the nature of managerial decision activity; the importance of managerial decisions; decision arrival time; managerial task difficulty; and variability of managerial tasks.

Many authors agree about a range of characteristics, which enhance PMIS comprehensiveness, relevance and, ultimately hence effectiveness, for instance, balanced measures such as financial and non-financial (Feurer and Chaharbaghi, 1995, 1997); and internal and external; and linking to the business strategy; linking measures hierarchically from strategy through to operational detail, as well as, the system should be simple to use, be easy to understand, and provides timely information (Dixon, et al., 1990; Lynch and Cross, 1995); and provides comparative information (Mia and Clarke, 1999). However, out of the dimensions being suggested by previous studies discussed above, only broad scope, integration, timeliness and benchmarking are being implemented by these companies. Accordingly, this is the justification for choosing the four dimensions instead of the full fledge of characteristics of a PMIS, the four characteristics are derived according to empirical work carried-out in the MASs (Chenhall and Morris, 1986; Mia and Clarke, 1999), and strategic performance measurement system literature (Kaplan and Norton, 1992; Chenhall, 2005; Hall, 2008; R. Jusoh, et al., 2008; R. Jusoh, 2008; F. Henri, 2008; Gimbert, et al., 2010). Although the studies of performance measurement and management systems have collected a great knowledge of the impacts of the PMIS on organisational performance, but the actual mechanism of these effects is not fully understood (Pavlov and Bourne, 2011).

A PMIS is conceptualised here as a formal system designed for providing information to managers. The researcher suggests that PMIS be conceptualised as a system that accumulates and processes accounting and generate information either electronically or manually. The characteristic's information of PMIS can be operationalised in terms of the availability of the four information characteristics as dimensions of the system and limited to essential dimensions of information characteristics: namely broad scope, integration, benchmarking and timeliness. The study has adopted the view that PMISs may be conceptualised in terms of a continuum from a low level of PMIS design to a high level of PMIS design. A high level of PMIS design provides information which has a high average level in the four characteristics/dimensions for a PMIS. Therefore, having discussed that PMIS is conceptualised as a system that accumulates and processes performance information both electronically or manually. it is characterised into four dimensions as stated above.

2.4.1. Broad Scope of PMIS

The scope of the information system refers to the prospects of the focus, identify, and time horizon of the information (Gordon and Narayanan, 1984; Chenhall and Morris, 1986). With a broad scope approach, the PMIS design can provide information related to the external environment irrespective of whether the information is financial or non-financial in nature. There four focuses can be referenced to whether the information is internally or externally collected of the organisation (eg. economic, technological and market factors). The quantifying feature pertains to whether the information is financial or non-financial. Time horizon refers to the extent to which the information refers to future events or historical events. It is viewed as a continuum with a narrow scope at one end and broad scope at the other. Narrow scope information has linked with traditional information systems in that these systems mainly are limited to providing information that is internally focused, financial, and historical information (Gul, 1991).

Broad scope information therefore describes information that is broad in its representation (a broad set of information inputs is required to facilitate marketing, competitive and management decision making). Sharif (2002) argued that comprehensive PMISs are designed to measure and evaluate performance in all the key areas of the organisation. Chia (1995) found that the broad scope caters to a diversity of information requirements in decision-making, for example, the information characteristics of broad scope are useful and relevant to the specific needs of the various sub-units. Gul (1991) found that broad scope information (both financial and non-financial) which is external to the organisation is essential for evaluating competitive actions. Farther, the broad scope of measures allows managers to consider a wider range of a lternatives as the available information enables managers to understand the situation (Bouwens and Abernethy, 2000). Ismail and Isa (2011) reported that the broad scope of MAS information which is reserved by managers could assist organisations to achieve the ultimate outcome of every organisation, i.e., to improve organisational performance. Kaplan and Norton (1996) argued that in the modern dynamic environment the survival of organisations is dependent upon their use of integrated and balanced of both financial and non-financial indicators in performance assessment, which incorporates multiple performance indicators. Specifically, this element is true regarding issues such as an organisation's product competitive capability.

The ability of PMIS to meet the needs of managers provides from information, thereby, it would provide an opportunity to enhance managerial performance, then to improve product strategies. The recent literature has indicated that a PMIS in an organisation should also provide information which has been traditionally considered to be outside the area of the system. A PMIS which is broad scope, would take into consideration the customer perspective, the internal business perspective, and the innovation and learning perspective, as well as the financial perspective. The benefits include the ability of PMIS to be linked to the business strategy, to communicate strategic objectives and to improve feedback and enhance organisational learning (Olson and Slater, 2002). Furthermore, it supports strategic processes and monitors the achievement of strategic goals (Bhimani (Bhimani and Langfield-Smith, 2007). In addition, Chenhall (2005) and Hall, (2008) suggest that the PMIS incorporates the financial and non-financial information, which might be of assistance to managers to provide improved competitive strategic outcomes.

Based on the literature reviewed, which related to an information system and management accounting information systems, the broad scop of PMIS is wide common in the manufacturing industry (Kaplan and Norton, 1996; El-Shishini, 2001; Malina and Selto, 2001; Malmi, 2001; Ittner, et al., 2003b; Chenhall, 2005). Hall (2008) has recognised that broad scope covers a much wider range of issues, including information that affects the organisations both internally and externally.

The conceptualisation of broad scope as found by Chenhall and Morris (1986) that is based on external and non-financial information as well as future-oriented information. In this study, it conceptualises the broad scope of PMIS based on the related literature. Accordingly, this study essentially follows Hall's (2008) in conceptualisation of broad scope. Hence, the broad scope of PMIS is considered as an aspect involving a broader scope of performance measures information including: information about key performance areas and different dimensions of an organisation's performance, critical and important areas of an organisations's operations, as well as, lagging and leading indicators, and financial and non-financial indicator, that are useful predictors of future events, and evolving to include a more diverse set of performance measure indicators. The presence of these elements would indicate the extent to which the PMIS provides broad scope information.

This conceptualisation of broad scope of PMIS is motivating at a holistic perspective in that it takes into consideration information related to oveall performance or dimensions or an area of the organisation's performance. In addition, previous studies have indicated that conceptualisation of broad scope is statistically highly reliable (Hall, 2008).

2.4.2. Integration of PMIS

In this study, integration of measures is referred to the extent the PMIS is a integrated and a logical model of financial and non- financial performance measures with well-grounded causal relations and with no overlapping in perspectives of the measures (Nanni, et al., 1992). The integration of PMIS with the strategy for providing information about the parties of the value chain which is considered as an vital characteristic of PMIS design. A PMIS can provide feedback to fully understand and provide information to successfully manage the increasing level of complex interdependencies that occur between operations and strategy and between various aspects of the value chain.

The effectiveness of integrated PMIS is depend on the extent to which they form a coherent performance measurement system that enables strategy and operations to be integrated and linked (Ittner, Larcker and Meyer, 2003a; Chenhall, 2005). Furthermore, Nanni, et. al., (1992) have argued that PMISs are able to integrate actions across functional boundaries, and focus on strategic outcomes and are vital to support the new manufacturing technology and competitive environments facing the organisations. Furthermore, the integration of measures with strategy and objectives throughout the organisation provides information regarding the progress of performance (Nanni, et al., 1992; Kaplan and Norton, 1992, 1996; Malina and Selto, 2001; Malmi, 2001; Webb, 2004; A. Neely, 2005). More integration of PMSs provide the understanding of the linkages between operations and strategy (Chenhall, 2005). Furthermore, Lynch and Cross, (1995) have reinforced the hierarchy of performance measurement, which adopts an integrated performance measurement system, the level of top management to operational level, which deals with both market and cost considerations to support aspects of strategic importance.

Integration is defined as the degree to which an individual manager's reaction is harmonious and consistent with the other organisation's units, and the combined reaction is contributing to added customer's value and enhancing the performance as well (Kuwaiti and Kay, 2000). The integration as a dimension of PMIS consists of information about the activities of other units within the organisation as well as information as to how the decisions made in one unit may influence the performance of other units. This information could, for instance, relate to the outputs, the operating processes and the technology employed by other units. On other side, the integrated information could involve reports, which provide information on the type and volume of output produced by other units, and information about the costs, revenues and prices associated with that output. Further, the integration information refers also to information that assists in coordination of activities within sub-units or between sub-units within an organisation (Chenhall and Morris, 1986).

According to Simons (1994), the goal-setting process is other significant integrating mechanism in which the integration of PMIS plays three critical roles:

1. it identifies the performance criteria on which objects are set;
2. it provides the monitoring of the progress towards the achievement of the objects and
3. it yields the feedback on the results (Kuwaiti and Kay, 2000).

The integration of measures with the strategy to provide of information about the parties of the value chain is also an important feature of a more integrated PMIS. Integrated information decreases uncertainty relating to cause and effect relations within units as it encourages learning and the generation of ideas. It enables units' managers to learn how to adjust products and production methods to be compatible with other units (A.A. Atkinson, Waterhouse and Wells, 1997). It also facilitates managers to better understand the different objectives and goals that exist within separate decision (A.A. Atkinson, et al., 1997) and to make trade-offs among alternative modes to operate within the given set of objectives. Based on the literature reviewed on MAS (Chenhall and Morris, 1986) and on PMS (Nanni, et al., 1992; Kaplan and Norton, 1996; Malina and Selto, 2001; Malmi, 2001; Webb, 2004; Neely, 2005, and Chenhall, 2005), it has been recognised that integration covers a much wider range of issues, including information that affects the organisation both internally and externally.

This study essentially followed Chenhall's, (2005) in conceptualisation of integration of PMIS. Hence, the integration of PMIS is considered as an aspect involving information that provides a record for evaluating performance and provides an understanding of cause-effect linkages among operations, strategy and goals, business units' activities to the achievement of objectives and goals, between sub-units, and linkage among different aspects of the value chain, including suppliers and customers. The presence of these elements would indicate the extent to which the PMIS provides integrated information.

This conceptualisation is motivating at a holistic perspective as it considers information related to horizontal linkages and vertical linkages of an organisation. In addition, previous studies have found that conceptualisation of integration is statistically highly reliable (Chenhall, 2005).

2.4.3. Timeliness of PMIS

According to Belkaoui (1980), timeliness refers to the age of the information, and related to the concept of real time. It has two elements interval and delay. Interval is the period of time lapse between the preparations of two successive reports. Delay is the period of time necessary to process the data, prepare the report and distribute it. However, timeliness information of PMIS is a uniquely desirable property of management accounting information. It might influence and conflict with some criteria such as cost considerations. Chenhall and Morris, (1986) recommend that timeliness is usually specified in terms of the provision of information on request and frequency of reporting for systematically collected information. PMISs allow the management accountant to make a critical contribution to the management of organisations in which is described as the information age (Kaplan and Norton, 1996). As mentioned above, timeliness of information for a PMIS refers to the age of the information and has two elements interval and delay (Belkaoui, 1980). A PMIS with a timeliness feature provides managers with timely information regarding news of changes in the organisation's performance, changes of consumer demand, and changes of competitor activities.etc. According to Azzone and Noci (1998) timeliness of information aims to describe how long the PMIS takes to analyse the collected data. And Chenhall and Morris (1986) describe timely information as receiving information quickly and on time.

The timeliness of PMIS includes the provision that the requested information arrives immediately upon request or it is the information that is provided to a decision maker, after it has been automatically fed upon receipt into the information system. It may also include reports which are provided frequently on a systematic and regular basis. Less timely PMIS may include infrequent or delayed information. However, Mia and Patiar (2001) have found that the timeliness of information (i.e., availability, accurate and relevant cost analysis on various products and services) is important for improving the process of efficiency, and the reduction of wastage. Since managers need to respond rapidly to changes in the competitive environment the timely and frequent information is beneficial for them (Gul, 1991). Therefore, it would seem that timeliness information is positively affected the manager's performance. The manager, therefore, can be proactive and respond more rapidly to any event with updated information reports from the PMIS. Particularly, this is true with regard to issues such as the organisation's competitive capabilities.

As an example, timeliness information can be seen as the period within which a departmental manager reports to the general manager for him/her to make the necessary decision. If the time it takes to provide the information is short, then the timeliness factor is strong within the company. On the other hand, if the time that it takes to provide the information is long, then timeliness is weakly practiced. Therefore, effective timeliness provides information that is adequate and on time for the managers to make decisions. For instance, on time reports provided in a company would assist managers to understand what is needed, and what should be done and when in order to meet the next plan or period for strategic and operational review (Chenhall and Morris, 1986). According to Bouwens and Abernethy (2000) the conceptualisation of timeliness information has two elements that are frequency of reporting, and the speed of reporting. Frequency refers to how often the information is provided to managers, while speed relates to the time-lag between a manager's request for information, and information is made available.

A PMIS design is considered essential and it should be high on the timeliness dimension. There is a definite relationship between timeliness and the PMIS, because it is very important for managing performance. Gordon and Narayanan (1984), and Chenhall and Morris (1986) stated that management accounting information should be available in time. Moreover, they suggest that PMIS design provides the manager with timely information relevant to changes in consumer tastes, to market developments and to monitor competitor activities. Therefore, the managers could effectively deal with the complexity within their business environment by being able to make timely decisions and take advantage of opportunities to make a profit. Consequently, PMIS assists in improving organisational performance, and conversely, when managers are unable to obtain key and timely information, they are not able to make appropriate decisions, with an outcome whereby they are likely to lose customers and also lose opportunities to make a profit, and as a result, the organisational performance worsens.

Timeliness information has the potential role in reducing uncertainty. It facilitates managers to continually modify their activities in response to the changes requested by customisation, and the changes occurring in other interdependent units as well. Therefore, timeliness of PMIS with provided the updated information reports would enable the managers to respond rapidly to any event.

This timeliness of PMIS is considered an aspect involving information, which refers to frequency and age of the information relevant to changes in the competitive environment. Therefore, effective timeliness provides information that is adequate and on time for managers to make appropriate decisions. The studies by Chenhall and Morris (1986) and by Bouwens and Abernethy (2000) adopted the view that the conceptualisation of timeliness, ought to be divided into two elements: frequency of reporting and speed of reporting.

Regarding to the conceptualisation of timeliness of PMISs, this study essentially follows the Chenhall and Morris (1986), Hence, the timeliness of PMIS is considered as an aspect having two main elements as mentioned above: frequency of reporting and speed of reporting. Frequency refers to how often the information is provided to managers, while speed relates to the time-lag between a manager’s request for information, and information is made available. A PMIS is considered high on the timeliness information when the information is provided frequently (i.e. on weekly or monthly basis) and when there is a little delay between an event occurs and information concerning this event is received by managers. The presence of these elements indicates the extent to which the PMIS provides timeliness information.

In addition, this conceptualisation is used widely in area of MASs, and the previous studies have found that, conceptualisation of timeliness is statistically highly reliable (Belkaoui, 1980, Chenhall and Morris, 1986; Bouwens and Abernethy, 2000).

2.4.4. Benchmarking of PMIS

The original definition for benchmarking is searching for best practices in the industry, and implementation of industry's best operational practices in order to achieve superior performance. Increased competition has forced organisations to continuously monitor their products and services as well as that of the competitors’. Therefore, studies have advocated that positioning and differentiating strategies are a key for survival (Mia and Clarke, 1999). In this context, the benchmarking effort goes beyond the typical competitive analysis, as it provides a better understanding of the processes that create superior performance (Kovacic, 2007). Organisations are attempting to integrate benchmarking efforts with performance measurement practices into an overall feature of an organisation’s information systems that to include benchmarking information of the PMIS (Gomes and Yasin, 2011). As such, organisations need to effectively maintain PMIS. The PMIS will provide benchmarking information in order to compare its competitive parcel of products and services against its competitors. As Kaplan (1983) noted that the benchmarking information could provide feedback on different area of performance, such as cost structures, inventory levels, market share, profitability, and productivity (Mia and Clarke, 1999).

A report comparing an organisation's current year's performance on market share, sales volume to that of previous years or with those of similar organisations in the industry. In general, the definition of benchmarking practice is the measuring of the performance of an organisation (or performance of business units) against the performance of previous years or other organisations in the same industry.

An organisation can use MAS (including PMS) which provides benchmarking information to scan the environment and clarify any changes in the industry and in market and competitors' strategies, in order to compare its competitive parcel of products and services, and its performance against its competitors or previous years. Maskell (1991) stated that additional important component of a PMIS is benchmarking. Typically, an external benchmarking of PMIS provides tools of assessing the feedback of PMIS against some independent best-practice source. Farther, according to Carr and Hasan (2008), benchmarking has been used by a number of manufacturing companies when setting objects for their business. These companies have found those not only their competitors' data available, but with some analysis, as that which enables them to identify their own strengths and weaknesses and their competitor's strengths and weaknesses as well.

Furthermore, the benchmarking is the process of assessing and emulating the products, services, and processes of best practices in the industry, implementation of industry's best operational practices and best performing organisations (Mia and Clarke, 1999). By using comparative information, a business can more easily identify its strengths and weaknesses, then take appropriate actions or make appropriate decisions. Originally, the definition for benchmarking is the seek for best practices in the industry that lead to higher performance. More lately, however, benchmarking has been seen as a systematic way to identify, understand, and creatively evolve superior designs, equipment, processes and services, and those practices would be led to improve organisational performance.

The subsequent could be a short and clear definition of benchmarking: It is the seeking for an industry's best operational practices implementation, which lead to the exceptional performance of a manager through the using the information provided by the PMIS which might be assist organisations to adopt and implement a strategy to respond in a superior way to their competitive environment (Mia and Clarke, 1999). Comparing the way an organisation achieves a specific activity with that of its competitor provides an opportunity for organisations to learn how to reduce costs, decrease defects, increase quality, improve performance or even identify some best practices linked to organisational superiority (Donthu, Hershberger and Osmonbekov, 2005).

According to Mia and Clarke (1999) benchmarking involves the comparison of a company with its competitors on relevant factors, including cost structures, productivity, quality, customer service, price and profitability. In the manufacturing industry, managers manipulate their competitive strategy very often to accommodate customers throughout the seasons. In the marketing studies, benchmarking is considered as a market-based learning tool enabling an organisation to improve and deploy resources and competitive capabilities that are appropriate for its market environment, and hence could assist to create successful marketing-driven (Day, 1994). This requires managers to always monitor their competitors in the region in order to make effective strategy decisions. Furthermore, the managers' use of PMIS provides the opportunity for them to ascertain whether their company was competing favourably compared to the competitors' performance or less favourably than their competitors' performance. Gomes and Yasin (2011) argued that benchmarking initiatives should be at the heart of the performance management system in order to integrate the different facets of performance with the strategic and operational practices of these organisations. Furthermore, Vorhies and Morgan (2005) in their study suggested that benchmarking has the potential to become a key learning mechanism for identifying, building, and enhancing capabilities to deliver a sustainable competitive advantage.

Mia and Clarke (1999) have found that benchmarking information is also one of the items managers use to improve their organisational performance. This can be done in two ways:

- Firstly, the using information helps managers in positioning their organisations in the market. Moreover, an organisation's proper positioning in the market is crucial to its ability to subsequently sustain the parcel of product attributes it offers to customers. Obtaining a cost advantage over its competitors is the basis for a positioning in the market (Bromwich and Bhimani, 1996).
- Secondly, the a PMIS can also promote an organisation's performance by providing information as feedback related to the implementation of plans and the completion of tasks. Feedback is information sent to a receiver pertaining to the beneficiary's behavior (Ashford and Cummings, 1983).

Benchmarking of PMIS refers to the need for providing information to help an organisation compare its performance against that of their competitors', which in turn assists in the process of evaluation of the company's course of action to be undertaken (Mia and Clarke, 1999).

This study essentially follows Mia and Clarke (1999) in the conceptualisation of benchmarking of PMISs. Hence, the benchmarking of PMIS is considered as an aspect involving information related to the process of continuous measuring, comparing an organisation's performance elements with those best practices of relevant entities, or organisations (i.e against similar entities or organisations/competitors in the industry), as well as, relevant entities in the organisation, and comparing trend and an explanation in organisation's performance elements during previous years, to obtain information, that will help to identify its strengths and weaknesses, and to implement improvement in that regard. This conceptualisation of benchmarking of PMISs is related to best practices in organisations and within industry to provide information on various aspects of performance, and involves an external and internl benchmarking information. The presence of these elements would indicate the extent to which the PMS provides benchmarking information. In addition, a previous study has found that conceptualisation of benchmarking is statistically highly reliable (Mia and Clarke, 1999).

In summary, this study treats the four dimensions of PMIS as conceptually distinct. Nevertheless, there is potentially some overlap between the dimensions, for example, broad scope, integrated and timeliness of information can vary along the dimension of benchmarking information. Similarly, the dimensions of broad scope, integration, and benchmarking of information can be provided in a timeliness information form. As a consequence, the importance managers attach to one dimension may simultaneously vary with the importance attached to the other dimensions. The above discussion has highlighted the main dimensions of PMIS. However, this study would use only four dimensions of broad scope, integration, timeliness and benchmarking.

As justified previously, these four variables are selected based on the previous research indicating four dimemsions of broad scope, integration, timeliness and benchmarking are the most relevant of PMIS and applicable to the field and context of study characteristics (Chenhall and Morris, 1986; Kaplan and Norton, 1996; 2001; Chenhall, 2005; Hall, 2008; Gimbert, et al., 2010). These characteristics are designed to enhance the usefulness of PMISs. Previous researchers have advocated the usage of PMISs by managers to provide information for the implementation of competitive strategy purposes and to improve performance (Kaplan and Norton, 1996; Chenhall, 2005 and Gimbert, et al., 2010). Furthermore, a PMIS, as one of the performance management tools, is widely used and common in the manufacturing sector compared with other sectors (Anthony and Govindarajan, 1998; C.M. Lau and Eggleton, 2003).

The next section will discuss the concepts of competitive capability and its types, which are underline of study as well as the relationship between PMISs and competitive capability and how the competitive capability can mediate the relationship between PMISs and organisational performance..

2.5. COMPETITIVE CAPABILITY

In today's business environment, creating new forms of competitive capabilities has become a major priority for management as the business sector continues to change rapidly and unpredictably (Boon-itt, 2010). Based on this challenge, an effective manufacturing strategy must take into account the competitive capability of organisations over their competitors. In practice, competitive capability is usually reflected in its superiority in production and performance outcomes (Day and Wensley, 1988). Improving competitive capability is necessary in order to gain competitive advantages in relation to cost leadership strategy and differentiation strategy. Thereby, competitive strategies function by informing customers (external constituents) what the organisation has to offer in terms of its capabilities (internal strengths) (Menguc, et al., 2007). In fact, the emphasis on the internal capabilities to respond to the environment is a must for an organisation due to the inconsistency in the marketplace (Bustinza, et al., 2010). As an aside, Reed, Lemak and Mero (2000) reported that an organisation should focus on creating a market advantage and on product design efficiency to improve revenues and reduce costs, respectively.

These competitive capabilities must be identified and evaluated in order for an organisation to achieve its strategic goals. In relation to operation's management, certain competitive capabilities such as cost, quality, and time could be used as competitive weapons. According to Porter (1985) competitive capability is the extent to which an organisation is able to create a defensible position over its competitors. Moreover, the capabilities are activities that an organisation can do better than its competitors (Ketokivi and Schroeder, 2004).

The method an organisation chooses to improve its competitive capabilities should create significant difficulties for others to imitate, resulting in a long-term. Models of market globalisations maintain that organisations operate within increasingly competitive global environments (M. Porter, 1990; Bustinza, et al., 2010). Porter (1985, 1990) recommended that organisations are compelled to compete by differentiating their products based on their product quality or low-cost price. Others claimed that organisations focusing strategies on product features should do so without a price premium. As Skinner (1985) mentioned that producing at a lower cost would only be possible with a decrease in quality. Furthermore, a organisations that are supposed to provide a high level of all capabilities will suffer from a high level of complexity and confusion (Boon-itt, 2010).

A competitive advantage can be defined as a positional superiority, based on the provision of higher customer value or the achievement of lower costs, and the resulting market share and profitability (Day and Wensley, 1988). Competitive capabilities is the extent to which an organisation is able to create a defensible position over its competitors, and it comprises capabilities that allow an organisation to differentiate itself from its competitors and is an outcome of critical management decisions (Porter, 1985). The strategic positioning of a organisation reflects the organisation's ability to gaining a competitive advantage (Y.J. Kim, et al., 2008).

According to Porter (1991) organisational performance is determined by industry structure and the organisation's competitive capability or strategic position in marketplace of the industry; and competitive capability is a function of business strategy (i.e., product differentiation or cost leadership). Such competencies should lead to marketplace positional advantages through competitive strategies such as product differentiation and cost leadership, which are considered as product characteristics. The different strategic positioning ought to lead to different organisational performance (Kim, et al., 2008). The product characteristics include unique features, high quality, low cost, flexibility, delivery and product services such as after-sales service.

Porter posits that such an attractive relative set of circumstances is the result of one of two basic types of competitive advantages: lower costs than competitors, or the ability to differentiate and command a premium price in excess of the extra cost of differentiation. In this outlook, superior profitability can only logically derive from commanding a higher price than competitors or enjoying lower costs. Successful strategic outcomes are defined as being competitive on these strategy priorities. The essentials needed to sustain competitive advantage presents considerable administrative difficulties and challenges (Chenhall, 2005). To sustain organisations' competitive advantage require administrative procedures that encourage invention and creativity, targeted on combinations of product features, Furthermore, modern strategies place demands on production processes to provide a capacity to manufacture products with supported features but at a low-cost price (Shank and Govindarajan, 1993; Cooper and Edgett, 2010). A strategy formulated, effective implementation is required to guarantee that innovative product characteristics and technologies deliver product characteristics to customers in cost-effective methods (Shank and Govindarajan, 1993).

The concept of competitive capabilities requires that given business strategies be viewed relative to its competitors with respect to three main areas of quality, cost and service. In other words, the competitive capabilities from the dimension of value and quality, the main elements of which can be labelled: cost-based, product-based, and service-based.

Meanwhile, various studies have suggested many different dimensions of competitive capabilities (Boon-itt, 2010). Rondeau, Vonderembse and Ragu-Nathan (2000) focused on dimensions of competitive capabilities that are competitive pricing, premium pricing, value to customer quality, dependable delivery and product innovation. Rosenzweig, Roth and Dean Jr (2003) and Kristal, Huang and Roth (2010) in their study focused on four dimensions of competitive capabilities which they identified as product quality, process flexibility, delivery reliability and cost leadership. Li, Ragu-Nathan, Ragu-Nathan and Subba Rao (2006) examined dimensions of competitive capabilities which focused on the following performance indicators: price/cost, quality, delivery dependability, product innovation, and time to market. Even so, Tuan and Takahashi (2010) focused on three dimensions of competitive capabilities, which are cost reduction capability, quality capability and innovation capability the results of which indicated that cost reduction capability, quality capability had a significant effect on performance, while, innovation capability has an insignificant effect on performance. They reported also that quality and cost capability is considered a priority capability of manufacturing companies because it is in the stage of development which at present is characterised by supporting industries in Vietnam.

The product attributes related to quality and cost are manufacturing-based competitive capabilities. Whereas, it is used to differentiate it with the existing definition of basic competitive ability, they are more suitable and have a greater importance for the manufacturing industry, particularly in transitional economies. In addition, the empirical literature has been quite consistent in identifying price/cost, quality of products as important competitive capabilities (Tracey, Vonderembse and Lim, 1999; Rosenzweig, et al., 2003; S. Li, et al., 2006; Rondeau, et al., 2000; Boon-itt, 2010; Tuan and Takahashi, 2010). Boon-itt (2010) stated that, the cost and quality have become baselines by which competitiveness is measured. Furthermore, the result of exploratory study to conceptualise competitive capabilities in Malaysian manufacturing industry include the competitive capability in order to achieve low-cost and high quality of products.

In this conceptualisation of competitive capabilities based on the related literature the competitive capabilities is the extent to which an organisation emphasises an ability to create a defensible position over its competitors, and it comprises abilities that enable an organisation to differentiate itself from its competitors and is an outcome of critical management decisions. The concept of capability, is in terms of capability, to represent the actual strength of an organisation rather than an objective, goal or plan to be achieved which in line with proposal of Flynn and Flynn (2004). In this context, the competitive capabilities have two dimensions or types and they are cost-based (cost capability) and product-based (quality capability), both of which are considered priority aspects. This conceptualisation is consistent with the concept of competitive advantage that is introduced by Porter’s (1980; 1985). The competitive capabilities can be realised by an organisation either by:

- an ability to providing a product with unique attributes for which customers are prepared to pay a premium price, this premium exceeding the additional costs of providing the unique attribute (quality capability); and
- an ability to providing a standard product at a lower cost than its competitors and charging either the same (or a lower) price than competitors (cost capability).

2.5.1. Quality Capability

Product quality as a competitive capability is identified as extent to which an organisation is capable of offering high product quality and performance; introducing new products and features in the market place creating a higher value for customers. An organisation with a differentiation strategy focuses on providing products with attributes that are highly valued by its customers. These include quality or dependability of the product, after-sales service, the wide availability of the product, and product flexibility. Quality has become a key competitive issue in the global marketplace, both domestically and internationally (Flynn, Schroeder and Sakakibara, 1994). Quality is defined as fitness for use and includes product performance, reliability and durability. Product quality and product line give a breadth of variety. It must meet or exceed customer expectations. The organisation ought to have high order fill rates, short order cycle times, accurate order and shipping information, and frequent deliveries. The product characteristics include conformance, reliability, performance and durability, and perceptions of customer satisfaction (Boon-itt, 2010), with the aim to achieve high levels of customer satisfaction and financial performance (Rosenzweig, et al., 2003).

In this study the quality capability is conceptualised essentially on the related literature. Hence, the quality capability is identified to the extent to which an organisation is capable of competing against major competitors based on the quality of products. In other words, the organisation is capable of offering products that are highly reliable, durable and of a high quality to their customers, offering products that function according to customer needs, and the ability to respond well to customer demand for new features in the market place creating a higher value for customers. The presence of these elements would indicate the extent to which an organisation has a competitive ability based on the quality of their products. In addition, previous studies have found that conceptualisation of quality capability is statistically highly reliable as previously mentioned.

2.5.2. Cost Capability

Cost leadership as a competitive capability is identified as the extent to which an organisation is capable of offering products and services at a lower cost/prices, thereby attracting more customers and gaining higher returns. Cost capability is recognised by the degree to which an organisation is capable of competing against major competitors based on low-cost. Cost capabilty implies that an organisation aims to become the lowest-cost producer in its industry. the organisations competing on lowest-cost must guarantee that their products are competitive on product features such as providing service, delivering on time, warrantees, and developing technologies to continuously lower costs as well, further, a manufacturer's ability to offer competitive prices and/or command premium prices are influenced by the costs it incurs across the supply chain as well as the level of accompanying service it is able to offer (Chenhall, 2005).

According to Tracey, et al., (1999) there is a strong positive relationship between cost and price, the implications of which are that organisations with higher costs also tend to charge higher prices. Accordingly, competitive pricing can reflect the ability of organisations to compete against their major competitors based on low price. Price affects both profits and market share. The price and value trade-off is one of the key determinants of customer satisfaction and in turn affects both profits and market share. The cost capability of organisations with the capacity to offer products and services at lower cost prices provides the opportunity to attract more customers and gain higher returns.

In this study, the cost capability is conceptualised based on the related literature. Hence, the cost capability is identified as the extent to which an organisation is capable of competing against major competitors based on the cost of products. In other words, the cost capability is the degree to which an organisation is capable of offering products and services at lower cost prices, low manufacturing costs and high efficient of their internal operational system; high economy of scale, and high human capital in the market place that creates a higher value for customers. The presence of these elements would indicate the extent to which the organisation's competitive ability is based on the cost of products. In addition, previous studies have indicated that conceptualisation of cost capability is statistically highly reliable.

In contemporary environments as Levitt (1983) reported, the product features include functionality, high quality, dependable delivery, effective after-sales service, flexible response to customer product requirements, rapid product volume and mix changes and low price (Chenhall, 2005). As the competitive advantage of novel priorities or cost advantage erodes over time, it is necessary to generate a continual flow of new ideas (Porter, 1990). This erosion is exacerbated for those organisations that have products with short product life cycles and that face continuous improvement in cost structures. Generally, a stream of evidence recommends that modern versions of formal strategy formulation and application, which are purposeful and deliberate, search to improve an organisation's competitive advantage which is under certain conditions, positively associated to performance (Bustinza, et al., 2010).

The successful implementation of each competitive strategy needs different resources and skills, supportive organisational arrangements, and control systems. The source of this competitive advantage might arise from factors such as the scale of, access to favorable raw material prices, and superior technology, and it is based on either cost leadership or differentiation. A well formulated and implemented strategy could have a significant impact on the achievement of a level of competitive capability (M.E. Porter and Kramer, 2006). Each of these intended strategies provides a basis for a sustainable competitive advantage within an industry and potentially defines the context for actions in each functional area of an organisation. The strategic positioning of an organisation reflects an organisation's ability to generate a competitive advantage. The strategic positioning is the output of a complex understanding of market structure and conditions that determine the sustainability of competitive advantage and long-term performance (Spanos and Lioukas, 2001).

Generally, an empirical evidence shows that modern versions of formal strategy formulation practices are common in modern medium and large-sized companies and that under certain conditions (such as an effective link between strategy formulation and strategy implementation, or operating managers having enough place to take autonomous action), they have a positive impact on performance (Chenhall, 2005, and Gimbert, et al., 2010). The result of Majeed's study (2011) demonstrated there is an association between an organisation's competitive advantage and its performance, and he explained that any organisation's management could utilise a competitive strategy to improve the competitive capability and to gain competitive advantage and achieve a higher level of performance. However, its result revealed that the lack of a comprehensive PMS appeared to have negative impacts on both the formulation and implementation of strategy.

The Performance Measurement Information System (PMIS) can play a crucial role in strategy implementation by helping to translate organisational strategy into desired behaviours and outcomes, communicate expectations, monitor progress, provide feedback, and motivate employees to improve organisational performance (Kaplan and Norton, 2001; Ittner, et al., 2003b; Chenhall, 2003, and Chenhall and Langfield-Smith, 1998). Even so, the providing performance information is not sufficient to improve the performance results. While the real success lies in managers' behavior in using this performance information. More specifically, and according to Hambrick (1982), and Shrivastava (1983) strategy studies have emphasised that information acquisition provides potentially valuable ideas related to external and internal opportunities and threats as well, and that are relevant to formulating innovative strategy to gain competitive advantage in product differentiation or cost leadership (Chenhall, 2005). PMISs have an important role in competitive strategy development (Gosselin, 2005). According to

Zhang and Lado (2001) the potential contributions of an information system to attain a competitive advantage can be understood in terms of their impact on the development and utilisation of distinctive organisational effectiveness. Roslender and Hart (2002) reported that the recent history of attempts to generate accounting information supports the pursuit of sustainable competitive advantage by businesses. Furthermore, the results of Zhang's (2005) study recommend that information systems could be a source of competitive advantage and performance, if they are used to support the development of certain competitive capabilities that would lead to a sustainable competitive advantage.

There are associations between information type and the development and implementation of strategy. The appropriate information mix and balance of financial and non-financial information is important to support strategic processes and monitor the achievement of strategic goals (Bhimani and Langfield-Smith, 2007), and the use of an information system for strategic purposes can provide a variety of competitive advantages (Choe, 2003) and supports for strategic flexibility has a positive effect on sales growth and returns on sales (Zhang, 2005). A PMIS supports competitive strategies (Rivard, et al., 2006); and has a facilitating role in socialisation processes, as well as, a positive association with performance (Mahama, 2006). Chenhall and Langfield-Smith (1998) and Davila (2000) suggested that in order to develop new products and more efficient production processes, the organisation cannot be limited to measures of traditional accounting, but it needs to use a broad set of non-financial measures in addition to the financial measures to assess the value-added activities in manufacturing of products. Farther, the management control systems provide information which leads to the reduction of uncertainty and supports product development (Davila, 2000).

A PMIS assists managers in monitoring the implementation of their business strategy by comparing actual results against strategic goals and objectives (Simons, Dávila and Kaplan, 2000). Ong (2003) reported that PMIS provides information for managers to test and modify mental models about how their actions influence the performance their companies (Mohamed, Wee, Abdul Rahman and Abdul Aziz, 2009). In addation, numerous researchers claimed that PMIS plays an important role in assisting an organisation to achieve a high level of competitive capabilities (Fitzgerald, et al., 1991; Kaplan and Norton, 1992; 1996; Simons, et al., 2000 and Chenhall, 2005). At the same time, competitive capability positioning has an affect on organisational performance (Hawawini, et al., 2003; Porter, 2001; Kim, et al., 2008, and Bustinza, et al., 2010) in that competitve capability has positive impacts on performance (Rosenzweig, et al., 2003, and Kristal, et al., 2010).

As information systems provide the foundation for accounting systems and management systems, in so far as specific development guidelines are followed, suitable metrics could be identified and as an outcome, crucial implementation obstacles could be overcome (Martinsons, et al., 1999). According to Henri (2006) the PMS must be aligned with competitive strategy and capability to be effective and consistent with strategic choices. (Grafton, Lillis and Widener, 2010) the impact of performance measurement systems on performance is fact be indirect via the effective management of strategic capabilities. As well as, Campbell, et. al., (2006) found that an organisation’s strategically linked performance measurement systems display more timely information over problems with strategies, and distinguish among problems with strategy formulation and implementation. More recently, Pavlov and Bourne (2011) reported that PMIS has clear effects on the organisational processes that enhance organisational performance. Abdel-Kader and Luther, (2008) reported that a system providing a broad scope of information that is related for the managers to control and monitor their activities would enhance organisational performance. Evans (2004) notions in his research the relationship between PMIS and performance and his results imply that organisations with a higher level of PMIS design, record better results in terms of overall organisational performance. Olsen, Zhou, Lee, Ng, Chong and Padunchwi (2007) reported that organizations implementing and using PMIS were able to achieve an increase in performance. Waal, Kourtit and Nijkamp (2009) reported their study that organisations adopt PMIS could achieve an increase in revenue, an increase in profit and a higher return on assets (ROA). Furthermore, the PMIS can play a vital role in strategy implementation by assisting to translate organisational strategy into desired behavior and outcomes, communicate expectations, monitor progress, provide feedback, and motivate employees to improve their organisational performance (Chenhall and Langfield-Smith, 1998; Kaplan and Norton, 2001; Ittner, et al., 2003b; Chenhall, 2003, and Bisbe and Malagueo, 2010).

2.6. CONTINGENCY THEORY

The contingency theory of accounting provides discernable and testable hypotheses of why there is no one universal system of accounting that is optimal for every environment and conveys the context in which these systems operate. According to Otley (1980) the contingency formulations developed in the contingency theory literature in the early mid-1960s, there was no reference to contingency theory in the accounting literature prior to 1967. However, it was originally developed within the organisational theory with more focus on contextual variables at the organisational level (Chenhall, 2003). According to the author, the term contingency means that something is true under specified conditions, for example a decision is appropriate and effective under a certain context; if the context changes the prescribed decision is no longer applicable, and, therefore, it does not lead to the same outcome. Chenhall's (2003) conceptual paper reviews the previous research on the use of contingency theory in management accounting and highlighted six contextual variables that determine a design of a MCS namely the external environment, technology, organisational structure, strategy, size and national culture. Otley (1999) stated that the select of a suitable system and control techniques is dependent upon the circumstances' environment surrounding a specific organisation.

The contingency theory has been widely used in strategic and management accounting information studies and the contingency approach is the only one which asserts that organisational performance depends on the existence of the fit between the organisation's characteristics and the situation in which it operates (Donaldson, 2001). The theoretical formulations for contingency theory by Otley (1980) highlighted three variables known as environmental, organisational characteristics and competitive strategies are suggested to be the main classes of contingent variables. Each contingency identified is matched with appropriate conditions of PMIS. However, PMIS design when faced by environmental, organisational and competitive capability's conditions that yield conflicting recommendations are voided by noting that three "archetypal" organisations, representing typical agglomerations of contingent variables appear to exist (see Figure 2.1).

The framework below is showed how contingency theory covers this research framework:[1]

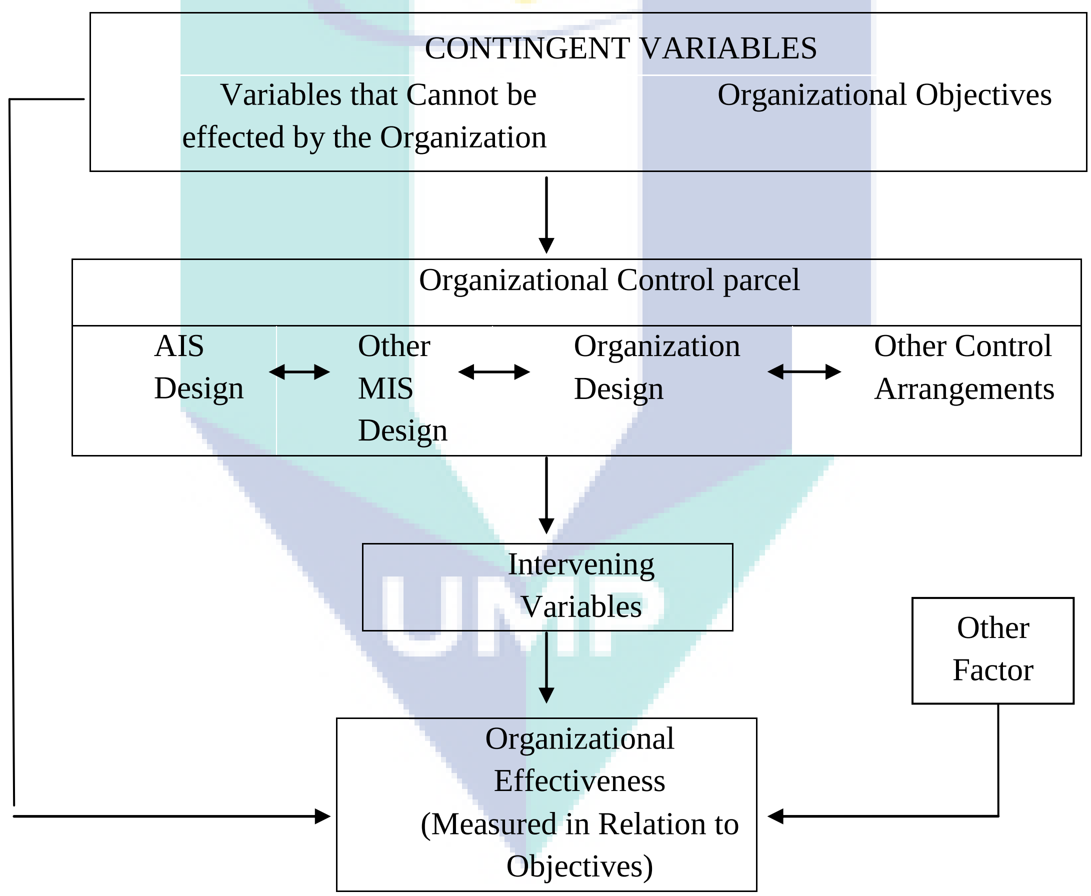

Figure 2.1: Otley's (1980) Contingency Theory Framework.

Source/ adapted from Ittner and Larcker's (2001).

[1] The graphic illustrates Otley's original (1980) view of contingency theory.

This contingency theory explains the conceptual framework which is presented by Fisher (1995) and Langfield-Smith (1997) indicating there are two methods in which researchers have studied the variables involved in the relationship between MCSs and organisational outcomes, where the two main methods have been applied on a large scale as follows:

- firstly, the researchers looked at the effects of variables such as environmental uncertainty or technology in moderating the relationship between accounting systems and outcomes; and
- secondly, studies have tried to build structural models that help explain how the accounting systems have influenced an outcomes (Chenhall, 2005).

Literature reviewed tells us that the design of MCS, and contingency theory have examined MCS as dependent and independent variables (Chenhall, 2003), to the extent which the system provides information (Mia and Chenhall, 1994), the degree of using the information (Abernethy and Guthrie, 1994; S.W. Anderson and Lanen, 1999; Guilding, 1999), the usefulness of the information (Chenhall and Morris, 1986) or the beneficial nature of the MCS/MAS (Chenhall and Langfield-Smith, 1998), the importance in making operational decisions (Bouwens and Abernethy, 2000), importance to product development (Davila, 2000), whether they are helpful to the organisation (Guilding, 1999), and satisfaction with the systems (Ittner, et al., 2003b).

In particular, the contingency theory of MCS/MASs, states that the relationship MCS/MASs (including the performance measurement systems) and organisational performance is dependent on an organisation's conditions (e.g. see: Otley, 1980 and Fisher, 1995). Thus, this study examines the relationship between the PMIS and organisational performance, and, which is mediated by competitive capabilities. The competitive capabilities are considered as an indicator of organisation's conditions or its competitive position. Otley (1980) who is among the earlier advocates of contingency theory in management accounting research highlighted the theoretical framework that constitutes the main construct. Among others, PMS as part of the organisational control parcel (criterion variable) would be contingent upon the context in which an organisation operates (predictor variable) (Chenhall, 2003).

This study investigates the extent to which a PMIS has an effect on organisational performance, and how the effect is. However, the effect of contextual variables does influence a PMIS as discussed above (Chenhall, 2003). At the same time, competitive capabilities is being investigated in this study on the grounds that there are questionable findings on the relationship between PMISs and performance as an intervening variable. In this study, a structural modelling approach would be adopted. According to Luft and Shileds (2003) the structural models are appropriate when developing a theory to explain the role of the variables that intervene in the relationship between MCS/MASs and the desired outcomes (Chenhall, 2005). This approach does not consider how the effects might be moderated by various contextual factors, but assumes that these factors are noise within models. A basic premise of Chenhall's (2003) study suggests that appropriate design of PMIS supports business strategies in ways that increase organisational performance.

2.7. GAPS IN THE LITERATURE

As mentioned previously, in recent times the Malaysian manufacturing industry has operated in an unstable economic environment which can be described as having intense competition coupled with high uncertainty. Hence, a strategy and practice to manage changing in manufacturing business is crucial in allowing organisations to exploitation of the best competencies of the opportunities available in the external environment. In other words, the right strategy and practice is needed for improving performance. Although the study of performance management has accumulated a great knowledge of the impacts of the PMIS on performance, the actual mechanism of these effects is not fully understood (Pavlov and Bourne, 2011). This means that an organisation's internal environment; in terms of PMIS design might provide a basis strategy or practice and eventually influence the organisational performance (Hitt, et al., 1994).

Prior studies on PMSs have indicated there is a direct relationship between a PMS and organisation performance (e.g. : Scott and Tiessen, 1999; Davila, 2000; Said, et al., 2003 and Baines and Langfield-Smith, 2003). Furthermore, other studies display the inclusion of non-financial measures in PMIS is associated with enhanced financial performance (Hoque and James, 2000; Davis and Albright, 2004). However, some researchers argue that there is no direct relationship between PMISs and organisational performance (Perera, et al., 1997; Ittner, et al., 2003b). In short, even though prior literature found a relationship between PMIS and organisational performance, the relationship between the two is not consistent. Farther, Prior research on MCS information characteristics has focused mainly on MAS as a whole (e.g. Mia and Chenhall, 1994; Bouwens and Abrenethy, 2000, and Mai and Patiar, 2000). Nevertheless, so far, there has been little consideration given to characterising PMIS design in terms of information output and to identify underlying information characteristics (Marchand and Raymond, 2008). Furthermore, only a few focused on the PMIS characteristics of the one dimension of integrativeness information (Chenhall, 2005) and comprehensiveness information (Hall, 2008). Ittner (2008) recommends that future research needs to pay closer attention to these research design issues to improve the current understanding of the impact of PMIS on organizational performance. Additionally, Cadez and Guilding (2008) mentioned that the studies that develop and test hypotheses concerning factors relating to strategic management accounting adoption are still incomplete, and therefore, should be encouraged. Hence, the previous studies on PMISs (e.g. : Chenhall and Langfield-Smith, 1998; Hoque and James, 2000, and Ittner and Larcker, 1998b) have not examined the information characteristics as dimensions of the PMIS.

Some researchers argue that to gain a competitive advantage and achieve high performance, MASs must provide with a clear strategy in the organisation, that is a necessary requirement, but not a sufficient condition. The organisations' strategy must be supported by appropriate regulatory factors and the process of actual production of the organisational structure and accounting information systems (Shank and Govindarajan, 1993; Johnson and Kaplan, 1987; Jermias and Gani, 2004). However, literature offers little knowledge about the actual mechanisms which lead to a positive impact on organizational performance (Bourne, et al., 2005; De Waal and Coevert, 2007).

There is a need for ways of renewed conceptualisation and better definition of PMISs, in terms of their essential characterisation as information systems that might help explain how the systems have beneficial direct and indirect effects on organisational performance Hence, this study investigates empirically the information characteristics of PMIS design as well.

Having discussed the earlier, this study attempts to contribute to management accounting literature related to progressing MAS information development from a developing country's perspective in general and Malaysia in particular. Specifically this study focuses on the extent of information of PMIS provides among manufacturing companies. With the emphasis of a company's PMIS design posited as the variable predictor in use while competitive capabilities as a variable mediator in the association between the criterion and predictor.

2.8. THEORETICAL FRAMEWORK

Based on the discussed and literature review concerning this study' variables, basically: the characteristics of PMIS design (broad scope, integration, benchmarking and timeliness), competitive capabilities (quality and cost) and organisational performance (financial and non-financial), the theoretical framework of this study is displayed in Figure 2.2. In addition, the contingency theory is utilised in order to develop the theoretical framework**.**

In this current study, the PMIS is assumed to predict organisational performance. In turn, the organisational performance is the dependent variable, the PMIS which constitutes information characteristics is identified as the independent variable, and competitive capability as a mediator variable. This is consistent with the results of earlier empirical studies which investigated the relationship between

PMISs and their effect on organisational performance. As an outcome of these studies, it was indentified that PMIS design has different results, some of which are conflicting (Chenhall and Langfield-Smith, 1998; Lipe and Salterio, 2000). However, another line of research has supported the positive relationship between the PMIS design (increased reliance on non-financial information) and organisational performance (Scott and Tiessen, 1999, and Hoque and James, 2000). Theoretically, the PMIS has a positive effect on organisational performance. Despite taking into consideration the discussion of PMIS and organisational performance, there is no clear link between the two variables. A variety of components make up these linkages and the understanding of their interaction is of critcal importance.

The present study proposes a refined research framework with linkages between PMISs and strategic outcomes, in order to produce a more thorough understanding of the phenomenon of how the PMIS affects organisational performance. A contingency theory is utilized as a theoretical foundation for the framework. The theory eases understand how the PMIS might well have substantial positive effects or benefits through the implementation and improvement of competitive strategy (competitive capabilities) on organisational performance (Chenhall, 2005; Gimbert, et al., 2010; Franco-Santos, et al., 2012).

The framework proposes that PMIS has an effects on organisational performance directly and indirectly through the competitive capability. Because of there are many factors that may influence and determine organisational performance, attempts to trace causality to any one single factor like PMISs might be inappropriate. As mentioned above, there are several studies which have investigated the effect of PMISs on organisational performance. However, to the researcher's knowledge, the researcher has identified an issue whereby no studies have been conducted to investigate the mediating role of competitive capability between the aforementioned independent variables and the dependent variable that conceptualise organisational performance in terms of financial and non-financial performance. To overcome this issue and to establish credibility between PMIS and organisational performance, intermediate variables such as competitive capability have been introduced.

Hence, the theoretical framework of study is presented in Figure 2.2.

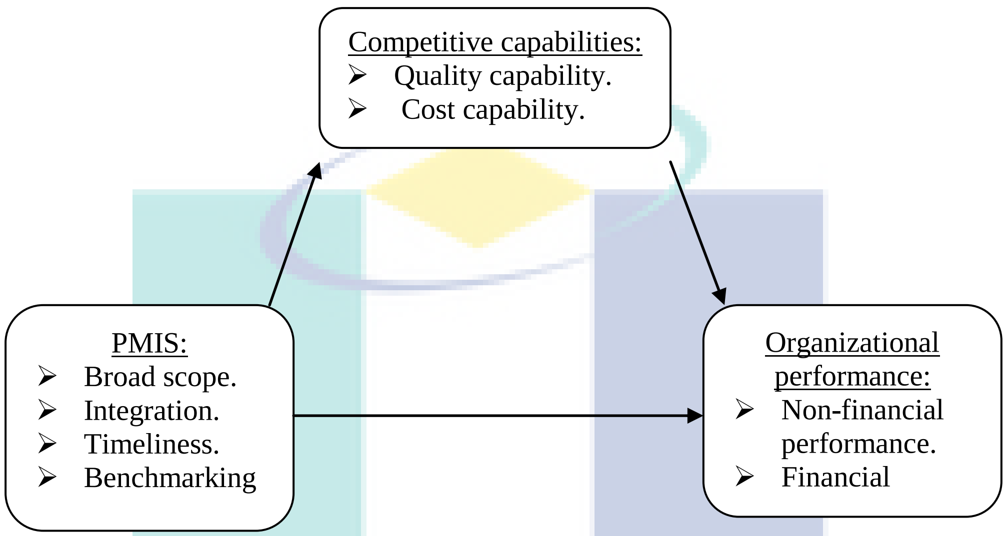

Figure 2.2: Conceptual Framework of This Study[2].

"The relationships between PMIS and performance organizational with the competitive capability as a mediator".

Gordon and Narayanam (1984); Chenhall and Morris (1986) argue that a MAIS provides a manager with timely information relevant to changes in consumer tastes, to market developments and to competitor activities, in order that they can effectively deal with the complexity within their working environment by providing information to assist in making timely decisions and ultimately to take advantage of opportunities to make a profit. The PMIS is the heart of MAS and control system and plays an crucial role in developing strategic plans, and assessing the achievement of the goals of the organization and enhance organizational learning (Ittner and Larcker, 1998b). Consequently, a PMIS assists in improving

[2] Source/ Otley's original (1980) Contingency Theory Framework as cited by Ittner and Larcker (2001).

organisational performance. In fact, some researchers argue that to gain a competitive advantage and achieve a high level of performance, a PMIS must provide a clear strategy in the organisation, which is a necessary requirement, but not a sufficient condition, with the organisational strategy being supported by appropriate regulatory factors and the process of actual production of the organisational structure and accounting information systems (Johnson and Kaplan, 1987; Shank and Govindarajan, 1993; Jermias and Gani, 2004).

Accordingly, the use of such information assists managers in positioning their organisation in the competitive market, and promotes an organisation's performance by providing feedback on the implementation of plans and the completion of tasks. Feedback is information sent to a recipient pertaining to the beneficiary's behaviour (Ashford and Cummings, 1983). An organisation's proper positioning in a marketplace is crucial to its ability to sustain the package of product attributes it offers to customers and in order to gain a cost advantage, which is the basis for such as marketplace position (Bromwich and Bhimani, 1996). According to Hambrick (1982), and Shrivastava (1983) strategy studies have emphasized that information acquisition provides potentially useful ideas related to external and internal opportunities and threats that are relevant to formulating innovative strategy to attain a competitive advantage in differentiation products or cost leadership (Chenhall, 2005). This premise is supported by the findings of Bromwich and Bhimani (1996).

2.9. HYPOTHESES DEVELOPMENT

From the theoretical framework, the research hypotheses for this study are formulated. Previous empirical findings pertaining to the relationships among the variables of study are presented to support the proposed hypotheses. Hypotheses are postulated in order to answer the identified research questions as stated in subsection 1.3 of chapter one.

2.9.1. The Relationship between PMIS and Organisational Performance

The relationship between a PMIS and organisational performance would appear to be an important characteristic of an effective PMIS. Historically, the resulting association between an organisation's performance and its PMIS design has been ambiguous, the evidence, therefore, is mixed at best on whether the importance placed on PMISs positively affects organisational performance (Kaplan and Norton, 1992; 1996; Ittner and Larcker, 1998a; Wouters, et al., 1999; Evans, 2004, and Pavlov and Bourne, 2011). Despite this, some studies have provided support for the relationship (E.W. Anderson, Fornell and Rust, 1997). There is a significant association between them as identified by Widener (2006) and Mahama (2006) studies, and the relationship varies depending on context and type of industry involved (Ittner and Larcker, 1998b). In fact, while there is no consensus in the debate on the direction of this relationship, most of the research in this area supports a positive relationship between PMISs and organisational performance as referred to above.

Therefore, this research overall predicts the direct relationship is a positive one, and further hypothesises that:

H1: There is a significant positive relationship between PMIS and organisational performance.

From this general hypothesis, it is possible to formulate other sub hypotheses based on the following information:

- There is a breadth of broad scope of PMIS, which has been identified as a potentially important tool to implement and improve strategy (Chenhall, 2005, and Gimbert, et al., 2010). Furthermore, Malena and Selto (2001) pointed that the Balanced Scorecard is important to manage organizations when it was a comprehensive performance information. As expected from such broader scope of information to enhance the managerial performance and in return would improve organisations’ capability and performance. The previous studies have reported the importance to managers of the provision of non-financial information in addition to financial information, to improve organisational performance. Moreover, it has been advocated that when the managers use the broad scope information provided by a PMS, managers can improve the performance of their organisation (Chenhall (Chenhall and Morris, 1986; Gimbert, et al., 2010; A.I. Ismail, Rose, Abdullah and Uli, 2010; Abdel-Kader and Luther, 2008).

- The breadth of integration of the information has been identified as another potentially important tool to implement and improve strategy (Chenhall, 2005; Bisbe and Malagueño, 2010, 2012). The previous studies have reported the importance of integration of non-financial and financial information to managers, as a useful tool to assist managers to improve organiational performance. Furthermore, it is advocated that when managers use the integrated information provided by PMIS, managers can improve organisational performance (Chenhall, 2005, and Gimbert, et al., 2010). The integration of PMIS with the strategy to provide information over parts of the value chain is an important attribute of the PMIS. Further, Nanni, et al. , (1992) stated that, the integration of PMIS functional cross-border procedures, and focus on the strategic outcomes, and that these functions are critical in supporting the new manufacturing technology and competitive environments facing organisations.
- The timeliness's function is to systematically collect and provide the information requested and the frequency of reporting (Chenhall and Morris, 1986). Timeliness of information becomes more crucial in the organisation which is highly decentralised. Accordingly, timeliness would also indicate that the timely information is positively effects on the manager's performance as they are enabled them to respond more rapidly to any event with updated reports from a PMIS (Chia, 1995).
- Previous studies have revealed that managers used benchmarking as one of the items of PMISs in order to help them to improve their organisation's performance. It was suggested that benchmarking information provided by MASs could assist in meeting organisational challenges resulting from

competing markets for the organisation and could aid its value-added efforts relative to its competitors (Mia and Clarke, 1999). Benchmarking of PMIS requires the comparison of elements of organisational performance with its competitors in terms of financial and non-financial. Comparing the organisation in performing a specific action with its competitors enable that organisation to learn how to enhance performance or identifying some of the best practices linked to excellence of organisation (Donthu, et al., 2005, and Kovacic, 2007). Therefore, through comparative information, organisations can more easily identify its strengths and weaknesses and then take appropriate strategic decisions in order to improve its performance outcomes.

Accordingly, further to **H1,** in that there is a positive relationship between a PMIS and organisational performance, from this general hypothesis, and from the points of discussion provided above, sub-hypotheses can be formulated as follows:

H1.1: There is a significant positive relationship between PMIS and non-financial performance.

H1.1a: There is a significant positive relationship between broad scope of PMIS and non-financial performance.

H1.1b: There is a significant positive relationship between integration of PMIS and non-financial performance.

H1.1c: There is a significant positive relationship between timeliness of PMIS and non-financial performance.

H1.1d: There is a significant positive relationship between benchmarking of PMIS and non-financial performance.

H1.2: There is a significant positive relationship between a PMIS and financial performance.

H1.2a: There is a significant positive relationship between broad scope of PMIS and financial performance.

H1.2b: There is a significant positive relationship between integration of PMIS and financial performance.

H1.2c: There is a significant positive relationship between timeliness of PMIS and financial performance.

H1.2d: There is a significant positive relationship between benchmarking of PMIS and financial performance.

2.9.2. The Relationship between PMIS and Competitive Capabilities

A PMIS is introduced as a strategic management system to assist in enhancing and sustaining competitive strategic outcomes. The main role of MCS in product development is to provide the requested information to reduce uncertainty (Davila, 2000). Therefore, an organisation's focus can be on the use of management accounting information to assist managers basic decision-making capability in order to achieve an organisation's objectives. The PMIS is one of the main functions of strategic management accounting, in that its operations are integral to evaluate, control and improve processes through comparing the performance of different organisational performance levels (Fakhri, et al., 2009). Thus, the PMIS is the heart of the control system and plays a crucial role in the development of strategic plans, evaluating the achievement of an organisation's objectives and providing the foundation for promoting organisational learning (Kaplan and Norton 1996, and Atkinson, et al., 1997).

Numerous researchers claimed that PMISs play an important role in assisting an organisation to perform a high level of competitive capability (Fitzgerald, et al., 1991; Kaplan and Norton, 1992; 1996; Simons, et al., 2000; Malina and Selto, 2001; Chenhall, 2005; Campbell, et al., 2006, and Grafton, et al., 2010). According to Chenhall (2005), the study displays that PMISs could provide feedback to understand and successfully manage the increasing level of complex interdependencies that occur between operations and strategy and among various aspects of the value chain, caused by product differentiation. Furthermore, effective cost-price strategies might be achieved by using integrative information that facilitates in developing customer relationships whereby the customers work for the organization to develop products at a particular cost. Malina and Selto (2001) noted that the balanced scorecard was important for managing the organisations when performance information was comprehensive. As such, a comprehensive performance information is expected to improve managers' performance, which in turn provides the impetus for improved organisational capability and performance.

Campbell, et. al., (2006) found that the organisation's strategically linked performance measures systematically reveal more timely information about problems concerning the strategy, and distinguish between problems with strategy formulation, implementation, and fit. The utilization of information helps managers in positioning their organisations in a marketplace, and an organisation's proper positioning in a marketplace is crucial to its ability to sustain the package of product attributes it offers to customers and in order to achieve a cost advantage, which is the basis for such as marketplace position (Bromwich and Bhimani, 1996). Kaplan and Norton (1996; 2001) have popularised PMS design as BSC by articulating the strategic nature of PMISs. Their study identified that PMIS design aims to accomplish four management processes that are critical to developing competitive strategies:

1. clarify and translate vision and strategy;
2. communicate and link strategic objectives and measures;
3. plan, set targets, and
4. align strategic initiatives.

Furthermore, the study identified that a PMIS design can "enhance strategic feedback and learning" (Kaplan and Norton, 1996). In addition, a well formulated and implemented strategy can have a significant effect on the attainment of a competitive capability level (Porter and Kramer, 2006). In combination, available evidence on the relationship between PMISs and competitive capability, according to Nicholls (1992) and supported by Ajibolade, et. al., (2010) companies that are able to identify true product costs in a more PMIS design will be able to price their products more competitively and gain some advantage over their competitors that are unable to do so (Ajibolade, et al., 2010).

A PMIS can help organisations build organisational capabilities (Mohamed, et al., 2008), and competitive strategy development (Gosselin, 2005). PMISs also can provide support for competitive strategy and strategic positioning (Chenhall, 2005, and Rivard, et al., 2006). Usage of PMIS for exploiting and developing strategic capabilities for sustained competitive advantage (Grafton, et al., 2010). In fact, while there is no clear consensus in the debate on the direction of this relationship, most of the research in this area supports a positive relationship between PMISs and competitve capability as discussed above. Therefore, it is hypothesised that:

H2: There is a significant positive relationship between a PMIS and competitive capabilities.

From this general hypothesis, it is possible to formulate other sub hypotheses based on the following information:

In this vein, Bourne, et.al., (2000) show, through three case studies, how PMIS can be used to challenge and question strategic assumptions, increasing the chance of recognising mistaken assumptions and consequently encouraging strategic revisions. Roslender and Hart (2002) report that the recent history of attempts to generate AISs to support the pursuit of sustainable competitive advantage by businesses for strategic purposes can provide a variety of competitive advantages (Choe, 2003).

- An organisation's senior level management team which usage of PMISs is likely to be aware of the need for strategic re-formulation (Langfield-Smith, 1997). Chenhall, (2005) and Hall, (2008) suggest that PMIS which incorporates the financial and non-financial (customers, business processes and long-term innovation) information, might be assistance to managers to improve organisational competitive strategy outcomes. The proposition regarding the role of functional differentiation on the association between the extent of broad scope of PMIS and competitive capabilities (in terms of low cost and high quality) as the Abernethy and Guthrie (1994) study identified the use of broad scope MAS information contributes more to performance in prospector-type organisations than in defender-type organiations. In combination, available evidence of the relationship between MASs and strategy, thus, proposes that MAS characteristics support a certain strategic position might vary from the MAS characteristics that enable a move towards that strategic position (Henri, 2006; Nyamori, Perera and Lawrence, 2001). The broad scope enables managers to consider a wider range of alternatives as the available information facilitates managers to better understand the orgganisation's situation (Bouwens and Abernethy, 2000).

- The integration of PMIS involves combining performance measures in order for manufacturing decisions to be assessed in terms of their coherence with strategies concerning financial returns, customers, internal processes, and learning and innovation (Lynch and Cross, 1995; Dixon, et al., 1990). That is, integration of PMIS could assist alignment by explicitly identifying, measuring and communicating to managers the effects of linkages between manufacturing, consumers and financial outcomes. This includes identifying and mapping logical connections between the stages across business processes to ensure consistency of the stages with the strategy (Chenhall, 2005), he suggests that the provision of strategic feedback from the integration of a PMIS provides the basis to enhance competitive strategies outcomes for both product differentiation strategy and cost leadership strategy.
- Mia and Patiar (2001) study identified that the timeliness of information (i.e., availability of timely, accurate and relevant cost analysis on various products and services) is critical for improving the process of efficiency, and reduction of wastage. Effective timeliness provides adequate information and, on time, for the managers to improve their organisation's competitive capability.
- The benchmarking of PMISs could accomplish a significant role in this regard whereby PMISs can provide benchmarking information in order for an organisation to compare its competitive parcel of products and services in terms of cost and quality (Mia and Clarke, 1999). Needless to say, benchmarking is crucial in the manufacturing industry due to the competition organisations are met with, whereby PMIS can assist the manufacturing industry in their pursuit of competitive cost and quality of their products. Ward (1993) asserted that, by definition, the competitive advantage is a relative concept; it can only be defined

and assessed by comparison with the external environment. Accordingly, PMIS adds an external focus in addition to an internal emphasis on accounting analysis, planning and control (Mia and Clarke, 1999). Vorhies and Morgan (2005) study indicated that benchmarking has the potential to become a key learning mechanism for identifying, building, and enhancing capabilities to deliver a sustainable competitive advantage.

Based on the above points of discussion, the relationship between PMISs (in terms of broad scope, integration, timeliness and benchmarking) and competitive capabilities (in terms of low cost and high quality) from the general hypothesis there is a positive relationship between PMISs and competitive capabilities, sub-hypotheses can be formulated as follows:

H2.1: There is a significant positive relationship between a PMIS and quality capability.

H2.1a: There is a significant positive relationship between broad scope of PMIS and quality capability.

H2.1b: There is a significant positive relationship between integration of PMIS and quality capability.

H2.1c: There is a significant positive relationship between timeliness of PMIS and quality capability.

H2.1d: There is a significant positive relationship between benchmarking of PMIS and quality capability.

H2.2: There is a significant positive relationship between a PMIS and cost capability.

H2.2a: There is a significant positive relationship between broad scope of PMIS and cost capability.

H2.2b: There is a significant positive relationship between integration of PMIS and cost capability.

H2.2c: There is a significant positive relationship between timeliness of PMIS and cost capability.

H2.2d: There is a significant positive relationship between benchmarking of PMIS and cost capability.

2.9.3. The Relationship between Competitive Capabilities and Organisational Performance

The organisational strategic positioning affects organisational performance (Porter, 2001; Hawawini, et al., 2003; Kim, et al., 2008; Day, 1994; Spanos and Lioukas, 2001). Competitive capability is regarded as part of the foundation for high level performance (Ismail, et al., 2010). Furthermore, most of the research in this area supports a positive relationship between competitive capability and organisational performance (Rosenzweig, et al., 2003; Tracey, et al., 1999; Kristal, et al., 2010; Tuan and Takahashi, 2010, and Majeed, 2011). Majeed (2011) explained that, any organisation's management can use its strateic tools to improve the company's competitive capabilities to achieve a higher level of performance. And Tuan and Takahashi (2010) reported that quality and cost capabilities positively affects performance levels. Therefore, a higher level of competitive capabilities will lead to a higher level of organisational performance. Thus, the study hypothesises that:

H3: There is a significant positive relationship between competitive capabilities and organisational performance.

From this general hypothesis, sub-hypotheses can be formulated as follows:

H3.1: There is a significant positive relationship competitive capabilities and non-financial performance;

H3.1a: There is a significant positive relationship between quality capability and non-financial performance.

H3.1b: There is a significant positive relationship between cost capability and non-financial performance.

H3.2: There is a significant positive relationship competitive capabilities and financial performance.

H3.2a: There is a significant positive relationship quality capability and financial performance

H3.2b: There is a significant positive relationship cost capability and financial performance.

2.9.4. The Mediating Effect of Competitive Capabilities on the Relationship between PMIS and Organisational Performance

Earlier studies carried out on PMISs have indicated there is a direct relationship between PMISs and organisational performance, e.g.: (Scott and Tiessen, 1999; Davila, 2000; Said, et al., 2003; Baines and Langfield-Smith, 2003). However, some of the researchers argue that there is no direct relationship between PMISs and organisational performance (Perera, et al., 1997; Ittner, et al., 2003a). A PMIS has distinct effects indirectly influence performance via their impact on organiational processes and organisational learning (HudayatI and AuzaIr, 2011; Pavlov and Bourne, 2011; Grafton, et al., 2010); via their impact on the strategic capabilities of an organization (Grafton, et al., 2010). A PMIS has a facilitating role in socialisation processes and has a positive association with performance as the Mahama, (2006) study indicated. Additionally, Zhang and Lado (2001) argue that the potential contributions of an information system to competitive advantage can be understood in terms of their impact on the development and utilisation of distinctive organisational effectiveness and a different strategic positioning will lead to a different level of performance (Kim, et al., 2008). The positional superiority which, derived from the provision of higher customer value and the achievement of low cost advantage, would enhance the resulting of market share and profitability (Day and Wensley, 1988).

In that way, this study has investigated the mediating effect of competitive capabilities on the relationship between PMIS and organisational performance. The definition and the importance of competitive capability and how it may influence the organisational performance by the information that is available from PMIS has been discussed previously in Chapter (2). At the same time, the information available that are characterised by broad scope, integration, benchmarking and timeliness of PMIS can be very important and helpful to the general and departmental managers to improve an competitive capability, which in turn provides the opportunity to enhance and contribute to organisational performance.

Nevertheless, this study examines how two dimensions of mediating variables, that is cost capabilty and quality capabilty has an affect on the relationship between PMIS and organisational performance. Porter (1980; 1985) propose that such competitive position is the result of competitive capability, whereby there are two primary types of competitive capabilities as follows:

- cost capabilty in comparison to that of competitors: or
- the ability to differentiate and command a premium price in excess of the extra cost of differetiating.

In this outlook, superior profitability can only logically derive from commanding a higher price than competitors or enjoying lower costs (Porter, 1991). According to Zhang (2005) the information system supports the strategic flexibility and organisational performance. PMIS must be aligned with competitive strategy and capability to be effective and consistent with strategic choices (Henri, 2006; Grafton, et.al., 2010). The strategic positioning affects organisational performance (Porter, 2001; Hawawini, et al., 2003; Kim, et al., 2008; Day and Wensley, 1988, and Spanos and Lioukas, 2001). The competitive capability is an organisation's ability to make suitable with changing market conditions, and it's a means for reducing uncertainty, making this capability a catalyst for gaining competitive advantages that allow organisatin to achieve high level of performance (Raduan, et al., 2009), and to support the sustainability of organisational performance (Spanos and Lioukas, 2001). Furthermore, the systems can focus attention on how to integrate the complexity derived from responding to change and to a diverse range of customer requirements.

The above conceptual and empirical work can justify the existence of such relationships. Hence, this research contends that through the development and leveraging of PMISs, companies thereby establish a set of competitive capabilities (quality capability and cost capability) that allow the company to achieve a higher level of organisational performance. Accordingly, it is hypothesised that:

H4: Competitive capability mediates the relationship between a PMIS and organisational performance.

a) **The mediating role of quality capability on the relationship between PMIS and organisational performance**

Quality capability can mediate the relationship between PMISs and organisational performance. It can be hypothesised that:

H4.1: Quality capability mediates the relationship between PMIS and organizational performance.

Thus, the quality capability can mediate the relationship between PMIS and non-financial performance. It can be hypothesized that:

H4.1.1: Quality capability mediates the relationship between PMIS and non-financial performance.

H4.1.1a: Quality capability mediates the relationship between broad scope of PMIS and non-financial performance.

H4.1.1b: Quality capability mediates the relationship between integration of PMIS and non-financial performance.

H4.1.1c: Quality capability mediates the relationship between timeliness of PMIS and non-financial performance.

H4.1.1d: Quality capability mediates the relationship between benchmarking of PMIS and non-financial performance.

Thus, the quality capability can mediate the relationship between PMIS and financial performance. It can be hypothesized that:

H4.1.2: Quality capability mediates the relationship between PMIS and financial performance.

H4.1.2a: Quality capability mediates the relationship between broad scope of PMIS and financial performance.

H4.1.2b: Quality capability mediates the relationship between integration of PMIS and financial performance.

H4.1.2c: Quality capability mediates the relationship between timeliness of PMIS and financial performance.

H4.1.2d: Quality capability mediates the relationship between benchmarking of PMIS and financial performance.

b) The mediating role of cost capability on the relationship between PMIS and organisational performance

Cost capability can mediate the relationship between PMISs and organisational performance. It can be hypothesised that:

H4.2: Cost capability mediates the relationship between PMIS and organisational performance.

Thus, the cost capability can mediate the relationship between PMIS and non-financial performance. It can be hypothesized that:

H4.2.1: Cost capability mediates the relationship between PMIS and non-financial performance.

H4.2.1a: Cost capability mediates the relationship between broad scope of PMIS and non-financial performance.

H4.2.1b: Cost capability mediates the relationship between integration of PMIS and non-financial performance.

H4.2.1c: Cost capability mediates the relationship between timeliness of PMIS and non-financial performance.

H4.2.1d: Cost capability mediates the relationship between benchmarking of PMIS and non-financial performance.

Thus, the cost capability can mediate the relationship between PMIS and financial performance. It can be hypothesized that:

H4.2.2: Cost capability mediates the relationship between PMIS and financial performance.

H4.2.2a: Cost capability mediates the relationship between broad scope of PMIS and financial performance.

H4.2.2b: Cost capability mediates the relationship between integration of PMIS and financial performance.

H4.2.2c: Cost capability mediates the relationship between timeliness of PMIS and financial performance.

H4.2.2d: Cost capability mediates the relationship between benchmarking of PMIS and financial performance.

2.10. CONTROL VARIABLE

Providing controls for industry impacts is crucial as the relationship between PMSs and performance might be an industry dependent (Ittner and Larcker, 1998b). Indeed, study without a control variable for industry might lead to misleading results, such as support for an opposite relationship, or insupportable relationships at best. Therefore, to remove whatever effects could have on the relationship under study, in this study, the company's size was controlled as the company’s size may well influence performance with a different size exhibiting different organisational characteristics and resource deployment. Therefore, this study initially suggested the company’s size as a control variable. However, the companies' industry type is not at issue in that in the present study the researcher chose from the manufacturing industry, the E&E manufacturing companies exclusively. The individual company’s size, is that which has widely been used in prior studies (Guilding, 1999) as well as the studies involving organisational performance as a dependent variable, e g.; (Tam, 1998; M. Li and Richard Ye, 1999; A.I. Ismail, et al., 2010). Following convention, the number of Full-Time Employees (FTEs) is used to measure a company’s size.

2.11. SUMMARY OF THE CHAPTER

The literature review discusses three main constructs namely: organisational performance, PMIS and competitive capability. Based on the review, the variables related to this study and related theories were further discussed. This chapter has also discussed the development of the theoretical framework, and formulated the hypotheses to be tested in this study. The focus of this study is organisational performance, thereby, it is argued here that it can be achieved by usage of PMIS with the mediating role of an organisation's competitive capability. In other words, this study postulates that the usage of PMISs will contribute to organisational performance through a higher level of an organisation's competitive capability carried out by an organisation. In the next chapter, the method and technique used to examin the hypotheses would be discussed.

CHAPTER 3

RESEARCH METHODOLOGY

3.1. INTRODUCTION

This chapter addresses and describes the research method which is used to test the hypotheses generated from the theoretical framework discussed in Chapter 2. The initial focus of current chapter is to elaborate on the research design undertaken, encompassing the research method, population and sampling, unit of analysis, data collection procedures and questionnaire design. This is followed by a discussion on the measurement of the research variables and the ways in which these variables are operationalised for this study. Finally, the statistical analysis techniques will be used in the study will be discussed.

3.2. RESEARCH METHODS

This study collected data on the interested relevant variables by using the questionnaire method (a personally administered survey approach). A questionnaire survey approach was adopted, which given the empirical nature of the investigation, with the aspiration to reach a wide range of respondents located within a large geographic area taking into consideration cost and time constraints. This method is believed to be a convenient means of collecting data from different respondents in a remarkably limited period of time and with extended geographical coverage.

3.2.1. Population and Sampling Procedure

Since the proposed research is conducted in the Malaysian environment and within its manufacturing industry, the electrical and electronics (E&E) product manufacturing (high technology industry) is the targeted population being the largest sub-sector of the manufacturing sector. Manufacturing companies are selected because the adoption of PMISs in this industry is generally commonplace. Specifically, a PMIS as one of the MCS and planning tools is widely used and common in the manufacturing sector (Anthony and Govindarajan, 1998, and Lau and Eggleton, 2003). Due to a greater diversity and complexity in many areas such as product market, technological process, and cost structure (particularly overhead cost), manufacturing companies should place a greater emphasis on their PMIS. Furthermore, it could be argued that high level technology manufacturing is likely to be more receptive to adopting advance techniques such as a PMIS design. Choe (2004) reported that there is a positive association between the level of advanced manufacturing technology and the extent of information available from the MAS. Besides, the Malaysian manufacturing sector is growing and playing an important role in the Malaysian economy by being the second largest sector, after the services sector, in terms of its share of total GDP.

The important economic role of the manufacturing sector implies that the overall well-being of this sector will have a large impact on the overall well-being of the Malaysian economy. Therefore, it is important to understand those factors influencing the manufacturing industry to assist in its overall performance. The manufacturing sector would remain the second largest contributor to Malaysia's GDP in 2011 viewing from its high productivity growth and the Government's emphasis on both the manufacturing and services sectors (Malaysia Productivity Corporation, 2011).

The decision was taken to focus on a single subsector of manufacturing sector; to negate the need for a more complex situation involving inter-sector differences, which would need to be highlighted by a more complex research design and a larger sample. Further, focusing on a single sector enables one of the main contingency factors of the uncertain environment to be effectively controlled and its repercussions removed from the research. The survey focuses on the E&E manufacturing companies in Malaysia, which is a substantial contributor to the national economy at 10 per cent of gross domestic product (GDP). In order to achieve the objectives of the study, the Malaysian E&E manufacturing companies were selected as the sample for this study.

There are two sampling methods which probability and non-probability sampling. Choosing one of the two types of methods is a matter of determining weight the requirements for validity and credibility against a realistic assessment of the requirement for effort of the alternative methods, comparing to non-probability sampling, the probability sampling if carefully designed and carried-out, has greater validity and credibility. The probability sampling is based on the concept of random selection, which is a controlled procedure that assures that each population element is known non zero chance of selection. Furthermore, according to Saunders, Lewis and Thornhill, (2009) five basic techniques for selecting probability samples are: simple random, systematic, stratified, cluster and multistage sampling.

In contrast, non-probability sampling is arbitrary or non-random and subjective. Each member does not have a known non-zero chance of being involved (Saunders, et al., 2009). Even though probability sampling has technical advantages, however, in some cases non-probability sampling might be chosen by researchers due to several factors. Firstly, non-probability sampling is quick, convenient and less expensive compared to probability sampling (Saunders, et al., 2009; Sekaran and Bougie, 2010). Secondly, it is possible that non-probability sampling may be the only feasible alternative. Furthmore, the total population may not be available for study in some cases. Two types of non-probability sampling are convenience sampling and purposive sampling. The present study uses a convenience sampling where the sample is selected only in the case of complete information being accessible i.e. company's address, name of chief executive officer (CEO) or general manager is available.

Accordingly to Hair, Black, Babin. BJ and Anderson (2010) and Sekaran and Bougie, (2010) in order to determine the sample size, several issues must be taken into consideration:

1. the response rate that would determine final number of usable cases;
2. the statistical requirement; and
3. manageability of the administration of the survey and cost.

In relation to sample size, these studies recommended the following rules of thumb to determining the size of the sample:

1. Sample sizes larger than 30 and less than 150 are appropriate for most research.
2. In multivariate study, the sample size should be several times (preferably 10 times or more) as large as the number of variables in the study.

The smaller samples have more sampling error and lower reliability. Ordinarily, a sample of less than about 30 responses will provide too little certainty to be practical (Saunders, et al., 2009).

The membership directory (42nd edition, 2011) of the Federation of Malaysian Manufacturing was used as the sampling frame. The Federation of Malaysian Manufacturing (FMM) directory was utilised, because it is the only directory that specifically covers manufacturers and manufacturing-related services in Malaysia. This directory lists the names, titles and addresses of managers in a large number of companies, in which a list of (684) E&E manufacturing companies in Malaysia are identified. Given the small sampling frame of the study, the diversity of their product offering and the possibility of low response from the mail survey (Tabachnick and Fidell, 2007), a census sampling technique was employed to select the sample. As such, a total of (684) E&E manufacturing companies were selected as the population of this study. In deciding the appropriate sample size for this study, Hair et al. (2010) recommend that in multiple regression, sample size shoud be 100 or larger to be meaningful, thus, 100 usable responses or larger are sufficient for analysis in this study. In addition, the most acceptable sample size is

10:1 ratio between the number of observations and the number of variables to be analysed. This study investigated 8 variables. Thus, the minimum number of observations required is 80 (10 X 8 variables) (Hair, et al., 2010; Sekaran and Bougie, 2010). However, Tabachnick and Fidell (2007) give a formula for calculating sample size requirements which is required for multiple regression, taking into account the number of independent variables that you wish to use: N > (50 + 8* number of independent variables) (Pallant, 2005). Such as in this study, having 4 independent variables a minimum 90 observations (50+4*8) as minimum number of observations will be required to do statistical analysis utilising Statistical Parcel for Social Science (SPSS version 17.0) (multiple regression).

As for the sampling procedure, its choice was considered justified as this sampling method has previously been used in other empirical studies, in particular those studying manufacturers (Othman, 2006; R. Jusoh, et al., 2008; R. Jusoh and Parnell, 2008). In short, given the financial and time constraints faced by the researcher in conducting this study, the choice of the sampling frame can then be justified. A questionnaire together with a cover letter was addressed to the chief executive officers (CEOs), or other senior level managers and directors asking for their participation in the study. Due to their diverse backgrounds and varied responsibilities, they are deemed to be the most appropriate personnel involved with strategy making and overall policies of the companies such as controlling and decision making, and they also have responsibility for the performance of their companies.

3.2.2. Unit of Analysis

The unit of analysis refers to the level of aggregation of data collected during the subsequent data analysis stage (Sekaran and Bougie, 2010). The organisation as a whole is considered as the research analysis unit. Thus senior level management is the most appropriate group of respondents. The justification behind this is based on many factors which are: Firstly, the dependent variable of this study is the organisational performance which deals with the performance of the organisations as a business entity, as well as the competitive capability and within manufacturing companies in Malaysia it is anticipated there has been implementation of PMIS. Secondly the chosen unit of analysis at an organisational level will enable comparison between findings of this study with previous research findings and is consistent with the theory of study.

3.2.3. Data Collection Techniques

A questionnaire survey approach was adopted given the empirical nature of the investigation, the desire to reach a wide range of respondents located within a large geographic area and cost and time constraints. It is also the most common method of data collection in business and management studies (Saunders, et al., 2009). questionnaire was the main and lone instrument for data collection because of: (1) The kind of population literate person; (2) Most of the population difficult to find opportunity and time for an interview, and (3) The increasingly expensive nature of alternative tools of data collection. The data is to be collected through questionnaire surveys alongside a personally administered approach and two methods of questionnaire distribution were used namely: postal mail; and personal delivery. This method is believed to be the most convenient way to collect data in this type of research.

3.3. MEASUREMENT OF VARIABLES

The identification of appropriate forms of measurement and the associated variables is created by undertaking an extensive review of the literature. A multi-item measure is used for constructs/variables which tend to be more reliable than single-item measures. Whenever possible, validated measures from extant study are utilized in operationalising the constructs in the theoretical framework. Most measures are adapted and modified to make them more suitable for this study setting, while other new measures are developed as needed. A 1-5 Likert scale is used for the items that measure PMISs, whereby 1 is ‘not at all’ and 5 is ‘a great extent', competitive capability constructs a 1-5 Likert scale is used for items, where 1 is 'strongly disagreeing' and 5 is 'strongly agreeing', and organisational performance constructs a 1-5 Likert scale is used for items, where 1 is 'very low' and 5 is 'very high'. Respondents to the questionnaire are asked to read each description and indicate their level of agreement with each item before progressing to the next description.

3.3.1. Information Characteristics of PMIS

A PMIS refers to the integral part of MCS and information system. Organisations have developed a more higher level of PMIS design to provide managers with information about multiple perspectives of the organisation's operations (Lillis, 2002, and Fullerton and McWatters, 2002), and to help organisations to attain its objectives and goals. The level of PMIS design refers to a range of information available for managers, which is perceived as being useful (Gul and Chia, 1994, and Choe, 2004).

In this the study, the PMIS design is identified in terms of key information characteristics, which furthers our conceptual understanding of the nature and specific information characteristics of PMISs. A PMIS is conceptualised in terms of a continuum from low sophistication to high sophistication. High level of PMIS design provides performance information available for managers, which is perceived as being useful and has a high average level of the four dimensions. The PMIS consists of four sub-constructs, including broad scope, integration, timeliness, and benchmarking information as previously identified.

The researcher provides a questionnaire to the organisation's senior level managers seeking their evaluation on their PMIS from the perspective of an information system within their corporate group on the number of items of each diminution on a five point scale, ranging from 1 = 'not at all' to 5 = 'to very great extent'. The survey items in each sub-construct are being developed and modified based on a thorough literature review in order to obtain content validity.

a) Broad Scope of PMIS

Scope refers to the measures being used and to the extension of PMIS in time and space. This dimension of PMIS is considered as an aspect involves broader scope information including financial and non-financial information, internal and external information that is useful in prediction of future events (Mia and Chenhall, 1994; Chenhall and Morris, 1986, and Hall, 2008). PMIS is evolving to include a more diverse set of performance indicators (Kaplan and Norton, 1996; Malmi, 2001; Malina and Selto, 2001; Ittner, et al., 2003b, and Hall, 2008).

This dimension is measured by the indicators: extent of the PMIS provides broad scope of performance information, its questionnaire items are adopted and modified based on the questionnaire that is developed and remarked by Chenhall (2005) and Hall (2008) as shown in table 3.1 below:

Table 3.1: Items of Broad Scope of PMIS

No.	Items: in our company…
1	The PMIS provides a diverse set of measures related to the key performance areas of the company. (MPBS1).
2	The PMIS provides borad range of measures that cover the critical areas of the organizations's operations. (MPBS2).
3	The PMIS provides financial indicators (e.g. Return on investment, Economic value-added, Sales Revenue, Operating income, Cash flows ...). (MPBS3).
4	The PMIS provides non-financial indicators as follows: (MPBS4).
	4.1 Customers indicators (e.g. customer satisfaction, customer response time, Number of overdue deliveries, Number of warranty claims ...).
	4.2 Internal business processes indicators (e.g. manufacturing efficiency, quality, defect rate, cycle time...).
	4.3 Learing and growth indicators (e.g. Employee training, employee retention, Number of new product launches, Number of new patents. ...).
5	The PMIS provides information on different dimensions of the organization's performance. (MPBS5).
6	The PMS provides a variety of indicators about important aspects of the organization's operations. (MPBS6).
7	The PMIS provides leading indicators (early warning signals) e.g. customer requirements, planned improvements. (MPBS7).
8	The PMIS provides lagging indicators (of past performance) e.g. rejects, customer complaints, past profits. (MPBS8).

b) Integration of PMIS

Integration refers to the information which is reflected the interaction and coordination effects of several functions in the organisation (Chenhall and Morris, 1986; Gul, 1991, and Chenhall, 2005). This dimension of PMIS is considered as an aspect involving information that provides an understanding of cause-effect linkages between operations, strategy and goals, and among various aspects of the value chain, involve suppliers and customers (Stivers and Joyce, 2000; Kaplan and Norton, 2001; Malina and Selto, 2001; Banker, et al., 2001, and Gimbert, et al., 2010). Integration of information assists in the coordination between segments within a sub-unit and between sub-units (Chenhall and Morris, 1986).

The dimension is measured by the indicators: the extent to which the PMIS provides integration of performance information, its questionnaire items are adopted and modified based on the questionnaire that is developed and remarked by Chenhall (2005) and Hall (2008) as shown in table 3.2 below:

Table 3.2: Items of Integration of PMIS

No.	Items: in our company…
1	The PMIS provides consistent reinforcing links between current operating performance and long term strategies of the company (PMIN1).
2	The PMIS provides indicators about how activities of this business unit affects each other units within the company (PMIN2).
3	The PMIS provides indicators about links to all other business units' activities, to meet the expected achievement of goals and objectives of the company (PMIN3).
4	The PMIS is produced in a fully documented form, which provides a record for evaluating performance (PMIN4).
5	The PMIS provides indicators about the link of activities of business units to suppliers (PMIN5).
6	The PMIS provides indicators about the link of activities of business units to customers (PMIN6).

c) Timeliness of PMIS

Timeliness refers to the frequency, speed of performance reporting and the orientation of the information (e.g. short or long-term), (Belkaoui, 1980; Chenhall and Morris, 1986, and Gul, 1991). This dimension of PMIS is considered an aspect involving information, which refers to frequentcy and age of the information relevant to changes in the competitive environment, which includes consumer tastes, market developments and competitor activities.

This dimension is measured by the indicators: extent to which the PMIS provides timeliness of performance information, its questionnaire items are adopted and modified based on the questionnaire that is developed and remarked by Chenhall and Morris (1986) as shown in table 3.3 below:

Table 3.3: Items of Timeliness of PMIS

No.	**Items: in our company…**
1	The PMIS frequently provides reports on a systematic basis (e.g. daily reports, weekly reports, monthly reports). (PMTI1).
2	The PMIS frequently provides reports on a regular basis (e.g. weekly reports, monthly reports). (PMTI2).
3	The PMIS provides the information automatically upon its receipt (PMTI3);
4	The performance measurement system provides the requested information immediately upon request. (PMTI4).
5	The PMIS provides information automatically as soon as processing is completed. (PMTI5).
6	There is no delay between an event occurring and relevant information being reported by the PMIS. (PMTI6).

d) Benchmarking of PMIS

Benchmarking refers to comparative information that is assistance in comparing performance against their competitors' performance which in turn helps in the process of evaluation of the organisation's course of action (Mia and Clarke, 1999). This dimension of a PMIS is considered as an aspect involving information related to the process of continuous measuring, comparing an organisation's performance elements with those best practices of relevant organisations (i.e against similar organisations or its competitor or competitors in the industry). It provides a basis to compare trends and provide explanation concerning an organisation's performance elements during previous years, to obtain information, that will help identify its strengths and weaknesses, in order to implement improvement. (Lau, Lau, et. al., 2005; Akdeniz, et al., 2010, and Mia and Clarke, 1999).

This dimension is measured by the indicators to the extent to which the PMIS provides comparative performance information, its survey items are being developed and modified based on a survey developed by Mia and Clarke, (1999) as shown in table 3.4 below:

Table 3.4: Items of Benchmarking of PMIS

No.	**Items: in our company…**
1	The PMIS provides competing indicators on various aspects of performance. (PMBE1).
2	The PMIS provides indicators for comparing the performance of our company against the performance of other companies in the same sector. (PMBE2).
3	The PMIS provides indicators for comparing performance of similar business units in our company. (PMBE3).
4	The PMIS provides indicators for comparing our performance of business units with similar business units in other companies in the same industry. (MPBE4).
5	The PMIS provides indicators for comparing the performance of our company against the performance of previous years. (PMBE5).
6	The PMIS provides indicators on fluctuations and provides an explanation (trends) in performance of our company during previous years. (PMBE6).

3.3.2. Competitive Capability

Competitive capability is the extent of an organization capable of creating a market position over its competitors, and it includes the ability that will enable the organization to differentiate itself from its competitors, that is results of critical management decisions (Porter, 1985). Furthermore, the competitive capability is defined as the organisational ability to gain one of the competitive advantages (marketplace positional advantage), to improve its performance (to survive and grow). According to Porter (1991) the organisation's competitive capabilities in the industry is a function of business strategy (i.e., product differentiation or cost leadership).

This study focus on two of Porter's suggested dimensions of competitive capability, that an organisation's competitive capabilities consist of two sub constructs, that is product quality and production cost. Furthermore, it is in line with suggestion of Flynn and Flynn (2004) that conceptualises capability in terms of representing the actual strength of an organisation rather than an objective, goal or plan to be achieved.

The researcher's questionnaire is formulated to seek information from an organisation's senior level managers within the E&E industry in order to evaluate their organisation's competitve capability within their corporate group on the number of items of each diminution on a five point scale, ranging from 1 = 'Strongly Disagree' to 5 = 'Strongly Agree'. The survey items in each sub construct are being developed and modified based on a thorough literature review in order to obtain content validity.

a) Quality Capability

Quality capability is identified as the extent to which an organisation is capable of offering product quality and performance; introducing new product features in the market place that creates a higher value for customers. This dimension is measured by the indicator's extent to which a company is capable of competing against major competitors based on quality, its questionnaire items, therefore, are adopted and modified based on the questionnaire that is developed and remarked by Tracey,et. al., 1999; Rosenzweig, et al., 2003, and Li, Ragu-Nathan, et al., (2006) as shown in table 3.5 below:

Table 3.5: Items of Quality Capability

No.	Items:
1	The company is able to compete based on quality (CCPQ1).
2	The company is offering products that are highly reliable (CCPQ2).
3	The company is offering products that are highly durable(CCPQ3).
4	The company is offering high quality products to our customer(CCPQ4).
5	The company is offering products that function according to customer needs (CCPQ5).
6	The company responds well to customer demand for 'new' features (CCPQ6).

b) Cost Capability

Cost capability is identified as extent to which a company is capable of competing against major competitors based on low cost/price. The cost capability is defined by the companies capacity to offer products and services at lower prices, thereby attracting more customers and gaining higher returns.

This dimension is measured by the indicator's extent of a company's capacity to compete against major competitors based on cost, the questionnaire items are adopted and modified based on the questionnaire that is developed and remarked by Tracey, et al., 1999; Rosenzweig, et al., 2003, and Li, Ragu-Nathan, et al., (2006) as shown in table 3.6 below:

Table 3.6: Items of Cost Capability

No.	Items:
1	The company offers competitive prices (CCPC1).
2	The company is able to offer prices lower than its competitors (CCPC2).
3	The company's manufacturing costs are lower than its competitors (CCPC3);
4	The company has efficient internal operation systems in place (CCPC4).
5	The company's economy of scale enables a cost advantage to be achieved (CCPC5).
6	The company has achieved a cost leadership position in its industry (CCPC6).
7	The company's human capital enables us to achieve a cost advantage (CCPC7).

3.3.3. Organisational Performance

This study views that concept that an organisation's performance is related to the survival and growth of an organisation, and the extent to which the company is successful in achieving its planned targets will be reflected by the success of the chosen of competitive strategy (Kaplan and Norton, 1992, and Laitinen, 2002). The purpose for measuring organisational performance is to investigate the impact of a PMIS on it, and would use subjective measures (non-quantitative) to assess organisational performance. Organisational performance is defined based on the use of financial and non-financial indicators to assess the performance of a company.

The respondents is directed to indicate how well their organisational performance compares with the industry average in last three years, within their corporate group of each diminution by a number of items on a five point scale, ranging from 1 = 'very low' to 5 = 'very high'. The survey items in each sub-construct are being developed and modified based on a thorough literature review and based on Govindarajan (1984) in order to obtain content validity. The twelve items in this instrument are used to measure the overall performance of an organisation by means of a manager's self-evaluation. The instrument of measurement used was developed to include measurements of the financial dimension, and measurements of non-financial ones, and which are related to marketing and customer dimensions.

a) Non-financial performance

Non-financial performance refers to how well a company achieves its non-financial goals. The non-financial performance is measured by the indicator's extent that a company is able to achieve its non-financial goals. The survey items are adopted and modified based on the questionnaire that is developed and remarked by Govindarajan (1984) as shown in table 3.7 below

Table 3.7: Items of Non-financial performance

No.	Items:
1	level of market share growth that this company has achieved (OPNF1).
2	level of sales growth that this company has achieved (OPNF2);
3	level of new customer acquisition that this company has achieved (OPNF3);
4	level of customer satisfaction that this company has achieved (OPNF4).
5	level of customer response time that this company has achieved (OPNF5).
6	level of retaining valued customers that this company has achieved (OPNF6).

b) Financial performance

Financial performance refers to how well a company can achieves its financial goals. The researcher quantifies the measurement by indicators determining the extent to which a company is able to achieve its financial goals, and the survey items are adopted and developed based on the questionnaire that is developed and remarked by Govindarajan (1984) as shown in table 3.8 below:

Table 3.8: Items of Financial performance

No.	Items:
1	level of return on investment (ROI) that this company has achieved (OPF1).
2	level of return on assets (ROA) that this company has achieved (OPF2).
3	level of return on equity (ROE) that this company has achieved (OPF3).
4	level of profit margin on sales that this company has achieved (OPF4).
5	level of operating income that this company has achieved (OPF5).
6	level of generation of cash flow that this company has achieved (OPF6).

3.4. QUESTIONNAIRE DESIGN

Data is gathered using a structured questionnaire developed from previous studies in this area of research. The variables' measurements are consistent with the conceptual framework of this study. It comprises the independent variable of the PMIS, mediator variables of competitive capability and dependent variable of organisational performance. In reality, within companies different managers need to know different sorts of information. Accordingly, this means each manager needs different information, which is provided by PMIS to achieve organisational goals.

Furthermore, a PMIS should be able to provide information and reports to each departmental or divisional manager of same seniority within the company with the information they require. PMISs within the context of providing information for the manufacturing industry can play an important role by providing this information to managers to assist them to improve their company’s competitive strategy, and organisational performance (Bisbe and Malagueo, 2010). Porter, (1991), and Ma, (2000) identified a high level of a company’s competitive capabilities might lead to enhanced organisational performance. Based on the earlier debate, this study has conceptualised the competitive capabilities of cost and quality as being the most important of an organisation’s competitive capability to improve the level of performance.

The questionnaire has been divided into five sections (A, B, C, D and E) with a total of 60 items. Section (A) asks about background information pertaining to the company, including: product type, size of company, age of company, the company’s annual revenue, type of ownership, type and use of computerised system or systems, and recording any customer complaints. The objective of this section is to provide information about important characters of the companies that facilitate in identifying similarities and differences between the sampled companies. Such identification is an essential factor for successful analysis and interpretation/explanation of the analysis results. Section (B) addresses the scale items related to four components of PMIS: broad scope, integration, benchmarking and timeliness. Section (C) addresses the scale items related to two types of competitive capabilities; quality and cost. Section (D) addresses the scale items related to two components of organizational performance: financial and non-financial. Section (E) asks about background information pertaining to the respondents, including their position in company, duration of experience with company, educational level, gender and age. The layout of the questionnaire is shown in Appendix **"A".**

3.5. PRE-TESTING OF THE QUESTIONNAIRE

The purpose of pretesting is to validate the data collection instruments and to ensure the appropriateness of the administration of the survey. Given that a PMIS is a relatively new construct, the study followed rigorous methods to validate the scale. In the primary stage, the literature reviews were conducted to gain insights for the researcher, in order to obtain some background and understanding of the issues included (see Chapter 2). From this knowledge, the study formulated relevant concepts and appropriate measures (see, Section 4.3).

In the second stage, a pool of items representing the respective components of organisational performance were generated. To strengthen this process, a multiple-step concompanyatory procedure was conducted. Initially, twelve managers, experts in their field within manufacturing companies, where asked to assess the content validity of the measures to ensure adequate measurement of the concepts. Of this number, only **four** companies' managers responded positively to the request to participate in the study. The researcher explained to them the purpose of the pre-test and requested their participation. The managers whom attended the workshop at Universiti Kebangsaan Malaysia (UKM) in January 2011, were selected as respondents for pre-test. However, the remainder did not respond for different reasons, including the responding person was busy or the company policy does not permit the disclosure of the type of information sought.

Upon acceptance by those experts who identified themselves as being available for the pre-testing component. The experts were exposed to the definition of each component plus a related explanation and were asked to identify the scale items they considered appropriate and/or not applicable. They assessed every scale in terms of content and meaningfulness, and they were asked whether they had any relevant items that need to be considered further. All experts were transcribed to inform of comments. The experts suggested some changes to the wording of some questions and items.

Next, the research framework benefited from the comments from examiners during the proposal defence session. Following that, a research overview and a sample questionnaire was developed and sent to **three** academicians for face validity for the **third** stage. In this stage, several revisions to question wording, the length of the questionnaire and its layout were made based on feedback, in order to minimise weaknesses. For example, adding examples for some of the items. The questions from section (D) of “Our company has achieved much higher levels of ……….” They were changed to “Level of .... that this company has achieved." The question wording of “The level of company’s ability to satisfy customers." It was changed to “the level of customer satisfaction that this company has achieved....” One item was added in section (C) part 2 “This Company’s human capital enables us to achieve cost advantage."

3.6. POILT STUDY

The purposes of conducting a pilot study are:

1) To warrant the potential respondents understand the survey questions well; and
2) to warrant that the research instrument as a whole functions well.

A preliminary questionnaire resulted from the previous work, as mentioned above, was distributed firstly to 12 executives and general managers who attended the workshop in UKM in January 2011. In addition, 21 managers in selected manufacturing companies who responsed three weeks later after mailing the questionnaire were added to pilot study sample. The addresses to the questions given by the 33 respondents then were used to pre-test the questionnaire for reliability of the measures. It granted that the questionnaire is not too lengthy and not too complex, the number of respondents is sufficient for pre-testing the questionnaire for reliability.

Accordingly, Cronbach's Alpha coefficient values were calculated for each of the variables of the study because it is an adequate test of internal consistency reliability (Sekaran and Bougie, 2010). The result of descriptive statistics shown in Tables 4.1, and the test of the viability and reliability is shown in Tables 4.2.

The results as shown in the Table 4.2, imply that all the values of Cronbach's Alpha test for the variables fall higher than the 0.70. Therefore, as recommended by Nunnally (1978), thus, these variables have an acceptable level of reliability (Sekaran and Bougie, 2010).

Table 3.9: Descriptive statistics of the pilot study

Variables	N	Mean	Std. Deviation
Broad Scope of PMIS	33	3.75	0.47
Integration of PMIS	33	3.64	0.67
Timeliness of PMIS	33	3.67	0.77
Benchmarking of PMIS	33	3.68	0.56
Quality Capability	33	4.23	0.54
Cost Capability	33	3.50	0.53
Non-financial Performance	33	3.56	0.60
Financial Performance	33	3.48	0.65

Table 3.10: Results of Reliability Analysis

Label	Number of Items	Cronbach's Alpha	Del.	Cronbach's Alpha	K-M-O
PMIS					0.68
Broad scope	8	0.90	One	0.92	
Integration	6	0.93	Non	0.93	
Timeliness	6	0.95	Non	0.95	
Benchmarking	6	0.91	Non	0.91	
Competitive Capabilities					0.80
Quality	6	0.89	Non	0.89	
Cost	7	0.88	One	0.90	
Organizational Performance					0.79
Non-financial	6	0.90	Non	0.90	
Financial	6	0.91	Non	0.91	

As result, delete one itrm from broad scope of PMIS (PMBS2) and one item from cost capability (CCPC6). Following that, modifications were made in the questionnaire to reduce possible ambiguity of some questions and to improve the general appearance of the questionnaire before sending it to respondents in the companies being sampled.

3.7. SURVEY ADMINISTRATION

A field survey was conducted after the questionnaire was refined, based on the pre-testing. Considering that the Federation of Malaysian Manufacturing (FMM) is regular updated, this study can utilise personalised cover letters, envelopes and questionnaire. Therefore, 651 questionnaires (after excluding the 33 pilot tested companies), addressed to senior level management, were sent at the end of July 2011, by ordinary postal mail. A covering letter, endorsed by the faculty of technology management, UMP, was attached to each copy of the questionnaire.

The letter provided an explanation concerning the nature and benefits of the study in addition to general instructions on how to answer the questionnaire. The letter also included an assurance that the information supplied would be strictly confidential and that individual company information would not be reported to any outside party. The supervisor's and the researcher's phone number along with the email addresses and researcher's mailing address was also provided to the respondents. This allowed the responding companies to contact the researcher asking for any clarification regarding the research questionnaire. A copy of the covering letter is attached in Appendix **"B1".**

A free stamped envelope, which was pre-addressed was provided for each questionnaire for the convenience of the respondents in order to facilitate the timely return of completed questionnaires. After sending the questionnaire by mail, telephone calls were made to the target respondents to inform them that the questionnaire had been sent to them and to request their participation. A follow-up letter was sent to the respondent four weeks after the questionnaire was mailed to remind them to complete and return their surveys. A copy of the reminder letters is shown in Appendix **"B2"** . In some cases, second sending of the questionnaire was made by email for respondents who said they did not receive the first copy of the questionnaire by mail. To prevent respondents who have completed the survey from being inundated with reminders, the study used a coding system, with their name, indicating that they have returned their survey. The data collection stage was ended at the end of October 2011.

The completed questionnaires received by mail were opened immediately, and the data was recorded at the top of the cover page of the questionnaires. This assisted in classifying the late and early respondents. The questionnaires have an individual code to make it easy to trace and check, and the data was keyed into the SPSS according to the data received. The aim of coding is to make it easy to identify the items. Therefore, an effort was made while designing the questionnaire to ensure that all items have a number to help when tabling the data. The coding is based upon the number and the unique variable name. After that the code was recorded at the code book containing all the variables in the questionnaires. The reserved questionnaires were checked for incompleteness.

The questionnaires that were reserved unanswered were discarded and marked as ‘blank’, similarly, questionnaires with a substantial number of items uncompleted were marked as ‘blank’ as well. Altogether, 12 respondents returned unanswered questionnaires, and another three questionnaires were discarded due to incomplete answers. Of the respondents, only five (5) did not answer the whole section, either section two or part of section four. Hence, these five questionnaires were also discarded. Other respondents failed to answer one or two questions either intentionally or unintentionally with some noting that the questions were not relevant to their companies. The missing value is treated by using the mean substitution method as recommended by Tabachnick and Fidell (2007). The treatment for missing values is further discussed in detail in Section 4.4.

3.8. STATISTICAL ANALYSIS TECHNIQUES

This study is a correlational study and exploratory in nature. In a correlational study, the relationships between the variables were examined. In determining the dimensions of the independent, mediator and dependent variables, exploratory factor analysis was employed. This is because the variables, such as the PMIS and competitive capabilities are still new in Malaysian context, and consequently, these concepts may not still exhaustive and final, so, the use of confirmatory factor analysis in the structural equation model (SEM) might not be appropriate. Thus, this study, the Statistical Parcel for Social Science (SPSS version 17.0) was used to order; tabulate and analyse the data collected from the survey. Therefore, multiple and hierarchical regression analyses were utilized, and exploratory factor analysis is emphasized. The possibility of using structural equation models (SEM) in which the measurement of latent variable's analysis and structural analysis are conducted simultaneously was ruled out for two reasons:

1. SEM represents causal processes that generate observations on multiple variables (Hair, et al., 2010). However, this study does not look into causal relationships,

but focuses on the direct and indirect relationship of independent variables and the dependent variable; and

2. SEM requires a large sample, i.e. a generally accepted ratio to minimise problems with deviations from normality is 15 respondents for each parameter estimated in the model. As the sample for this study is 118, it is considered insufficient to conduct SEM (Hair, et al., 2010).

The following subsection discusses the statistical test that would be employed in the present study:

3.8.1. Tests of Differences

This test was conducted to decide if there exists statistically significant differences among variables. This study used three types of tests of differences: chi-square test, independent sample t-test, and one-way ANOVA. The chi-square test was used to test for non-response bias by comparing the mean value of main variables among early and late respondents in the demographic variables. The independent sample t-test is used to determine the mean differences between two groups (Hair et al., 2010). The one-way ANOVA is used to test for significant mean differences among three or more groups (Hair et al., 2010).

T-test in this study are used to determine if there are significant differences of main variables among Malaysian E&E manufacturing companies' characteristics such as company's size. In the event the test shows that there are significant differences ($p< 0.05$) of performance measurement information system, competitive capabilities or organisational performance among these variables, then this characteristic would be used to control variable the relationships. The reason for these analyses is that problems with control variable may become more common as the number of controls increase (Becker, 2005). Farther, Becker (2005) noted that including a control variable "that is uncorrelated with the dependent variable in analyses reduces power".

3.8.2. Descriptive Statistics

Descriptive statistics analysis are used to summarise and describe the key features of the sample data such as frequency, percentage, means, standard deviations, minimum, maximum and range for the total respondent of 118 companies. In this study, descriptive statistics were used to describe the characteristics of the companies in addition to all the study's variables (PMIS, competitive capabilities, and organisational performance).

3.8.3. Factor Analysis

Factor analysis is an interdependence technique; whose primary purpose is to identify the underlying structures or commonalities in the data (Hair et al., 2010). Factor analysis is used to test the validity of items in the survey, i.e., to determine if the items are actually measuring the concept they purport to measure (Sekaran and Bougie, 2010). In this study, factor analysis was employed to test the validity of all the study's variables. Independent, mediating and dependent variables are separately run to ascertain their dimensional structure; this allows for the identification of factors and their corresponding items. The critical assumptions underlying factor analysis is verified through the examination of anti-image correlation, the Bartlett's test of sphericity, and Kaiser-Meyer-Olkin (KMO) statistics, measure of sampling adequacy. The minimum acceptable value for KMO is 0.6 and Bartlett's test of sphericity with the p-value less than 0.05 was used to test the overall significance of correlation among items.

To assess the dimensionality and appropriateness of the measurement scale, a principal component analysis with Varimax rotation method is performed for all the variables. As the measure used for each variable is extracted from theoretical underpinnings, a priori conceptual beliefs about the number of factors exist (B. Kim and Oh, 2002). This method tries to maximise a variable-factor correlation for clearer separation of the factor (Hair et al., 2010) and Kaiser's criterion was employed for determining the factor to retain in the analysis. Overall, the factor that had eigenvalue exceeded 1.0 were accepted, while the other were dropped

(Hair, et al., 2010). Furthermore, in relating an item to factor, Hair et al., (2010) suggested that factor loadings of 0.5 and higher will be considered significant and appropriate for a sample that ranges between 120 and 150. Hence this study considered 0.5 as a minimum requirement of the factor loading.

3.8.4. Reliability Analysis

Reliability analysis was employed to test the consistency and stability of the measurement instrument and to assist to evaluate the goodness of the measure (Hair et al., 2010). The internal consistency and stability could be determined by the coefficient value of Cronbach's Alpha. The Cronbach's Alpha has a range of 0 to 1 denoting higher agreement among respondents in the latter and the higher the internal consistency reliability. As well as, It provided some evidence of convergence validity. Cronbach's Alpha of below 0.6 is generally considered as poor, 0.7 is considered to be acceptable, and those above 0.80 are considered to be good (Sekaran and Bougie, 2010). Hence, in this study reliability analysis were done on all the study's variables.

3.8.5. Correlation

Correlation analysis is used to establish a correlation matrix between variables. In this study, correlation testing was done to determine any possible relationship among study's variables. Correlation coefficient of 0.10, 0.30 and 0.50, irrespective of sign, are interpreted as low, medium and strong respectively. In addition to evaluating the strength of the association between two variables, the correlation analysis can detect high multicollinearity among independent variables as well (Hair, et al., 2010). Multicollinearity occurs when predictor variables are correlated to the extent that the independent variables are a linear combination of one another. Multicollinearity is revealed if the correlations between variables are somewhere around 0.80 or 0.90 (Hair, et al., 2010). Furthermore, the correlation was used to assess the construct validity of PMIS. For this study, bivariate correction using Pearson's correlation method was performed to determine the relationships between the independent variables, mediating variables and dependent variables.

3.8.6. The Assumptions of Multiple Regression

The criteria for suitability of the data are based upon the assumptions relevant to the use of multiple regression analysis, which as follow:

1. **Multicollinearity** within the acceptable level: Multicollinearity occurs when highly correlated independent variables are included in the same regression model. Multicollinearity can distort the regression results. This study adopted Hair et al., (2010) rule of thumb for identification of the problem of multicollinearity. Two assumptions must be met to ensure there is no multicollinearity. Firstly, the variation inflation factor (VIF) value must be less than 10. Secondly, the conditional index value should not exceed 30.
2. **Outliers**: Outliers are observations that are unsuitable representations of the population from which the sample is drawn. Outliers should be eliminated from the analysis as they would have a significant effect on the regression solution. Outliers were identified from the cases with standardised residual values higher than 3.3 or lesser than -3.3 were considered outliner; and standardised residual plot.
3. **Normality** of data: This assumption meant that each variable, and all linear combinations of the variables are normally distributed. The histogram or the normal probability plot was used to determine the normal distribution of the data by visually checking on the estimation of the differences between the observed and predicted dependent variable scores. Normality means most of the value fall in the centre, and normal probability (p-p) plots (residual points should be close to the diagonal line).

3.8.7. Multiple Regressions

One of the main focuses of this study is to determine the proportion of variance explained in the dependent variable (organisational performance) by the independent variable (PMIS) and mediator variable (competitive capabilities). Using multiple regression determines whether the specified independent variables were statistically significant predictors of the dependent variable. The relationship between the dependent variable, the independent variable and mediator variable can be characterised in terms of the strength of the relationship or the size effect. Multiple regression was chosen rather than a structural equations approach because of sample size. The following describes the suitability of the raw data of this study for analysis.

Since this study control by company characteristic (size) as indicated in Chapter 3; this study used two steps of multiple regression analysis. The first step: control variable was regressed on dependent variables. Then, independent variables were included in the second step. This was to test whether there was a significant relationship between the independent variables and the dependent variable after controlling the control variable. The multiple regression analysis was used to examined the relationships between the PMIS and organisational performance, and between PMIS and competitive capability, as well as the relationships between competitive capabilities and organisational performance.

3.8.8. Hierarchical Regression

This study tested the effect of mediating variables in the research model by using the hierarchical regression approach analysis. According to Baron and Kenny (1986) multi-step hierarchical regression analyses could be utilised to measure and test the mediator's effect. Baron and Kenny (1986) outlined three assumptions that needed to be fulfilled before the effect of the mediating variables could be tested. Firstly, there must be a significant relationship between the independent variables and the dependent variables. Secondly, the independent variables must also have a significant relationship with the mediating variable. Thirdly, the relationship between the mediating variable and the dependent variables must also be significant.

After all these conditions are fulfilled, the mediating effect could be tested using a three-step hierarchical regression approach analysis. The first step, the control variable was regressed on dependent variable. The second step includes the direct relationship between the independent variables and the dependent variables, and the outcome must be significant. In the third step, the mediator is included, and the result must also be significant. However, if by the inclusion of the mediator, the earlier significant relationship between independent variable and dependent variables is not significant, then a full mediation effect is proven. The whole explanatory power of the regression model is taken over by the mediator. Nevertheless, if the relationship between the independent variable and dependent variable remains significant, it shows a partial mediating effect. Partial mediating effects imply that the explanatory power of the model is shared by both the independent and the mediating variables.

3.9. SUMMARY OF THE CHAPTER

This chapter developed the methodology to be used. This study was designed to be cross-sectional by focusing on analysing individual companies at one point in time. The population of this study was E&E manufacturing companies in Malaysia. The measurement of the variables were based mostly on an adaption of previously used measurements excepting PMISs. The method of data collection is a questionnaire, which has been directed to senior level managers, or directors in the sample companies. The collected data would be analysed using various statistical techniques, including descriptive, factor and reliability analysis, multiple regression analysis, and hierarchical regression analysis. The next chapter presents the research findings.

CHAPTER 4

ANALYSIS AND FINDINGS

4.1. INTRODUCTION

This chapter analyses the data, which was collected from E&E manufacturing companies in Malaysia. This chapter begins with the sample characteristics of this study. This is followed by assessing the Goodness of measures through factor analysis. Subsequently, the reliability measures are aggregated to form their respective dimensions prior to conducting descriptive analysis. Finally, two mediating models are analysed through multiple regression analyses for the dependent variables of financial and non-financial performance.

4.2. RESPONSE RATE

Table 5.1 summarises the response rate for this study. There are 684 E&E manufacturing companies listed in the Federation of Malaysian Manufacturing directory (FMM, 42nd edition, 2011). After excluding the 33 companies used for the pilot study, the sample comprises 651. Therefore, a total of 651 questionnaires were sent to the respondents, of which 19 questionnaires were returned due to unknown address details and 12 questionnaires were returned without participation. In total, 132 questionnaires were received. Of the 132 questionnaires received, eight (8) questionnaires were partially answered and six (6) questionnaires unusable for statistical analysis purposes (outlier).

Table 4.1: Response Rate of the Survey

Description	Results
Total questionnaires sent	651
The blank questionnaires returned without participation	12
The blank questionnaires returned for unknown address	19
The potential respondents for the study	620
Complete questionnaires returned	132
Returned questionnaires partially answered	8
Unusable cases (outlire)	6
Questionnaires not returned	483
Total usable questionnaires	118
Overall response rate	0.20
Useable response rate	0.18

The resultant response rate of 18% is low but not unusual, given the length of the survey instrument and the position within the organisation of the senior level managers targeted, the rate of response is acceptable (Sekaran and Bougie, 2010). This response rate was obtained after follow-up calls, in some cases emails and used two methods of questionnaire distribution (postal mail; and personal delivery). In addition, this rate of response is considered acceptable given the low response rate from the mail survey (Sekaran and Bougie, 2010), and overall low rate of response for this type of correlationary study in Malaysia.

The rate of response is considered acceptable compared to other similar studies. For example in Malaysia, a study conducted by Jusoh and Parnell (2008) using a mail questionnaire sent to senior level managers on competitive strategy and performance measurement of Malaysian manufacturing companies achieved 12.3%. Othman (2006) also using a mail survey to directed to chief executive officers on the balanced scorecard in Malaysian companies, gave a response rate of 12.2 %. As well as, Ismail, et al. (2010) using a mail survey based on an organisation's competitive advantage and performance in Malaysian manufacturers, found their response rates were 12.7%. Based on those studies' responses, the low response rate is quite common in the case of the Malaysian context. Thus, the sample study have fulfilled the necessary composition in terms of the existing companies in generalising the study to E&E manufacturing companies in Malaysia

4.3. SAMPLING PROFILE

4.3.1. Companies' Profile

The profile of sample companies are defined by seven demographic characteristics: type of industry; size company' size; company's age; annual revenue; ownership status; computerised system, and customer complaints record.

Table 4.2 shows the sample profile. The SPSS output is presented in Appendix **C1.** Almost 44.5% of the respondents companies were electrical products, 18.6% were classified as electronic products and 39.8% were electric and electronic products. In terms of the size of the companies 15.3% are from the very large category and 32.2% are from large companies; this is followed by 32.2% and 20.3% from medium and small companies, respectively, this indicates that the sample of study is covered almost equally of mixed sizes of E&E manufacturing companies. Almost 39% of the companies have operated between 11-20 years. And 25.4% of the companies have operated up to 10 years. While, 35.6% of companies have operated more than 20 years, which mean the majority (74.6%) are operated in more than 10 years.

With respect to the average annual revenue, 31.5% and 38.7% of companies have up to 10 Million and 11-50 Million, respectively. Approximately, 21.6% of companies have between 51-100 Million, and 8.1% of companies more than 100 Million Malaysian Ringgit, the majority of companies (70.2%) are achieve average annual revenue is up to MR 50 Million..

Based on the ownership status of the respondents companies, the Malaysian fully owned make up more than two-fifth (41.5%) of companies, while the ones fully owned by a foreign interests are one-third (31.5%) of companies, and the rest are joint ventures between Malaysian and foreign interests comprising 27.1% of the companies. Which imply that the foreign investment is quite interested in Malaysia.

Table 4.2: Sample Profile (Companies)

Characteristics	Description	Frequency	%
Products Type	Electrical	22	18.6
	Electronic	49	41.5
	E & E	47	39.8
Number of Employees (Company Size)	Up to than 50	24	20.3
	51-150	38	32.2
	151-500	38	32.2
	More than 500	18	15.3
Duration of operations (Company Age)	Up to 10	30	25.4
	11-20	46	39.0
	More than 20	42	35.6
Average annual revenue (RM)	Up to 10 Million	35	31.5
	11-50 Million	43	38.7
	51-100 Million	24	21.6
	More than 100 Million	9	8.1
Ownership type	Local-Owned	49	41.5
	Joint-Owned	32	27.1
	Foreign-Owned	37	31.4
Record of customer complaints	No	14	11.9
	Yes	104	88.1
computerized system	No	13	11
	Yes	105	89

With respect to companies registering a record of customer complaints, the great majority of the companies (88.1%) are keeping record, and just 11.9% of companies are not keeping record of customer complaints, telling that the great majority pay attention to customer satisfaction and their market position. The great majority of companies are using computerised systems in their daily activities with 89% of the companies using computerised systems and only a handful of companies, 11 % (13) do not use computerised systems in daily activities at all, proposed that, the great majority of the companies are using information technology, Gaven indictor to expacted to having high level of PMIS design. Thus, the sample of study have fulfilled the necessary composition in generalising the results of study to E&E manufacturing companies in Malaysia.

In terms of average annual revenue for the past three years as presented in Table 4.3 (SPSS output is presented in Appendix **C2**), 50.9 % of small and medium-sized companies reported revenue less than or equal to RM 10 million, 45.6 % reported revenue of between RM 11 million to RM 50 million, and only 3.5 % reported revenue of between RM 51million to RM 100 million. For large companies,11.1 % of large companies reported revenue less than or equal to RM 10 million, 31.5 % reported revenue of between RM 11 million to RM 50 million, 40.7 % reported revenue of between RM 51 million to RM 100 million, and 16.7 % reported revenue above RM 100 million.

The average annual revenue for small and medium-sized companies was RM39.47 million and for large-sized company it was RM82.46 million.

Table 4.3: Companies' Annual Revenue and size

Annual Revenue	**Company size – number of employees**			
	Small and medium		Large	
	No.	%	No.	%
Up to RM 10 million	29	50.9	06	11.1
Between RM 11 million and 50 million	26	45.6	17	31.5
Between RM 51 million and 100 million	02	3.5	22	40.7
Above RM 100 million	00	00	09	16.7
Total	57	100	54	100
Missing = 7				

4.3.2. Respondent Profile

The profile of a respondent was measured in five demographic areas: position in the company, years of service with the company, educational level, gender and age. Table 4.4 shows the respondents' profile. The SPSS output is presented in Appendix **C3.** The table reveals that more than half (50.8%) of them are a chief executive officers, and (28%) are general managers, followed by senior vice-presidents (16.1%), and only a handful of respondent (5.1%) from other top managerial level. In terms of the level of experience of the managers, the table shows that the majority (83.9%) of the respondents have more than five years of work experience in their company, which means questionnaires were answered by the most experienced personnel.

Table 4.4: Respondents profile

Characteristics	Description	Frequency	(%)
Position in company	General Manager	33	28
	Chief executive officer	60	50.8
	Senior Vice-presidents	19	16.1
	Others	6	5.1
Years in company	Less than 5 years	19	16.1
	5-10 years	60	50.8
	11-20 years	29	24.6
	More than 20 years	10	8.5
Education level	Pre- degree	13	11
	Degree	62	52.5
	Masters	26	22
	PhD	11	9.3
	Others	6	5.1
Gender of respondents	Male	92	78
	Female	26	22
Age of respondents	21-30 years	08	6.8
	31-40 years	49	41.5
	41-50 years	42	35.6
	Over 50 years	19	16.1

Regarding the respondents' educational level, the data shows that most of them studied at university, as highest level of education (89%), this is reflected by 52.5.% holding a bachelors degree, 22% holding a masters degree and 9.3% with a PhD degree. The data shows that 78% of the respondents are male and 22% are female, the majority is male, which mean the female not get a big chance to be a leader in that companies. Similarly, the table reveals that most respondents are in the middle range age 31-50 years (77.1%), while the rest are between 21-30 years (6.8%), and above 50 years (16.1%). The overall evaluations for the respondents' profile indicate that the respondents who answered the questionnaire have knowledge and capability in answering the questions measuring the study's constructs.

4.4. MISSING VALUES

The first step in any examination of missing data is to clarify the type of missing data involved (Hair, et al., 2010). The initial concern is the missing data is part of the research design and under control, or the causes and effects are truly unknown. In dealing with missing data, it is required to determine two things: (1) The type of missing data – the missing data is ignorable or not ignorable; (2) the extent of missing data – the extent or amount of missing data is low enough not to affect the results, even if it operates in a non-random manner (Hair, et al., 2010).

One of the most direct means of assessing the extent of missing data is by tabulating: (1) the percentage of variables with missing data for each case; and (2) the number of cases with missing data for each variable (Hair, et al., 2010). The next step includes an examination carried out for any non-random patterns in the data such as a concentration of missing data in a specific set of questions, attrition in not completing the questionnaire, and so on. Further, an examination is carried-out on the number of cases without missing any of the variables, which would provide the sample size available for analysis if remedies for missing data are not applied. The pattern of missing data is more important than the amount missing (Tabachnick and Fidell, 2007).

Missing values scattered randomly through data matrix poses fewer serious problems. Non-randomly missing values, on the other side, are serious no matter how few of them are identified because they affect the generalisation of results.

The missing value analysis is based on the original total respondents of 118 (Excluded 5 questionnaires, as refer section 4.2).

Table 4.5: Summary of Statistics of Missing Data for Original Sample

Items	Mean	Std. Dev.	Number	Percent
Indicators on different dimensions of the performance.	3.75	0.69	2	1.70
A variety of indicators about important aspects of the the company's operations.	3.63	0.68	2	1.70
Consistent reinforcing links between current operating performance and long term strategies of the company.	3.68	0.76	3	2.50
indicators about link all business unit activities to the achievement of goals and objectives of the company.	3.52	0.66	2	1.70
Indicators that for comparing our performance of business units with similar business units in other companies in same industry.	3.91	0.64	4	3.40
Provides frequently reports on a systematic basis	3.89	0.61	4	3.40
Provides frequently reports on a regular basis	3.31	0.68	2	1.70
Able to compete based on quality	4.15	0.68	2	1.70
Efficient internal operation system	3.59	0.77	1	0.85
Human capital enables us to achieve cost advantage	3.58	0.67	8	6.80
Market share growth	3.59	0.82	4	3.40
Sales growth	3.64	0.80	4	3.40
Return on investment	3.51	0.69	5	4.20
Return on assets	3.55	0.79	5	4.20
Return on equity	3.46	0.66	5	4.20
Profit margin on sales	3.42	0.74	7	5.90
Operating income	3.40	0.68	6	5.10
Generation of cash flow	3.43	0.73	7	5.90

Table **4.5** above, shows the descriptive statistics for the observations with values, including the percentage of cases with missing data on variables, ranging from 0.85% to 6.8%. Viewing the missing data, it could be seen that the percentage of missing data ranges from 3% to 7% as shown in table **4.6**. The percentage is lower than 10%, which is the mean substitution method used for the missing value. The missing value is replaced by the mean. This approach is widely used in practice (Tabachnick and Fidell, 2007, and Hair, et al., 2010).

Table 4.6: Summary of Cases

Number of missing data per case	Number of cases	Percentage of sample
0	97	82%
1	08	7%
2	05	4%
3	05	4%
6	03	3%
Total	118	100%

4.5. NON-RESPONSE BIAS TEST AND ONE-WAY ANALYSIS OF VARIANCE

One of the critical contributors to survey error is non-response bias occurring when the sample members do not answer questionnaires, and the resulting sample is not a representative of the population. Actually, non-response might diminish the perceived credibility of study results. Therefore, to determine whether non-response bias was displaying in this study, early respondents were compared with late respondents along with all the descriptive response items in the survey. Early responses are defined in this study as responses received before sending the reminder letter (three weeks from first mailing), while late responses are those responses received after the reminder letter. Therefore, 53 were considered as early responses and 65 responses were considered as late responses and to be proxies for non-respondents.

To represent early versus late respondents, an independent group t-test was performed to test whether there were significant differences between mean scores of early respondents and late respondents. This test is conducted using independent sample t-test, which is used for continuous, observed variables of study. A comparison of the means of the constructs revealed little difference between early and late respondents as shown in the table 4.7 (more ditales see Appendix D1).

Table 4.7: Early and Late Groups Statistics

Groups		N	Mean	Std. Deviation	Std. Error Mean
Broad Scope	Early	53	3.66	0.48	0.07
	Late	65	3.71	0.52	0.06
Integration	Early	53	3.65	0.57	0.08
	Late	65	3.73	0.52	0.06
Timeliness	Early	53	3.76	0.51	0.07
	Late	65	3.77	0.53	0.07
Benchmarking	Early	53	3.64	0.55	0.07
	Late	65	3.64	0.50	0.06
Quality	Early	53	4.14	0.54	0.07
	Late	65	4.16	0.58	0.07
Cost	Early	53	3.46	0.50	0.07
	Late	65	3.53	0.52	0.06
Non-financial	Early	53	3.55	0.60	0.08
	Late	65	3.71	0.64	0.08
Financial	Early	53	3.42	0.56	0.08
	Late	65	3.49	0.54	0.07

Levene’s test for equality of variances is shown in the Table 4.8 which reveals that, the variances for all variables are equal because the P-value ranging from 0.41 to 0.94 ($P > 0.05$) are not statistically significant, meaning that the assumptions of equal variances have not been violated. Table 4.8 presents that the other variable had a significance (2-tailed) value of higher than 0.05. Hence it could be concluded that it is unlikely to be a systematic bias because of differences among respondents and non-respondents. Therefore, non-response bias is not a serious concern in this sample. The full SPSS output is attached in Appendix D2.

Table 4.8: Independent Sample Test of Variables

Variables	Assumption	Levene's Test Sig.	t-test for Equality of Means		
			t	t-test Sig. (2-tailed)	Mean Difference
Broad Scope	Equal variance	.55	-.59	.56	-.05
	Non-Equal variance		-.59	.56	-.05
Integration	Equal variance	.56	-.79	.43	-.08
	Non-Equal variance		-.78	.44	-.08
Timeliness	Equal variance	.82	-.11	.91	-.01
	Non-Equal variance		-.11	.91	-.01
Benchmarking	Equal variance	.43	.01	1.00	.00
	Non-Equal variance		.01	1.00	.00
Quality	Equal variance	.41	-.14	.89	-.01
	Non-Equal variance		-.14	.89	-.07
Cost	Equal variance	.76	-.77	.45	-.07
	Non-Equal variance		-.77	.44	-.07
Non-financial	Equal variance	.94	-1.40	.16	-.16
	Non-Equal variance		-1.40	.16	-.16
Financial	Equal variance	.69	-.72	.47	-.08
	Non-Equal variance		-.72	.47	-.08

To further assure, since the demographic variables are categorical variables, they were analysed using the chi-square. A multivariate chi-square test was conducted using the demographic variables (seven variables) in order to determine whether significant differences exist between the two groups. Table **4.9** presents the result of test chi-square. The SPSS output is displayed in Appendix **D3.**

Table 4.9: Chi-Square Test for Differences between Early and Late Response

Variable	Categories	Early responses (53)	Late responses (65)	Chi-Square value (x^2)	Sign. P
Products Type	Electrical	09	13	0.23	0.89
	Electronics	23	26		
	E & E	21	26		
Size of company	Up to than 50	09	15	3.37	0.34
	51-150	12	24		
	151-500	21	17		
	More than 500	09	09		
Age of company	Up to 10	17	13	2.50	0.29
	11-20	20	26		
	More than 20	16	26		
Annual revenue (RM)	Up to 10 Million	18	17	2.57	0.46
	11-50 Million	19	24		
	51-100 Million	10	14		
	More than 100 Million	02	07		
Ownership status	Local-Owned	24	25	0.61	0.74
	Joint-Owned	13	19		
	Foreign-Owned	16	21		
Computerized system	No	05	08	0.25	0.62
	Yes	48	57		
Record of Customer complaints	No	06	08	0.03	0.87
	Yes	47	57		
Respondent's Position in company	General Manager.	8	15	2.02	0.57
	Chief Executive.	12	30		
	Senior Vice-presidents.	4	9		
	Others	0	4		
Respondent's Years in company	Less than 5 years.	5	8	2.72	0.44
	5-10 years.	9	33		
	11-20 years.	7	13		
	more than 20 years.	3	4		
Education level of respondent	Pre-degree.	4	5	4.39	0.36
	Degree.	14	29		
	Masters.	2	16		
	PhD.	3	5		
	Others	1	3		

Table 4.9: Continued

Variable	Categories	Early responses (53)	Late responses (65)	Chi-Square value (x^2)	Sign. P
Gender of respondent	Male.	17	47	1.01	0.31
	Female.	7	11		
Age of respondent	21-30 years.	2	7	1.81	0.61
	31-40 years.	8	26		
	41-50 years.	11	18		
	Over 50 years.	3	7		

It is clear from the table that no significant differences exist between the early and late respondents. For all the seven characteristics of companies (products type, size of company, age of company, annual revenue, ownership status, computerised system, customer complaints record) and for all the five characteristics of respondents (position in the company, years in company, educational level, gender and age) the chi-square test implied no significant difference exists between the early and late respondents. Accordingly, it could be concluded that a non-response bias is not a serious problem in this study.

4.6. DESCRIPTIVE STATISTICS ANALYSES

Descriptive statistics such as mean and standard deviation was applied to describe the characteristics of surveyed companies and all variables (independents, dependents, and mediators) under study. The SPSS output is shown in Appendix **E1.** Given that the study tests the association between some characteristics of companies and variables of study, t-test was used to examine the differences of a company's size among the focal variables for the study's verification of the feasibility of the proposed control variable. In addition, the t-test was used to test the differences in companies' PMISs with respect to computerised systems used. The t-test was used to test the differences in companies' competitive capabilities regarding record keeping of customer complaints. The t-test was used to test the differences in companies' performance with respect to annual revenue.

4.6.1. Descriptive Analysis of PMIS

Table 5.10 presents the minimum, maximum, means and standard deviation of the four components of PMIS (broad scope, integration, timeliness, and benchmarking). The table reveals that the Malaysian E&E manufacturing companies emphasised more on timeliness (mean=3.76, standard deviation=0.52), followed by integration (mean = 3.70, standard deviation = 0.54), broad scope (mean = 3.69, standard deviation = 0.50), and the lowest component of a PMIS is benchmarking (mean = 3.64, standard deviation = 0.52). given that the scale used a 5-point scale (1 = not at all,5 = to very great extent), it can be concluded that Malaysian E&E manufacturing companies are above average on four information characteristics of a PMIS.

Table 4.10: Descriptive Statistics of PMIS

Variables	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Broad scope	2.48	4.86	3.69	.50
Integration	2.50	4.83	3.70	.54
Timeliness	2.60	4.80	3.76	.52
Benchmarking	2.50	4.83	3.64	.52

Note: all variables used a 5-point likert scale (1= Not at all , 5= To very great extent).

To investigate further how PMIS information characteristics differ between dichotomous attributes of the company, t-tests were conducted on PMS components by size of the company (small and medium-sized and large-sized), and computerised system (used and not used). Table 4.11 describes summary of the t-tests; the SPSS output is shown in Appendices **E2 & E3.**

Table 4.11 presents that there are significant differences between large-sized and small and medium-sized companies regarding components of PMIS;

broad scope (t-value= -3.57, p<0.01), integration (t-value= -4.69, p<0.01), timeliness (t-value= -3.68, p<0.01), and benchmarking (t-value= -3.79, p<0.01). The mean and t-value indicate that broad scope, integration, timeliness, and benchmarking are a higher priority in large-sized companies compared to the small and medium-sized companies.

Table 4.11: T-test for PMIS

Company Attribute		**Broad scope**		**Integration**		**Timeliness**		**Benchmarking**	
		M	t-value (Sig.)	M	t-value (Sig.)	M	t-value (Sig.)	M	t-value (Sig.)
Company size	<150	3.54	-3.57** (.001)	3.49	-4.69** (.000)	3.60	-3.68** (.000)	3.47	-3.79** (.000)
	≥150	3.85		3.92		3.93		3.82	
computerized system	No	3.08	-6.17** (.000)	3.15	-4.17** (.001)	3.22	-4.03** (.001)	2.91	-6.16** (.000)
	Yes	3.76		3.77		3.83		3.73	

*Note: *p<0.05,**p<0.01, M=Mean*

The table also shows that there are significant differences between companies' computerised system regarding all components of PMIS. Close inspection of the means reveals that the companies which have used computerised systems have a higher levels of PMIS design than the companies which do not use computerised systems.

Generally, the PMIS can be interpreted as relevantly high satisfied by the companies surveyed as indicated by the mean value of 3.70 (on a 5-point scale).

4.6.2. Descriptive Analysis of Competitive Capabilities

Table 4.12 presents the minimum, maximum, means and standard deviation of the two components of competitive capability (quality, and cost). The table reveals that the Malaysian E&E manufacturing companies have higher-quality capability (mean=4.15, standard deviation=0.56), than their cost capability (mean=3.50, standard deviation=0.51). given that the scale used a 5-point scale (1= strongly disagree, 5= strongly agree), it can be concluded that Malaysian E & E manufacturing companies have a high level of quality capability and above average level of cost capability.

Table 4.12: Descriptive Analysis of Competitive Capabilities

Variables	Minimum	Maximum	Mean	Std. Deviation
Quality Capability	3.00	5.00	4.15	0.56
Cost Capability	2.40	4.60	3.50	0.51

Note: all variables used a 5-point likert scale (1= strongly Disagree, 5= strongly Agree).

To investigate further how competitive capability differs between dichotomous attributes of the company, t-test were conducted on competitive capability component by size of the company (small & medium-sized and large-sized), and record of customer complaints (keeping record or not keeping record). Table 4.13 describes summary of the t-test, and the SPSS output is shown in Appendices **E2 & E4.**

Table 4.13 presents that there are significant differences between large-sized and small and medium-sized companies regarding both components of competitive capabilities: quality capability (t-value= -4.21, $p<0.01$), and cost capability (t-value= -3.80, $p<0.01$). The mean and t-value indicate that quality and cost capabilities are higher in large-sized companies compared with the small and medium-sized companies.

Furthermore, Table 4.13 presents that there are significant differences in quality capability (t-value= -2.68, $p<0.05$), and cost capability (t-value= -3.34, $p<0.05$). Close inspection of the means and t-value reveals that the companies that are keeping record of customer complaints have been higher level of quality and cost capability than the firms that are not keeping record of customer complaints.

Table 4.13: T-test for Competitive Capabilities

Company Attribute		Quality		Cost	
		M	t-value (Sig.)	M	t-value (Sig.)
Company size	<150	3.95	-4.21** (.000)	3.33	-3.80** (.000)
	≥150	4.36		3.67	
K.R.C.C	Yes	4.20	-2.68** (.009)	3.55	-3.34** (.001)
	No	3.79		3.09	

*Note: *p<0.05,**p<0.01, M=Mean*

Generally, competitive capabilities can be interpreted as high satisfactory levels with the companies surveyed as indicated by the mean value of 3.83 (on a 5-point scale).

4.6.3. Descriptive Analysis of Organisational Performance

Table 4.14 shows the minimum, maximum, means and standard deviation of the two components of organisational performance (non-financial and financial). The table 4.14 reveals that the Malaysian E & E manufacturing companies have achieved non-financial performance (mean=3.64, standard deviation=0.62), higher than the level of financial performance (mean=3.46, standard deviation=0.55). given that the scale used a 5-point scale (1= very low, 5=very high), it can be concluded that Malaysian E&E manufacturing companies have achieved above average on these two components of organisational performance.

Table 4.14: Descriptive Analysis of Organizational Performance

Variables	Minimum	Maximum	Mean	Std. Deviation
Non-financial	2.20	5.00	3.64	0.62
Financial	2.17	4.50	3.46	0.55

Note: all variables used a 5-point likert scale (1= Very Low, 5=Very High)

To investigate further how organisational performance differs between dichotomous attributes of the company, t-testing was conducted on the organisational performance component by size of the company (large, and small and medium sized), and annual revenue (high and low average revenue). Table 4.15 provides the summary of the t-test; the SPSS output is shown in Appendices **E2 & E5**.

Table 4.15 shows that there are significant differences between large-sized and small and medium-sized companies regarding components of organisational performance non-financial (t-value= -4.82, $p<0.01$), and financial (t-value= -6.10, $p<0.01$). The mean and t-value indicate that non-financial and financial performance are high in large-sized companies compared with the small and medium-sized companies. Regarding the annual revenue, table 4.15 discloses significant differences in non-financial (t-value = -4.58, $p<0.01$) and financial (t-value = -4.38, $p<0.01$). Close inspection of the means and t-value reveals that the companies with high annual revenue had higher non-financial and financial performance than the companies that have low annual revenue. These results indicate that organisational performance appears at a higher level in the companies with a higher annual revenue than those companies with a lower annual revenue.

Table 4.15: T-test for Organizational Performance

Company Attribute		**Non-financial**		**Financial**	
		M	t-value (Sig.)	M	t-value (Sig.)
Company size	<150	3.39	-4.82** (.001)	3.20	-6.10** (.000)
	≥150	3.89		3.74	
Annual revenue	<50RM	3.47	-4.58** (.000)	3.33	-4.38** (.000)
	≥50RM	4.03		3.79	

*Note: *p<0.05,**p<0.01, M=Mean*

Overall, performance can be interpreted as moderately satisfied with the companies surveyed as indicated by the mean value of 3.55 (on a 5-point scale).

Finally, the companies surveyed have an average annual revenue of RM 60.39 million.

Given that the study was designed as the path model (independent, mediator, and dependent variables) the results of regression analysis may be affected by the differences observed above. In other words, the variations in a PMIS of competitive capabilities, and organisational performance may be due to the above discussed companies' attributes such as company size. Therefore, to remove whatever effects that it might have no relationship, under this study, controls for the potential effect of company attributes showed significant differences in the t-test (Becker, 2005). Particularly, the study controls for one variable in regression analysis (company's size). The control variable match with this as initially suggested in chapter 2 (refer to section 2.10). Therefore, this study recorded a company's size as a control variable.

4.7. GOODNESS OF MEASURES

In this section report, the results of validity and reliability test as a tools to assess the Goodness of measures of the study constructs (Sekaran and Bougie, 2010). The study used exploratory factor analysis for testing the validity and multi-collinearity of measures of main variables of study. In contrast, the reliability of empirical measurement was obtained by internal consistency (Hair, et al., 2010) utilising Cronbach's Alpha test and the results of factor and reliability analyses are described in the following sub-sections.

4.7.1. Factor Analyses

Statistical procedures, to a certain extent, clarify the validity and reliability of survey-based measures if sound theoretical evaluation has been considered. With regards to validity, a procedure called factor analysis allows the researcher to ensure whether the number of items could be decreased to a number of concepts that were initially hypothesised.

Factor analysis was employed to verify the number of dimensions conceptualised. Factor analysis is an interdependence technique; the key objective is to define the underlying structure among the variables in the analysis. The analysis provides the tools for analysing the structure of the interrelationships between a large number of variables by defining a set of variables that are highly correlated, recognized as factors (Hair, et al., 2010). This study uses principal component analysis as a factor extraction method. According to Hair, et al. (2010), essential component analysis is most appropriate when: (1) data reduction is a primary concern, focusing on the minimum number of factors required to account for the maximum portion of the total variance represented in the original sets of variables; and (2) prior knowledge suggests that specific and error variance represent a relatively small proportion of the total variance. In order to employ factor analysis, minimum absolute sample size should be 50 observations, and ideally, the sample size should be 100 or larger (Hair, et al., 2010).

The sample in this study is 118 respondents; thus, it meets the sample requirement to perform factor analysis. The other requirement for factor analysis is that the variables must have sufficient correlations. One of the measures to quantify the degree of inter-correlation among the variables and the appropriateness of factor analysis is the Kaiser-Meyer-Olkin measure of sampling adequacy (MSA). Factor analysis for each dimension reveals that the items within each dimension are multidimensional as they are loaded satisfactorily on single factor (more than 0.5).

In conducting factor analysis, this study followed assumptions recommended by Hair, et al. (2010):

1. firstly, there must be the sufficient number of statistically significant correlations in the matrix;
2. secondly, Kaiser-Meyer-Olkin (MSA) should be at least 0.6;
3. thirdly, Bartlett's test of spherecity should be significant as 0.05;
4. fourthly, anti-image correlation of items should be greater than 0.50;
5. fifthly, communalities of items should be greater than 0.50;

6. sixthly, the minimum requirement of factor loading 0.50 (since the sample size of the study is 118 E&E manufacturing companies) based on a 0.05 significant level, with value of cross loading exceeds 0.50; and
7. finally, eigenvalue should be more than 1 for factor analysis extraction.

In this study, three-factor analyses were run to verify the postulated dimensions of independent (PMIS), dimensions of mediating (competitive capabilities) and dimensions of dependent (organisational performance) variables, (see Table 4.2 – Table 4.3).

a) Factor Analysis of Independent Variables – PMIS

Factor analysis was undertaken on the twenty- five items (in the first run), which was used to measure the PMIS. Table 4.16 showed the summary of results of factor analysis on PMISs, and the SPSS output is shown in Appendix **F1.** In the first run the item (PMTI3) achieved low communalities value (0.48), (less than 0.50), so this item was dropped. In the second run of factor analysis, as the Table shown, the value of KMO measure of sampling adequacy is 0.89 (above the suggested level of 0.6) and Bartlett's test of spherecity is significant (p=0.00). This reveals that the conditions of factor analysis were satisfactorily met, and the matrix is suitable for subsequent factor analysis.

Table 4.16 showed that the items were loaded on four factors as conceptualised, with eigenvalue more than 1. The four factors cumulatively captured 60.53% of the total variance for the data (above the suggested level of 60%). The loading values of all items are more than the minimum value of 0.50. Since each factor contained the original items, the same names were retained as broad scope, integration, benchmarking, and timeliness with eigenvalue of 9.68, 1.74, 1.60, and 1.50 respectively. The factor analysis for the independent variables revealed a 4-factor structure with a combined total variation of 60.53% as indicated in Table 4.16.

Table 4.16: Factor Loading for Independent Variables – PMIS

Items No	Items	Component			
		1	2	3	4
MPBS	**Broad Scope**				
MPBS5	The PMIS provides information on different dimensions of the organization's performance.	**0.72**	0.13	0.12	0.21
MPBS4	The PMIS provides non-financial information (about customers, internal business, learning and growth).	**0.71**	0.32	0.31	0.03
PMBS6	The PMIS provides a variety of information about important aspects of the organization's operations.	**0.67**	-0.05	0.26	0.27
PMBS8	The PMIS provides lagging indicators (of past performance)	**0.67**	0.18	0.22	0.15
MPBS1	The PMIS provides a diverse set of measures related to the key performance areas of the company.	**0.67**	0.21	0.21	-0.08
MPBS7	The PMIS provides leading indicators (early warning signals).	**0.64**	0.40	0.08	0.22
MPBS3	The PMIS provides financial information.	**0.60**	0.30	0.15	0.23
PMIN	**Integration**				
PMIN4	The PMIS is produced in a fully documented form, which provides a record for evaluating performance.	0.30	**0.74**	0.14	0.27
PMIN3	The PMIS provides indicators about link all business unit activities to the achievement of goals and objectives of the company.	0.31	**0.73**	0.14	0.07
PMIN6	The PMIS provides indicators about link activities of business units to customers.	0.18	**0.64**	0.33	0.24
PMIN1	The PMIS is provided consistent reinforcing links between current operating performance and long term strategies of the company.	0.38	**0.64**	0.19	0.03
PMIN5	The PMIS provides indicators about link activities of business units to suppliers.	-0.02	**0.62**	0.45	0.11
PMIN2	The PMIS provides indicators about how activities of the business units affect each other within the company.	0.23	**0.57**	0.35	0.12

*Note: N=118, **P<0.01*

Table 4.16: Continued

MPBE	**Benchmarking**				
MPBE4	The PMIS provides indicators that for comparing our performance of business units with similar business units in other companies in same industry.	0.20	0.03	**0.74**	0.23
MPBE2	The PMIS provides indicators that for comparing performance of company against the performance of other companies in the same sector.	0.23	0.18	**0.73**	0.01
MPBE3	The PMIS provides indicators that for comparing performance of similar business units in our company.	0.16	0.26	**0.68**	0.33
MPBE5	The PMIS provides indicators that for comparing performance of company against the performance of previous years.	0.24	0.30	**0.67**	0.20
MPBE1	The PMIS provides competing indicators on various aspects of performance.	0.25	0.28	**0.61**	0.06
MPBE6	The PMIS provides indicators on fluctuations and explanation (trend) in performance of our company during previous years.	0.39	0.30	**0.51**	0.22
PMTI	**Timeliness**				
PMTI4	The PMIS provides the requested information immediately upon its requested.	0.13	-0.02	0.20	**0.74**
PMTI2	The PMIS provides frequently reports on a regular basis	0.09	0.42	0.02	**0.70**
PMTI5	The PMIS provides information automatically as soon as processing its completed.	0.09	0.12	0.25	**0.70**
PMTI1	The PMIS provides frequently reports on a systematic basis.	0.25	0.49	0.02	**0.64**
PMTI6	There is no delay between event occurring and relevant information being reported by PMIS.	0.41	0.09	0.24	**0.58**
PMTI3	The PMIS provides information automatically upon its receipted.	**-**	-	**-**	**Del**
	Eigenvalue	**9.68**	**1.74**	**1.60**	**1.50**
	Percentage of Variance Explain	**40.34**	**7.25**	**6.68**	**6.26**
	Total Variance Explaned (%)	**60.53**			
	Kaiser-Meyer-Olkin (KMO)	**0.89**			
	Bartett's Test of Spherecity	**1510.97****			

*Note: N=118, **P<0.01*

b) Factor Analysis of Mediating Variables - Competitive Capabilities

Factor analysis was done on the twelve items, which was used to measure competitive capability. Table 4.17 showed the summary of results of factor analysis on competitive capability, and the SPSS output is shown in Appendix **F2**. In first run, the item CCPC1 achieved low communalities value (0.49), (less than 0.50), so this item was dropped. In the second run of factor analysis as the table present the value of KMO measure of sampling adequacy is 0.86 (more than the suggested level of 0.6) and Bartlett's test of spherecity is significant (p=0.00).

This displays that the conditions of factor analysis were satisfactorily met, and the matrix is appropriate for subsequent factor analysis. The table 4.17 shows that the items were loaded on two factors as conceptualised, with eigenvalue more than 1. The four factors cumulatively captured 60.438% of the total variance in the data (more than the suggested level of 60%). The loading values of items are more than the minimum value of 0.50. Since each factor contained the original items, the same names were retained as capability of a quality and capability of cost, with eigenvalue of 4.51, and 1.14 respectively.

The factor analysis for the mediating variables revealed a 2-factor structure with a combined total variation of 60.44% as indicated in Table 4.17.

Table 4.17: Factor loading for Mediating Variables - Competitive Capabilities

Items No	Items	Component	
		1	2
CCPQ	**Quality Capability**		
CCPQ4	Offering high quality products to our customer.	**0.85**	0.16
CCPQ3	Offering products that are highly durable.	**0.75**	0.35
CCPQ1	Able to compete based on quality.	**0.74**	0.19
CCPQ5	Offering products that function according to customer needs.	**0.74**	0.21
CCPQ2	Offering products that are highly reliable.	**0.60**	0.46
CCPQ6	Responing well to customer demand for "new" features.	**0.60**	0.46
CCPC	**Cost Capability**		
CCPC3	Manufacturing costs are lower than its competitors.	0.11	**0.77**
CCPC7	Human capital enables us to achieve cost advantage.	0.26	**0.71**
CCPC2	Able to offer prices lower than our competitors.	0.23	**0.70**
CCPC5	Economy of scale enables us to achieve a cost advantage.	0.30	**0.70**
CCPC4	Efficient internal operation system.	0.45	**0.61**
CCPC1	Offering competitive prices.	-	**Del**
Eigenvalue		**5.51**	**1.14**
Percentage of Variance Explain		**50.07**	**10.37**
Total Variance Explaned (%)		**60.44**	
Kaiser-Meyer-Olkin (KMO)		**0.86**	
Bartett's Test of Spherecity		**643.11****	

*Note: N=118, **P<0.01*

c) Factor Analysis of Dependent Variable – Organisational Performance

Factor analysis was done on the eleven items which was used to measure organisational performance. Table 4.18 provides the summary of results of factor analysis on organisational performance, and the SPSS output is shown in Appendix **F3.**

Factor analysis, as the table shows, the value of KMO measure of sampling adequacy is 0.86 (more than the suggested level of 0.6) and Bartlett's test of spherecity is significant (p=0.00). This displays that the conditions of factor analysis were satisfactorily met, and the matrix is appropriate for subsequent factor analysis.

Table 4.18: Factor loading for the Dependent Variable - Organizational Performance

Items No.	Items	Component	
		1	2
OPNF	**Non-financial performance**		
OPNF1	Level of market share growth.	**0.81**	0.29
OPNF5	Level of customer response time.	**0.78**	0.20
OPNF2	Level of sales growth.	**0.75**	0.41
OPNF4	Level of customers satisfaction.	**0.73**	0.17
OPNF3	Level of new customers acquisition.	**0.64**	0.49
OPF	**Financial performance**		
OPF6	Level of generation of cash flow.	0.17	**0.79**
OPF4	Level of profit margin on sales.	0.20	**0.75**
OPF5	Level of operating income.	0.22	**0.72**
OPF2	Level of return on assists (ROA).	0.43	**0.68**
OPF1	Level of return on investment (ROI).	0.43	**0.62**
OPF3	Level of return on equity (ROE).	0.49	**0.60**
Eigenvalue		**5.91**	**1.06**
Percentage of Variance Explain		**53.77**	**9.60**
Total Variance Explaned (%)		**63.37**	
Kaiser-Meyer-Olkin (KMO)		**.86**	
Bartett's Test of Spherecity		**796.63****	

*Note: N=118,** P< 0.01*

The table 4.18 shows that the items were loaded on two factors as conceptualised, with eigenvalue more than 1. The two factors cumulatively captured 63.37% of the total variance in the data (more than the suggested level of 60%). The loading values of items are more than the minimum value of 0.50.

Since each factor contained the original items, the same names were retained as non-financial and financial performance, with eigenvalue of 5.91, and 1.06 respectively. The factor analysis for the dependent variables revealed a 2-factor structure with a combined total variation of 63.37% as indicated in Table 4.18.

4.7.2. Reliability Analysis

The items that represent each individual factor were subjected to reliability analysis. The reliability test is used to assess the internal consistency reliability of several measures of latent variable. Using Cronbach Alpha to test the internal consistency for all the measures, and to determine the extent of agreement between respondent for each dimension, Nunnally (1978) suggested the values of 0.6 as the lower limit of construct acceptability, and therefore, the Alpha value of the construct less than 0.6 is unsuitable and need further amendment. Accordingly, a higher score indicates a higher reliability, with a range from 0 to 1.

a) Broad Scope of PMIS

The reliability for the construct of broad scope of PMIS is depicted in Table 4.19. The Cronbach Alpha for the construct is 0.87 indicating that the construct has a very good internal consistency. The result is quite satisfactory as combining these 7-items of broad scope of a PMIS would yield the best reliability rather than removing any item. The corrected item-total correlation ranges from 0.57 to 0.75, also designating that the constructs of broad scope of a PMIS has a good validity.

Table 4.19: Reliability Test for Broad scope of PMIS

Item	Corrected item-total correlation	Alpha if item deleted
PMBS1	.57	.86
PMBS3	.61	.85
PMBS4	.75	.84
PMBS5	.65	.85
PMBS6	.61	.85
PMBS7	.68	.84
PMBS8	.64	.85
Cronbach Alpha:	.87	

b) Integration of PMIS

The reliability for the construct of integration of PMIS is depicted in Table 4.20. The Cronbach Alpha for the construct is 0.86 indicating that the construct has a very good internal consistency. The result is quite satisfactory as combining these 6-items of integration of a PMIS would yield best reliability rather than removing any item. The corrected item-total correlation ranges from 0.62 to 0.69, also designating that the constructs of integration of a PMIS has a good validity.

Table 4.20: Reliability Test for Integration of PMIS

Item	Corrected item-total correlation	Alpha if item deleted
PMIN1	.66	.84
PMIN2	.62	.84
PMIN3	.67	.83
PMIN4	.69	.83
PMIN5	.62	.84
PMIN6	.65	.84
Cronbach Alpha:	.86	

c) Timeliness of PMIS

The reliability for the construct of timeliness of PMIS is depicted in Table 4.21. The Cronbach Alpha for the construct is 0.81, indicating that the construct has a very good internal consistency. The result is also quite satisfactory as combining these 5-items of timeliness of a PMIS would yield the best reliability rather than removing any item. The corrected item-total correlation ranges from 0.56 to 0.65, also designating that the constructs of timeliness of a PMIS has a good validity.

Table 4.21: Reliability Test for Timeliness of PMIS

Item	**Corrected item-total correlation**	**Alpha if item deleted**
PMTI1	.65	.76
PMTI2	.62	.77
PMTI4	.57	.78
PMTI5	.60	.77
PMTI6	.56	.79
Cronbach Alpha:	.81	

d) Benchmarking of PMIS

The reliability for the construct of benchmarking of PMIS is depicted in Table 4.22. The Cronbach Alpha for the construct is 0.86, indicating that the construct has a very good internal consistency. The result is quite satisfactory as the combination of these 6-items of benchmarking of PMIS would yield best reliability rather than removing any item. The corrected item-total correlation ranges from 0.60 to 0.73, also designating that the constructs of benchmarking of a PMIS has a good validity.

Table 4.22: Reliability Test for Benchmarking of PMIS

Item	Corrected item-total correlation	Alpha if item deleted
PMBE1	.62	.84
PMBE2	.60	.85
PMBE3	.71	.83
PMBE4	.61	.84
PMBE5	.73	.82
PMBE6	.64	.84
Cronbach Alpha:	.86	

e) Quality Capability

The reliability for the construct of quality capability is depicted in Table 4.23. The Cronbach Alpha for the construct is 0.87, indicating that the construct has a very good internal consistency. The result is quite satisfactory as combining these 6-items of quality capability would yield best reliability rather than removing any item. The corrected item-total correlation ranges from 0.62 to 0.75, also designating that the constructs of quality capability has a good validity.

Table 4.23: Reliability Test for Quality Capability

Item	Corrected item-total correlation	Alpha if item deleted
CCPQ1	.62	.86
CCPQ2	.66	.86
CCPQ3	.75	.84
CCPQ4	.71	.85
CCPQ5	.66	.85
CCPQ6	.65	.86
Cronbach Alpha:	.87	

f) Cost Capability

The reliability for the construct of cost capability is depicted in Table **4.24**. The Cronbach Alpha for the construct is 0.81, indicating that the construct has a very good internal consistency. The result is quite satisfactory as combining these 5-items of cost capability would yield best reliability rather than removing any item. The corrected item-total correlation ranges from 0.56 to 0.65, also designating that the constructs of cost capability has a good validity.

Table 4.24: Reliability Test for Cost Capability

Item	**Corrected item-total correlation**	**Alpha if item deleted**
CCPC2	.56	.79
CCPC3	.56	.79
CCPC4	.61	.77
CCPC5	.65	.76
CCPC7	.62	.77
Cronbach Alpha:	.81	

g) Non-financial Performance

The reliability for the construct of non-financial performance is depicted in Table **4.25**. The Cronbach Alpha for the construct is 0.87, indicating that the construct has a very good internal consistency. The result is quite satisfactory as combining these 5-items of non-financial performance would yield best reliability rather than removing any item. The corrected item-total correlation ranges from 0.60 to 0.78, also designating that the constructs of non-financial performance has a good validity.

Table 4.25: Reliability Test for Non-financial Performance

Item	Corrected item-total correlation	Alpha if item deleted
OPNF1	.78	.82
OPNF2	.78	.82
OPNF3	.68	.85
OPNF4	.60	.87
OPNF5	.66	.85
Cronbach Alpha:	.87	

h) Financial Performance

The reliability for the construct of financial performance is depicted in Table **4.26**. Cronbach Alpha for the construct is 0.86, indicating that the construct has a very good internal consistency. The result is quite satisfactory as combining these 6-items of financial performance would yield best reliability rather than removing any item. The corrected item-total correlation ranges from 0.60 to 0.73, also designating that the constructs of financial performance has a good validity.

Table 4.26: Reliability Test for Financial Performance

Item	Corrected item-total correlation	Alpha if item deleted
OPF1	.66	.84
OPF2	.73	.82
OPF3	.68	.83
OPF4	.62	.85
OPF5	.60	.85
OPF6	.65	.84
Cronbach Alpha:	.86	

In short, thereby, all dimensions in this study have high levels of reliability and are well above the cut-off value of 0.70 as indicated in Table 4.27 below, with the lowest registering a value of timeliness (0.81) and the highest (0.87) quality capability. The rest of the variables; non-financial (0.87), broad scope (0.87), financial (0.86), benchmarking (0.86), integration (0.86), and cost capability (0.811) had satisfactory Alpha value. The Alpha coefficients are informed in the similar tables of factor analyses to ease the comparison between the representative extracted factors and their capability scores, unaccompanied that all the scales show a satisfactory level of reliability (Cronbach's Alpha exceeds the minimum value of 0.6). Hence, it could be concluded that the measures have an acceptable level of reliability. The full SPSS output is annexed in Appendix **F4**.

Table 4.27: Cronbach's Alpha for Study Variables

Construct	variables	No. of items	Cronbach's alpha
Performance Measurement Information System	Broad scope	7	0.87
	Integration	6	0.86
	Timeliness	5	0.81
	Benchmarking	6	0.86
Competitive Capability	Quality capability	6	0.87
	Cost capability	5	0.81
Organizational Performance	Non-financial	5	0.87
	Financial	6	0.86

4.8. TESTING THE ASSUMPTIONS OF MULTIPLE REGRESSION

4.8.1. Multicollinearity

Multicollinearity is a problem because it would inflate the size error terms and weaken an analysis. The multicollinearity could be tested by using the Collinearity Diagnostic Test. The Collinearity Diagnostic Test would discover multicollinearity by giving a tolerance and variance inflation factor (VIF). Tolerance is defined as the amount of variability of the chosen independent variable not explained by the other independent variables (Hair, et al., 2010). The tolerance value should be high, which imply a small degree of multicollinearity. VIF is calculated as the inverse of the tolerance value, a higher degree of multicollinearity is reflected in a lower tolerance value and higher VIF values. A commonly , cut-off doorstep is a tolerance value of 0.10, that corresponds to a VIF value of 10 (Hair, et al., 2010).

As displayed in table 5.28, there appears to be no evidence of severe multicollinearity in the relationship between each construct in the model. The result revealed that all values of the VIF are less than the doorstep of 10 ($1.61 \leq$ VIF ≤ 2.07), All tolerance values are more than 0.1 ($0.48 \leq$ Tolerance ≤ 0.62), and all variance proportions are less than 0.90. This reveales that there is no multicollinearity in the data.

Table 4.28: Collinearity Diagnostic Test- PMIS

Variables	Tolerance value	VIFs value
Broad scope	0.51	1.95
Integration	0.48	2.07
Timeliness	0.62	1.61
Benchmarking	0.48	2.07

4.8.2. Outliers

An outlier is a case with such an extreme value on one variable or such a strange combination of scores on two or more variables that it distorts the statistics (Saunders, et al., 2009). There are four possible reasons for the presence of an outlier. Firstly, an incorrect data entry has been made. Secondly, there is a failure to specify a missing value codes in computer syntax so that missing value indicators are read as real data. Thirdly, is that an outlier is not a number of the population from which the study intended to sample. Fourthly, is that the case is from the intended distribution but the distribution for the variable in the population has more extreme values than a normal distribution (Saunders, et al., 2009).

In this study, checking for an incorrect data entry was done by conducting descriptive statistics and ensuring that the value for minimum and maximum is between 1 and 5, which was based on the five-point Likert Scale used. For missing values, the cell in the SPSS is left blank; not entering any number indicates a missing value. The missing value is also detected by conducting descriptive statistics and then replacing it by the mean as explained in Section 4.4.

According to Pallant (2005), the presence of an outlier can be detected from the scatter plot and standardised residual plot. If the residuals are roughly rectangular in distribution, with most of the scores concentrated in the centre (along the 0 point), then it indicates no outlier problem. The cases have an outlier if the standardised residual is more than 3.3 or less than 3.3. With large samples, it is not uncommon to find a number of outlying residuals. If there are only a few outliers, it may not be necessary to take any action (Pallant, 2005). Besides that, outliers can also be detected by using a plot such as a histogram, box plots, normal probability plots or extended normal probability plots (Saunders, et al., 2009).

For this study, an outlier is detected using a box plot and a standardised residual plot. From both plots, six cases were found as outliers and were deleted from the data analysis. After deleting these cases, the standardised residual for all variables involved in the regression is between 3.3 and -3.3. Therefore, the issue of outlier has been resolved and should not be a problem for the analyses. (See Appendix “**I“& “J**”).

4.8.3. Normality of Data

Normality of variables is assessed by either the statistical or graphical method (Hair, et al., 2010). Two components of normality are skewness and kurtosis: Skewness refers to the symmetry of the distribution; a skewed variable is a variable whose mean is not in the center of the distribution. A positive skewness value indicates a positive skew meaning scores are clustered to the left at the low values. Kurtosis is a measure of whether data sets are peaked or flat in respect of a normal distribution; a distribution will either peak or will be flat. That is, a positive kurtosis values indicates the distribution is rather peaked (clustered in the centre), with long thin tails. If the distribution is perfectly normal, then the values of skewness and kurtosis should be zero, however, it is uncommon in social science research (Pallant, 2005). The data has a normal distribution if it is symmetrical and has a bell-shaped curve (Pallant, 2005). In the SPSS 17, normality can be tested using the Kolmogorov-Smirnov test and the skewness and kurtosis ratio tests. The analysis of normality is shown in Table 4.29.

Table 4-29: Normality Test

Variables	Skewness	Kurtosis	Kolmogorov-Smirnov	z-value Skewness/ (6/N)½	z-value Kurtosis/ (24/N)½	Normality
Broad Scope	0.23	-0.09	0.17	1.02	-0.20	Ok
Integration	0.06	-0.41	0.17	0.27	-0.91	Ok
Timeliness	-0.08	-0.15	0.00	-0.36	-0.33	Ok
Benchmarking	-0.15	-0.45	0.03	-0.67	-1.00	Ok
Quality	-0.15	-0.84	0.00	-0.67	-1.87	Ok
Cost	-0.10	0.37	0.00	-0.44	0.82	Ok
Non- financial	0.03	-0.45	0.05	0.13	-1.00	Ok
Financial	-0.29	-0.65	0.02	-1.29	-1.44	Ok

The table 4.29, with respect to broad scope and integration, indicates there is a non-significant result (significance value of more than 0.05) indicating normality. The other variables have a significant value of 0.00 to 0.05 suggesting a violation of the assumption of normality. However, based on Hair, et al., (2010), if the z value for skewness and kurtosis together fall in the range +/-1.96, then the assumption about the normality can be accepted. Based on the z value for both skewness and kurtosis, all variables fall within this range suggesting no violation of the assumption of normality.

Also, through the test of Kolmogorov-Smirnov, skewness and kurtosis can detect the normality of data distribution, according to Hair, et al., (2010), the tests of significance are less useful for small samples (fewer than 30) and quite sensitive in large samples (exceeding 1,000 observations). Thus, Hair, et al., (2010), recommended using both the graphical plots and any statistical tests such as Kolmogorov-Smirnov, skewness and kurtosis to assess the actual degree of departure from normality. Regarding to the normality test, the histogram indicates the bell distribution of the data, and it is symmetrical, and the graph suggests the data could be a sample from a normal population, a suggestion that there has been no violation of the normality assumption. The normality test and graph of the histogram for the study's variables is annexed in Appendix **G3.**

4.9. CORRELATION ANALYSIS

The purpose of conducting the correlation analysis is to meet three objectives, **initially**, it is important to show the individual relationships between two variables. In this study, correlation analysis is used to determine the strength and direction of the linear relationships between variables of study, **secondly**, the analysis is used to examine the inter-correlation between variables, and **thirdly**; the correlation analysis may also detect the presence of multi-collinearity among the observed variables. The significant in the front indicates whether there is a positive correlation or negative correlation. The size of the absolute value (ignoring the significant) provides an indicator of the strength of the relationship. A perfect correlation exists if the r is 1 or -1 indicating that the value of one variable can be determined exactly by knowing the value of the other variable, and if the r is 0 it indicates that there is no relationship between the two variables. For that, to determine the level of the correlation depend on the value of "r," the guidelines by Pallant (2005) are used: r = +/-.01 to .29 It is small; r = +/-.30 to .49 It is medium; and r = +/-.50 to.10 It is large.

The correlation matrix for the constructs operationalised in this study is represented in the Table 5.30. These bivariate correlations allow for preliminary inspection and information regarding hypothesised relationships. The table presents that no correlations near 1.0 (or approaching 0.80 or 0.90) were revealed, which imply that multicollinearity is not a serious problem in this particular data set. In interpreting the correlation coefficients for this study, the correlation values of -+0.5 and above indicate strong correlations between the variables.

Table 4.30 reveals also that all the correlations are in the hypothesised positive relationship. For instance, the relationship between the four components of a PMIS and both components of competitive capabilities are distinctively positive and statistically significant (0.54≤ r ≤0.62, p< 0,01). The table presents also that all the four components of a PMIS are significant correlated with the two dimensions of organisational performance where the correlations range between (0.45≤ r ≤0.60, p <0.01). The table also reveals that two competitive capabilities are significantly correlated with the two dimensions of organisational performance (0.60≤ r ≤0.70, p <0.01). Based on the bivariate correlations, there was some expectation that these coefficients would be significant; the full SPSS output is attached in Appendix H.

As earlier referred to the correlation analysis could assist to detect the possibility of multicollinearity among the independent variables and dependent variables that would cause a problem for regression analysis. The inter-correlation of larger than 0.90 means the existence of such a problem (Pallant, 2005). Similarly, Hair, et al., (2010), mentioned that the cut off the tolerance value was 0.10, that corresponds to a multiple correlation of 0.95.

Table 4.30 : Pearson Correlations Coefficient for All Variables

Variables	BS	IN	TI	BE	Q	C	NF	F
Broad scope	1							
Integration	.61**	1						
Timeliness	.53**	.54**	1					
Benchmarking	.62**	.65**	.53**	1				
Quality	.60**	.61**	.58**	.54**	1			
Cost	.59**	.55**	.57**	.62**	.67**	1		
Non-financial	.59**	.60**	.56**	.54**	.65**	.60**	1	
Financial	.58**	.60**	.45**	.60**	.61**	.70**	.71**	1

Notes: Level of significant: *p<0.05, **p<0.01, N=118.

The result of the correlation analysis as shows in table 5.30 provides a strong indication of association. In order to undertake a more complete examination of proposed relationships and to assess whether such associations are direct or indirect, multiple regression analysis and hierarchical regression analysis were conducted. Hierarchical regression was used because it gave the best predictive model of a linear relationship show between the independent variables. Regression analyses were chosen rather than a structural equation approach due to the sample size (Frazier, Tix and Barron, 2004). The next statistical analyses the testing of the hypotheses.

4.10. HYPOTHESES TESTING

This section presents the results of the hypotheses testing using regression analysis. Multiple regression analysis (MRA) is used in a exploratory way to analyse the relationship between one continuous dependent variable and a number of independent variables. Multiple regressions are based on correlation but allow a more sophisticated exploration of the interrelationship between a set of variables (Pallant, 2005). The analysis outcome is the prediction of the dependent variables from the independent variables and can be characterised in terms of the strength of the relationship or the effect size.

The control variable considered in this study was company size (small and medium sized, and large sized), since they had been found to have an effect on the focal variables under study (PMIS, competitive capabilities, and organisational performance). The control of this variable was conducted to clarify the real effect of predictor on criterion variables. There are four hypotheses, and its resultant (8) main hypotheses and (36) sub-hypotheses in this study. The main effects were tested using multiple regression analysis (MRA) which acted upon the first three hypotheses (H1, H2, and H3), and their resultant (6) main hypotheses and (20) sub-hypotheses. The mediating effect was examined using hierarchical regression analysis, which confirmed the fourth hypothesis (H4) in that competitive capabilities mediates the relationship between a PMIS and organisational performance, and its resultant (2) main hypotheses and (16) sub-hypotheses, the statistical procedures of which were explained in chapter 3.

4.10.1. The Relationship between PMIS and Organisational Performance

This section deals with the first hypothesis in the study predicting that the four PMIS components of broad scope, integration, timeliness, and benchmarking have a significant positive relationship with the two dimensions of the organisational performance (non-financial and financial) as shown in in figure 4.1 below.

Figure 4.1: The Relationship between PMIS and Organizational Performance

To test this hypothesis, a two-step multiple regression analysis was carried out (Hair, et al., 2010). The first step involved an analysis to test the effects of a company's size on organisational performance. For the second step, a PMIS was introduced to test the impacts on organisational performance. The results of the three multiple regression analysis is discussed in next subsections.

a) The Relationship between PMIS and Non-Financial Performance

Table 4.31 displays the results of a two-step multiple regression analysis of a control variable and four components of PMIS on non-financial performance. The two regression models were significant ($F=23.233$, $p<0.01$; $F=22.499$, $p<0.01$). In the first step, the control variable has a significant effect on non-financial performance. The control variable explains approximately 16.7% of total variation in non-financial performance. After adding the four PMIS components in step two explains the additional 33.4% of non-financial performance variance. This means that control variable and the PMIS cumulatively explain 50.1% of the variance in non-financial performance. The results showed that the hypothesis was partially supported, i.e. there is a significant positive relationship between a PMIS and non-financial performance.

The results also showed that broad scope has the most significant effect on non-financial performance (β=0.234, p<0.05), followed by timeliness (β=0.221, p<0.05), then integration (β=0.216, p<0.05). However, benchmarking shows no significant relationship (effect) with non-financial performance (β=0.093, p>0.10), though the results still indicate a significant positive relationship between the two variables.

Table 4.31: Multiple Regression Result for the Relationship between PMIS and Non-financial Performance

Variable	**DV: Non-financial Performance**					
	Step1			**Step2**		
	Std. Beta	t-value	Sig.	Std. beta	t-value	Sig.
Control variable:						
Company size	.408**	4.82	.000	.146	1.98	.050
Model variables:						
Broad scope				.234*	2.51	.014
Integration				.216*	2.20	.030
Timeliness				.221*	2.60	.011
Benchmarking				.093	0.97	.334
F value	23.233**			22.499**		
R2	.167			.501		
Adjusted R2	.160			.479		
R2 change	.167			.334		
F change	23.233**			18.759**		

Note: p-values for each unstandardized parameter estimate are in parentheses.
Level of significant: *p<0.05, **p<0.01.

These results give support to the hypotheses H1.1a (broad scope and non-financial performance), H1.1b (integration and non-financial performance), and H1.1c (timeliness and non-financial performance). However, hypothesis H1.1d (benchmarking and non-financial performance) was not supported. The full SPSS output is annexed in Appendix **I1**.

b) The Relationship between PMIS and Financial Performance

Similar analysis was conducted for the relationships between PMIS and financial performance. Table 4.32 summarises the results of two step multiple regression analysis. The first step disclosed the effect of the control variable on the financial performance. The two regression models were significant (F=37.148, p<0.01; F=24.839, p<0.01). The control variable (company's size) shows a significant effect on financial performance. The control variable explains 24.3% of variance in financial performance. However, the addition of the four components of a PMIS in the second step explains an additional 28.3% of the variance. This means that the control variable and the four PMIS components cumulatively explain 52.6% of the variance in financial performance.

Table 4.32: Multiple Regression Result for the Relationship between PMIS and Financial Performance

Variable	DV: Financial Performance					
	Step1			Step2		
	Std. Beta	t-value	Sig.	Std. Beta	t-value	Sig.
Control variable:						
Company size	.493**	6.10	.000	.259**	3.61	.000
Model variables:						
Broad scope				.216*	2.37	.019
Integration				.192*	2.02	.046
Timeliness				.019	0.23	.817
Benchmarking				.247**	2.64	.009
F value	37.148**			24.839**		
R2	.243			.526		
Adjusted R2	.236			.505		
R2 change	.243			.283		
F change	37.148**			16,726**		

Note: p-values for each unstandardized parameter estimate are in parentheses.
*Level of significant: *p<0.05, **p<0.01.**

These results give support to hypotheses H1.2a (broad scope and financial performance), H1.2b (integration, and financial performance), and H1.2d (benchmarking and financial performance). However, hypothesis H1.2c (timeliness and financial performance) was not supported. The full SPSS output is annexed in Appendix **I2.**

Table 4.33 below summarises the results of testing the hypotheses concerning the relationships between PMIS and organisational performance. The tables indicate that the hypotheses H1.1 is partially supported (PMIS and non-financial performance), and hypotheses H1.2 is also partially supported (PMIS and financial performance).

Table 4.33: Summary of Hypotheses Testing "Results for the Relationship between PMIS and Organizational Performance

Item			**Statement of hypotheses**	**Remark**
H1			There is a significant positive relationship between PMIS and organizational performance	Partially Supported
	H1.1		There is a significant positive relationship between PMIS and non-financial performance.	Partially Supported
		H1.1.a	There is a significant positive relationship between broad scope of PMIS and.non-financial performance.	Supported
		H1.1.b	There is a significant positive relationship between integration of PMIS and.non-financial performance.	Supported
		H1.1.c	There is a significant positive relationship between timeliness of PMIS and.non-financial performance.	Supported
		H1.1.d	There is a significant positive relationship between benchmarking of PMIS and.non-financial performance.	Rejected
	H1.2		There is a significant positive relationship between PMIS and financial performance.	Partially Supported
		H1.2.a	There is a significant positive relationship between broad scope of PMIS and financial performance.	Supported
		H1.2.b	There is a significant positive relationship between integration of PMIS and financial performance.	Supported
		H1.2.c	There is a significant positive relationship between timeliness of PMIS and financial performance.	Rejected
		H1.2.d	There is a significant positive relationship between benchmarking of PMIS and financial performance.	Supported

These results signify, thus, the hypothesis H1 “There is a significant positive relationship between PMIS and organisational performance” is partially supported.

4.10.2. The Relationship between PMIS and Competitive Capabilities

This section deals with the second hypothesis in the study which predicts that the four PMIS components (broad scope, integration, timeliness, and benchmarking) have a significant positive relationship with the two dimensions of competitive capabilities (quality capability and cost capability), as shown in figure 4.2 below.

To test this hypothesis, a two-step multiple regression analysis was carried out. The first step, the analysis, examine the impact of the control variable (company’s size) on competitive capability. For the second step, a PMIS was introduced to test the impact on two of competitive capabilities’ dimensions. The results of two multiple regression analysis are discussed in subsections below.

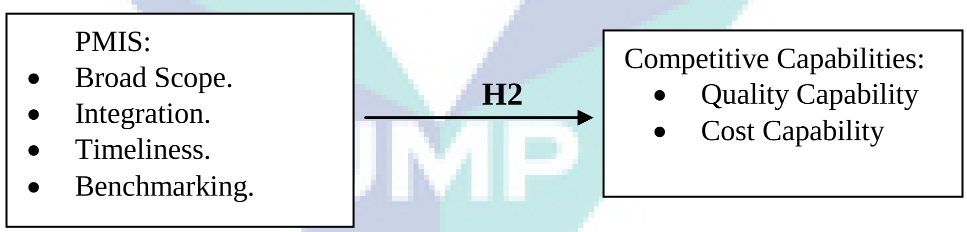

Figure 4.2: The Relationship between PMIS and Competitive Capabilities.

a) The Relationship between PMIS and Quality Capability

Table 4.34 showed the results of a two-step multiple regression analysis of a control variable and four components of a PMIS on quality capability. The two regression models were significant ($F=17.723$, $p<0.01$; $F=23.245$, $p<0.01$). In the first step, it was determined that the control variable has a significant effect on quality capability. The control variable explains about 13.3% of total variation in quality capability. The additions of the four PMIS components in the step explain an additional 37.7% of quality capability variance. This means the control variable and the PMIS cumulatively explain 51% of the variance in quality capability.

The results indicated that the hypothesis was supported, i.e. there is a significant positive relationship between PMIS and quality capability. Farther, it presented that timeliness of PMIS has the most significant effect on quality capability (β=0.259, p<0.01), followed by broad scope (β=0.243, p<0.05), then integration (β=0.234, p<0.05). However, benchmarking of PMIS shows no significant relationship (effect) with quality capability (β=0.075, p>0.05), though the results still indicate a positive relationship between the variables.

Table 4.34: Multiple Regression Result for the Relationship between PMIS and Quality Capability

Variable	**DV: Quality Capability**					
	Step1			**Step2**		
	Std. Beta	t-value	Sig.	Std. Beta	t-value	Sig.
Control variables:						
Company size	.364**	4.21	.000	.086	1.17	.244
Model variables:						
Broad scope				.243*	2.62	.010
Integration				.234*	2.41	.018
Timeliness				.259**	3.06	.003
Benchmarking				.075	0.79	.431
F value	17.723**			23.245**		
R2	.133			.509		
Adjusted R2	.125			.487		
R2 change	.133			.377		
F change	17.723**			21.495**		

Note: p-values for each unstandardized parameter estimate are in parentheses.
Level of significant: *p<0.05, **p<0.01.

These results give support to hypotheses H2.1a (broad scope and quality capability), H2.1b (integration and quality capability), and H2.1c (timeliness and quality capability). However, the hypothesis H2.1d (benchmarking and quality capability) was not supported. The full SPSS output is displayed in Appendix **I3**.

b) The Relationship between a PMIS and Cost Capability

Similar analysis was conducted for the relationships between a PMIS and financial performance. Table 4.35 summarises the results of a two-step regression analysis. The first step discloses the effect of the control variable on the cost capability. The two regression models were significant ($F=14.478$, $p<0.01$; $F=22.825$, $p<0.01$). The control variable (company's size) shows a significant effect on cost capability. This control variable explains 11.1% of variance in cost capability. However, after adding the four components of a PMIS in the second step explains an additional 39.4% of the variance. This means that the control variable and the four PMIS components cumulatively explain 50.5% of the variance in cost capability.

Further analysis of the results in table 4.26 presents that benchmarking has the most significant effect on cost capability ($\beta=0.279$, $p<0.01$), timeliness ($\beta=0.238$, $p<0.01$), broad scope ($\beta=0.226$, $p<0.05$). However, integration shows no significant relationship (effect) with cost capability ($\beta=0.078$, $p>0.05$). Though the results still indicate that integration has a positive effect on cost capability, but is not significant.

These results give support to hypotheses H2.2a (broad scope and cost capability), H2.2c (timeliness and cost capability), and H2.2d (benchmarking and cost capability). However, the hypothesis H2. 2b (integration, and cost capability) was not supported. The full SPSS output is presented in Appendix **I4.**

Table 4.35: Multiple Regression Result for the Relationship between PMIS and Cost Capability

Variable	**DV: Cost Capability**					
	Step1			**Step2**		
	Std. Beta	t-value	Sig.	Std. Beta	t-value	Sig.
Control variables:						
Company size	.333**	3.81	.000	.061	.833	.406
Model variables:						
Broad scope				.226*	2.431	.017
Integration				.078	0.797	.427
Timeliness				.238**	2.807	.006
Benchmarking				.279**	2.914	.004
F value	14.478**			22.825**		
R2	.111			.505		
Adjusted R2	.103			.483		
R2 change	.111			.394		
F change	14.478**			22.258**		

Note: p-values for each unstandardized parameter estimate are in parentheses.
*Level of significant: *p<0.05, **p<0.01.*

Table **4.36** summarises the results of testing the hypotheses concerning the relationships between PMIS and competitive capabilities. The table reveals that both of the main hypotheses (H2.1 and H2.2) are partially supported. These results signify that three characteristics of a PMIS, excepting benchmarking, show a significant positive relationship with quality capability. In addition, the results indicate that only integration of PMIS shows an unsignificant positive relationship with cost capability. Thus, over-all hypothesis H2 "There is a significant positive relationship between PMIS and competitive capabilities" are partially supported.

Table 4.36: Summary of Hypotheses Testing "Results for the Relationship Between PMIS and Competitive Capabilities"

Item			Statement of hypotheses	Remark
H2			There is a significant positive relationship between PMIS and competitive capabilities.	Partially Supported
	H2.1		There is a significant positive relationship between PMIS and quality capability.	Partially Supported
		H2.1.a	There is a significant positive relationship between broad scop of PMIS and quality capability.	Supported
		H2.1.b	There is a significant positive relationship between integration of PMIS and quality capability.	Supported
		H2.1.c	There is a significant positive relationship between timeliness of PMIS and quality capability.	Supported
		H2.1.d	There is a significant positive relationship between benchmarking of PMIS and quality capability.	Rejected
	H2.2		There is a significant positive relationship between PMIS and cost capability.	Partially Supported
		H2.2.a	There is a significant positive relationship between broad scop of PMIS and cost capability.	Supported
		H2.2.b	There is a significant positive relationship between integration of PMIS and cost capability.	Rejected
		H2.2.c	There is a significant positive relationship between timeliness of PMIS and cost capability.	Supported
		H2.2.d	There is a significant positive relationship between benchmarking of PMIS and cost capability.	Supported

4.10.3. The Relationship between Competitive Capabilities and Organisational Performance

This section deals with the third hypothesis in the study which predicts that two types of competitive capability (quality capability and cost capability) have a positive relationship with the two dimensions of organisational performance (non-financial and financial), as shown in figure 4.3 below.

To test these hypotheses, a two-step multiple regression analysis was carried out. Firstly, the analysis examine the impact of a control variable (company's size) on organisational performance. The second step, competitive capability was introduced to test the impacts on two organisational performance dimensions. The results of the two multiple regression analyses were discussed in the subsections below.

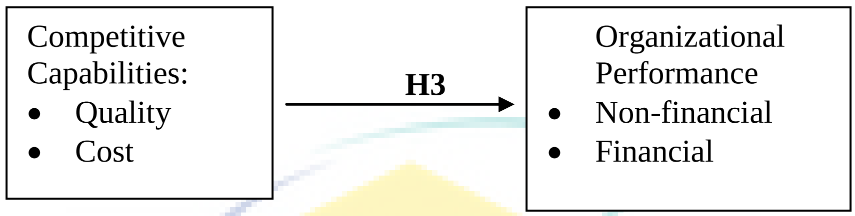

Figure 4.3: The Relationship between Competitive capabilities and Organizational Performance.

a) The Relationship between Competitive Capabilities and Non-finacial Performance

Table 4.37 presents the results of the two-step multiple regression analysis of the control variable and two components of competitive capability on non-financial performance. The two regression models were significant (F=23.233, p<0.01; F=37.767, p<0.01). In the first step, the control variable have significant effect on non-financial performance. It explains approximately 16.7% of total variation in non-financial performance. After adding the two competitive capability components in the second step explains the additional 33.2% of non-financial performance variance. This means the control variable and the competitive capability cumulatively explain 49.8% of the variance in non-financial performance. The results revealed that the hypothesis was supported, i.e. there is a positive relationship between competitive capability and non-financial performance.

Table 4.37: Multiple Regression Result: The Relationship between Competitive Capability and Non-financial Performance

Variable	DV: Non-financial Performance					
	Step1			Step2		
	Std. Beta	t-value	Sig.	Std. Beta	t-value	Sig.
Control variables:						
Company size	.408**	4.82	.000	.170*	2.37	.020
Model variables:						
Quality Capability				.414**	4.517	.000
Cost Capability				.264**	2.913	.004
F value	23.233**			37.767**		
R2	.167			.498		
Adjusted R2	.160			.485		
R2 change	.167			.332		
F change	23.233**			37.686**		

Note: p-values for each unstandardized parameter estimate are in parentheses.
Level of significant: *p<0.05, **p<0.01.

The results also showed that quality capability has the most significant effect on non-financial performance (β=0.414, p<0.01), than, cost capability which shows a less significant effect on non-financial performance (β=0.264, p<0.01), though the results still indicate a positive relationship between the two variables. These results give support to both hypotheses H3.1a (quality capability and non-financial performance), and H3.1b (cost capability and non-financial performance). The full SPSS output is presented in Appendix **I5**.

b) The Relationship between Competitive Capabilities and Financial Performance

Table 4.38 presents the results of the two-step regression analysis of the control variable and the two components of competitive capability on financial performance. The two regression models were significant (F=37.018, p<0.01; F=50.198, p<0.01). In the first step, the control variable has a significant effect on financial performance. The control variable explains approximately 24.3% of total variation in financial performance. The addition of the two competitive capability components in second step explain an additional 33.6% of the financial performance variance. This means that control variable and the competitive capabilities cumulatively explain 57.8% of the variance in financial performance.

Table 4.38: Multiple Regression Result for the Relationship between Competitive Capabilities and Financial Performance

variable	DV: Financial Performance					
	Step1			Step2		
	Std. Beta	t- value	Sig.	Std. Beta	t-value	Sig.
Control variables:				.		
Company size	.493**	6.10	.000	.264**	4.01	.000
Model variable:						
Quality Capability				.188*	2.23	.027
Cost Capability				.480**	5.78	.000
F value	37.148**			52.073**		
R2	.243			.578		
Adjusted R2	.236			.567		
R2 change	.243			.336		
F change	37.148**			45.337**		

Note: p-values for each unstandardized parameter estimate are in parentheses.
*Level of significant: *p<0.05, **p<0.01.*

Table 4.39 summarises the results of testing the hypotheses concerning the relationships between competitive capabilities and organisational performance. The table indicates that both of the main hypotheses are fully supported (competitive capabilities and non-financial performance) and (competitive capabilities and financial performance). These results signify that quality and cost capabilities show significant positive relationship with financial performance, thus, the hypothesis is full supported.

Table 4.39: Summary of Hypotheses Testing "Results for the Relationship Between Competitive capabilities and Organizational Performance".

Item	Statement of hypotheses	Remark
H3	There is a significant positive relationship between competitive capabilities and organizational performance.	Full Supported
H3.1	There is a significant positive relationship between competitive capabilities and non-financial Performance.	Full Supported
H3.1.a	There is a significant positive relationship quality capability and non-financial performance.	Supported
H3.1.b	There is a significant positive relationship between cost capability and non-financial performance.	Supported
H3.2	There is a significant positive relationship between competitive capabilities and financial performance.	Full Supported
H3.2.a	There is a significant positive relationship between quality capability and financial performance.	Supported
H3.2.b	There is a significant positive relationship between cost capability and financial performance.	Supported

4.10.4. The Mediating Effect of Competitive Capabilities

The support from the first three hypotheses provides the initial steps required to test the fourth hypothesis and its sub hypotheses (16 hypotheses) in this study which predicts whether competitive cabapilities (quality and cost) may be a mediating variable between a PMIS (broad scope, integration, timeliness and benchmarking) and organisational performance (non-financial and financial), as shown in figure 4.4 below.

To test these hypotheses, this study adopted Baron and Kenny's (1986) three-step procedure to test the mediating effect. The procedure is as follows:

1. The independent variables should be related to the dependent variables (B1 should be significant);
2. The independent variables should be related to the mediating variables (B2 must be significant); and

3. The mediator should be related to the dependent variables (B3 must be significant).

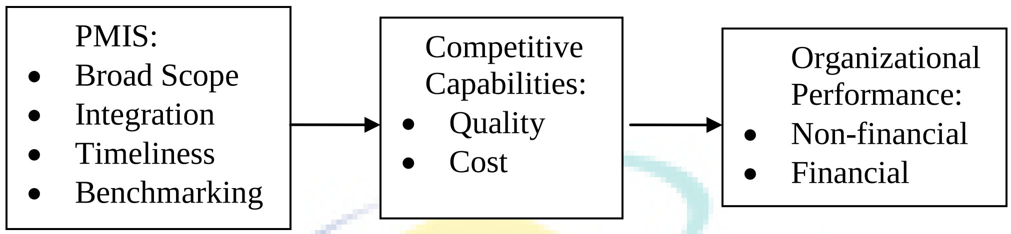

Figure 4.4: The Mediating Effect of Competitive Capabilities.

To establish whether the mediator is fully or partially mediating the relationship between the independent and dependent variables, the impact of the independent variable on dependent variable controlling the mediating variable should be zero or B4 is not significant in a full mediator model. In other words, the significant relationship between the independent variables and the dependent variables will be diminished after introducing the mediating variable. However, if the relationships between the independent variables and the dependent variables are still significant after introducing the mediating variable, the mediating effect would be considered as partial or B4 is significant but reduced.

In order to fulfill the condition for testing the mediation effect of competitive capabilities, three regression equations were estimated with the two dimensions of organisational performance (non-financial and financial). Each dimension of organisational performance was regressed on the control variable (company's size) in step one, adding four components of a PMIS in step two, competitive capabilities were added in step three as mediating to determine whether there is a significant influence on organisational performance. The results of hierarchical regression analyses were discussed in the subsections below.

4.10.4.1. The Mediating Effect of Quality Capability on the Relationship between a PMIS and Organisational Performance

The quality capability was hypothesised to mediate the relationship between a PMIS and organisational performance. However, based on the result of multiple regression analysis presented in Table 4.27, benchmarking did not significantly influence quality capability. Therefore, this variable violated the second assumption of the mediating effect; in that the independent variable must significantly influence the mediating variable (B2 must be significant). Thus, benchmarking could not establish the mediation effects.

a) The Mediating Effect of Quality Capability on the Relationship between a PMIS and Non-financial Performance

The quality capability was hypothesised to mediate the relationship between a PMIS and non-financial performance. The result of multiple regression analysis as presented in Table 4.34 indicated benchmarking of a PMIS did not significantly influence quality capability. As a result, this variable violated the first assumption of the mediating effect; in that the independent variable must significantly influence the mediating variable (B1 must be significant). Additionally, the result of multiple regression analysis that had been presented in Table 4.31 benchmarking of PMIS did not significantly influence non-financial performance. Therefore, this variable violated the first assumption of the mediating effect; in that the independent variable must significantly influence the dependent variable (B2 must be significant). Thus, benchmarking of a PMIS could not establish the mediation effects. On the other hand, the three dimensions of PMIS (broad scope, integration, and timeliness) were found to influence significantly the quality capability and non-financial performance. Furthermore, quality capability was found to significantly influence non-financial performance.

This indicated that there is a possible mediating effect of quality capability on the relationship between three of the components of a PMIS and non-financial performance, as shown in figure 4.5.

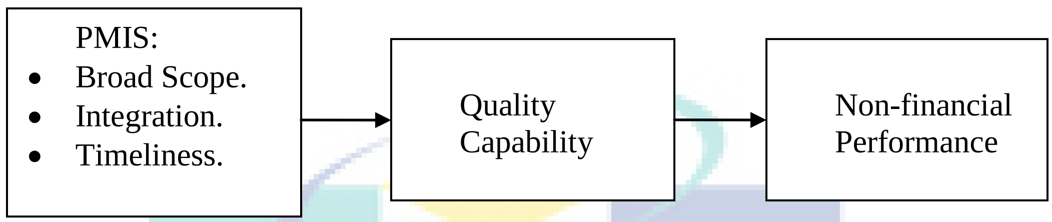

Figure 4.5: The Mediating Effect of Quality Capability(I).

Table 4.40 presented the results of the hierarchical regression analysis testing the mediating effect of quality capability on the relationship between a PMIS and non-financial performance. In the first step, the control variable has a significant effect on non-financial performance. In the second step, the results showed that all three components of PMIS have significantly influenced non-financial performance. In the third step, the broad scope significantly influenced non-financial performance (β=0.179, p<0.05), while integration and timeliness was insignificant influenced non-financial performance.

The results indicate also that quality capability as a mediating variable significantly influenced non-financial performance in the third step (β=0.31.2, p<0.01). Hence, it could be interpreted that quality capability partially mediated the relationship between broad scope of PMIS, and non-financial performance, while it fully mediated the relationship between integration and timeliness of aPMIS and non-financial performance. The full SPSS is showed in Appendix **J1**.

Table 4.40: Hierarchical Regression Result: The Mediating Effect of Quality Capability on the Relationship between PMIS and Non-financial Performance

Variable	DV: Non-financial Performance								
	Step1			Step2			Step3		
	Std. Beta	t-value	Sig.	Std. Beta	t-value	Sig.	Std. Beta	t-value	Sig.
Control variable:									
Company size	.408**	4.82	.000	.150*	2.04	.044	.122	1.73	.087
Model variables:									
Broad scope				.262**	2.95	.004	.179*	2.03	.045
Integration				.250**	2.72	.007	.168	1.85	.067
Timeliness				.237**	2.83	.006	.152	1.82	.071
Mediating:									
Quality capability							.312***	3.44	.001
F value	23.233**			27.902**			26.829**		
R2	.167			.497			.545		
Adjusted R2	.160			.479			.525		
R2 change	.167			.330			.048		
F change	23.233**			24.710**			11.835**		

Note: p-values for each unstandardized parameter estimate are in parentheses.
Level of significant: *p<0.05, **p<0.01.

b) The Mediating Effect of Quality Capability on the Relationship between a PMIS and Financial Performance

Quality capability was hypothesised to mediate the relationship between a PMIS and financial performance. The result of multiple regression analysis as presented in Table **4.34**, indicates benchmarking of PMIS did not significantly influence quality capability. Accordingly, this variable violated the first assumption of the mediating effect; in that the independent variable must significantly influence the mediating variable (B1 must be significant). Also, the result of multiple regression analysis presented in Table 4.32 indicated that timeliness of

PMIS did not significantly influence financial performance. Therefore, this variable violated the second assumption of the mediating effect; in that the independent variable must significantly influence the dependent variable (B2 must be significant). Thus, timeliness and benchmarking of PMIS could not establish the mediation effects. On the other hand, the two dimensions of PMIS (broad scope, integration) were found to influence significantly the quality capability and financial performance. Furthermore, quality capability was found to have significantly influenced financial performance. This indicated that there is a possible mediating effect of quality capability on the relationship between broad scope, integration of PMIS and financial performance, as shown in figure 4.6 below.

Figure 4.6: The Mediating Effect of Quality Capability(II).

Table 4.41 presented the results of the hierarchical regression analysis testing the mediating effect of quality capability on the relationship between broad scope and integration of PMIS and financial performance.

In the first step, the control variable has a significant effect on financial performance explaining approximately 24.3% of the variance in financial performance. In the second step, the results showed that both broad scope and integration of PMIS significantly influenced financial performance. In the third step, broad scope and integration significantly influenced financial performance.

The results indicate also that quality capability as a mediating variable significantly influenced financial performance in the third step (β=0.262, $p<0.01$).

Hence, it could be interpreted that quality capability partially mediated the relationship between broad scope and integration of a PMIS, and financial performance. The full SPSS is presented in Appendix J2.

Table 4.41: Hierarchical Regression Result: The Mediating Effect of Quality Capability on the Relationship between PMIS and Financial Performance

Variable	**DV: Financial Performance**								
	Step1			**Step2**			**Step3**		
	Std. Beta	t-value	Sig.	Std. Beta	t-value	Sig.	Std. Beta	t-value	Sig.
Control variables:									
Company size	.493**	6.10	.000	.276**	3.78	.000	.245**	3.44	.001
Model variables:									
Broad scope				.308**	3.63	.000	.216*	2.47	.015
Integration				.300**	3.42	.001	.210*	2.33	.022
Mediating:									
Quality capability							.262**	3.00	.003
F value	37.148**			37.103**			32.014**		
R2	.243			.494			.531		
Adjusted R2	.236			.481			.515		
R2 change	.243			.251			.037		
F change	37.148**			28.329**			8.968**		

Note: p-values for each unstandardized parameter estimate are in parentheses.
Level of significant: *p<0.05, **p<0.01.

4.10.4.2. The Mediating Effect of Cost Capability on the Relationship between PMIS and Organisational Performance

Cost capability was hypothesised to mediate the relationship between a PMIS and organisational performance. However, based on the results of multiple regression analysis as presented in Table 4.35, the integration of a PMIS did not significantly influence cost capability. Therefore, this variable violated the second assumption of the mediating effect; in that the independent variable must significantly influence the mediating variable (B2 must be significant). Thus, integration of PMIS could not establish the mediation effects.

a) The Mediating Effect of Cost Capability on the Relationship between a PMIS and Non-financial Performance

The cost capability was hypothesised to mediate the relationship between a PMIS and non-financial performance. The result of multiple regression analysis as presented in Table 4.35, indicated that the integration of a PMIS did not significantly influence cost capability. Accordingly, this variable violated the first assumption of the mediating effect; in that the independent variable must significantly influence the mediating variable (B1 must be significant). Also, the result of multiple regression analysis that had been presented in Table 5.31, benchmarking of PMIS did not significantly influence non-financial performance. Therefore, this variable violated the first assumption of the mediating effect; in that the independent variable must significantly influence the dependent variable (B2 must be significant). Thus, integration and benchmarking of PMIS could not establish the mediation effects. On the other hand, the relationship between cost capability and non-financial performance in Table 4.37 was significant. Thus, these two relationships achieved the third assumption of the mediating effect; in that the mediating variable must significantly influence the dependent variable (B3 must be significant). Therefore, cost capability could establish the mediation effect with the above-mentioned relationship. Thus, the above-mentioned relationships were eliminated from further analysis.

The cost capability was hypothesised to mediate the relationship between a PMIS and non-financial performance as presented in Figure 4.7. The two dimension of PMIS (broad scope and timeliness) were found to influence significantly the cost capability and non-financial performance. Furthermore, cost capability was found to significantly influence non-financial performance. This indicated that there is a possible mediating effect of cost capability on the relationship between broad scope and timeliness of PMIS and non-financial performance, as shown in figure 4.7 below.

Figure 4.7: The Mediating Effect of Cost Capability(I).

Table 4.42 presents the results of the hierarchical regression analysis testing indicating the mediating effect of cost capability on the relationship between broad scope and timeliness of a PMIS and non-financial performance. In the first step; the control variable has a significant effect on non-financial performance. The control variable explains approximately 16.7% of the variance in non-financial performance. In the second step, the results showed that broad scope and timeliness of PMIS significantly influenced non-financial performance. In the third step, the broad scope and timeliness of a PMIS significantly influenced non-financial performance.

The results indicate also that cost capability, as mediating variable, significantly influenced non-financial performance in third step (β=0.266, $p<0.01$). Hence, it could be interpreted that cost capability partially mediated the relationship between broad scope and timeliness of a PMIS, and non-financial performance. The full SPSS is presented in Appendix **J3**.

Table 4.42: Hierarchical Regression Result: The Mediating Effect of Cost Capability on the Relationship between PMIS and Non-financial Performance

Variable	DV: Non-financial Performance								
	Step1			Step2			Step3		
	Std. Beta	t-value	Sig.	Std. Beta	t-value	Sig.	Std. Beta	t-value	Sig.
Control variables:									
Company size	.408**	4.82	.000	.196**	2.66	.009	.168*	2.34	.021
Model variables:									
Broad scope				.367**	4.46	.000	.265**	3.05	.003
Timeliness				.301**	3.64	.000	.213*	2.50	.014
Mediating:									
Cost capability							.266**	2.97	.004
F value	23.233**			32.882**			28.568**		
R2	.167			.464			.503		
Adjusted R2	.160			.450			.485		
R2 change	.167			.297			.039		
F change	23.233**			31.582			8.814**		

Note: p-values for each unstandardized parameter estimate are in parentheses.
Level of significant: *$p<0.05$, **$p<0.01$.

b) The Mediating Effect of Cost Capability on the Relationship between a PMIS and Financial Performance

Cost capability was hypothesised to mediate the relationship between a PMIS and financial performance. The result of multiple regression analysis as presented in Table 4.35, indicates the integration of PMIS did not significantly influence cost capability. Accordingly, this variable had violated the first assumption of the mediating effect; in that the independent variable must significantly influence the mediating variable (B1 must be significant). Also, the result of hierarchical regression analysis as presented in Table 4.32, indicates timeliness of a PMIS did not significantly influence financial performance. Therefore, this variable violated the first assumption of the mediating effect; in that the independent variable must significantly influence the dependent variable (B2 must be significant). Thus, integration and timeliness of a PMIS could not be established as having mediation effects. On the other hand, the relationship between cost capability and financial performance, as indicated in Table 5.38, was significant. Thus, these two relationships achieved the third assumption of a mediating effect; in that the mediating variable must significantly influence the dependent variable (B3 must be significant). Therefore, cost capability could establish the mediation effect with the above-mentioned relationship. Thus, the above-mentioned relationships were eliminated from further analysis.

The cost capability was hypothesised to mediate the relationship between a PMIS and financial performance as presented in Figure 4.8. The two dimensions of PMIS (broad scope and benchmarking) were found to influence significantly the cost capability and financial performance. Also cost capability was found to have significantly influenced financial performance. This indicated that there is a possible mediating effect of cost capability on the relationship between broad scope and benchmarking of PMIS and financial performance as shown in figure 5.8 below.

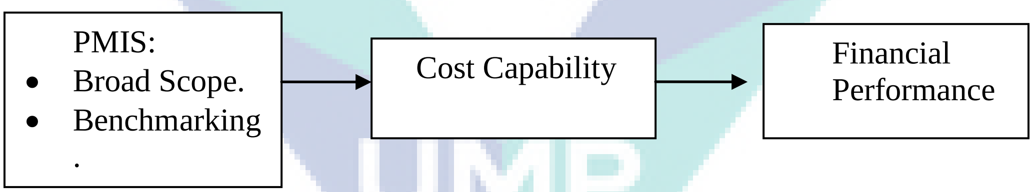

Figure 4.8: The Mediating Effect of Cost Capability(II).

Table 4.43 presented the results of the hierarchical regression analysis testing the mediating effect of cost capability on the relationship between broad scope and benchmarking of PMIS and financial performance. In the first step, the control variable has a significant effect on financial performance and explains approximately 24.2% of the variance in non-financial performance. In second step, the results showed that broad scope and benchmarking of PMIS significantly influenced financial performance. In the third step, the results indicate that cost capability, as a mediating variable, significantly influenced financial performance (β=0.421, p<0.01), also benchmarking of PMIS still significantly influenced financial performance (β=0.196, p<0.05), while the broad scope insignificantly influenced financial performance. Hence, it could be interpreted that cost capability fully mediated the relationship between broad scope of PMIS and financial performance, while it partially mediated the relationship between benchmarking of a PMIS and financial performance. The full SPSS is presented in Appendix **J4**.

Table 4.43: Hierarchical Regression Result: The Mediating Effect of Cost Capability on the Relationship between PMIS and Financial Performance

Variable	**DV: Financial Performance**								
	Step1			**Step2**			**Step3**		
	Std. Beta	t-value	Sig.	Std. Beta	t-value	Sig.	Std. Beta	t-value	Sig.
Control variable:									
Company size	.493**	6.10	.000	.294**	4.18	.000	.250**	3.90	.000
Model variables:									
Broad scope				.283**	3.34	.001	.146	1.81	.073
Benchmarking				.330**	3.87	.000	.196*	2.05	.043
Mediating:									
Cost capability							.421**	5.20	.000
F value	37.148**			39.072**			42.766**		
R2	.243			.507			.602		
Adjusted R2	.236			.494			.588		
R2 change	.243			.264			.095		
F change	37.148**			30.566**			27.057**		

Note: p-values for each unstandardized parameter estimate are in parentheses.
Level of significant: *p<0.05, **p<0.01.

Table 4.44 summarises the results of testing hypotheses concerning the mediating effect of competitive capabilities between a PMIS and organisational performance. The findings of the mediating effects implied that broad scope, integration and timeliness of PMIS has an influence on non-financial performance in Malaysian E&E manufacturing companies through quality capability. Moreover, broad scope and timeliness of PMIS influenced the non-financial performance of Malaysian E&E manufacturing companies through cost capability. While integration and benchmarking of PMIS influence financial performance in Malaysian E&E manufacturing companies through quality capability. Furthermore, broad scope and benchmarking of PMIS influence financial performance of Malaysian E&E manufacturing companies through cost capability.

Table 4.44: Summary of Hypotheses Testing “Results for the Mediating Effect of Cometitive Capabilities”.

Item	Statement of hypotheses	Remark
H4	Competitive capability mediates the relationship between PMIS and organizational performance.	Partially Supported
H4.1	Quality capability mediates the relationship between PMIS and organizational performance	Partially Supported
H4.1.1	Quality capability mediates the relationship between PMIS and non-financial performance.	Partially Supported
H4.1.1.a	Quality capability mediates the relationship between broad scope and non-financial performance.	Supported
H4.1.1.b	Quality capability mediates the relationship between integration and non-financial performance.	Supported
H4.1.1.c	Quality capability mediates the relationship between timeliness and non-financial performance.	Supported
H4.1.1.d	Quality capability mediates the relationship between benchmarking and non-financial performance.	Rejected
H4.1.2	Quality capability mediates the relationship between PMIS and financial performance..	Partially Supported
H4.1.2.a	Quality capability mediates the relationship between broad scope and financial performance.	Supported
H4.1.2.b	Quality capability mediates the relationship between integration and financial performance.	Supported
H4.1.2.c	Quality capability mediates the relationship between timeliness and financial performance.	Rejected
H4.1.2.d	Quality capability mediates the relationship between benchmarking and financial performance.	Rejected

Table 4.44: Continued

H4.2	Cost capability mediates the relationship between PMIS and organizational performance	Partially Supported
H4.2.1	Cost capability mediates the relationship between PMIS and non-financial performance.	Partially Supported
H4.2.1.a	Cost capability mediates the relationship between broad scope and non-financial performance.	Supported
H4.2.1.b	Cost capability mediates the relationship between integration and non-financial performance.	Rejected
H4.2.1.c	Cost capability mediates the relationship between timeliness and non-financial performance.	Supported
H4.2.1.d	Cost capability mediates the relationship between benchmarking and non-financial performance.	Rejected
H4.2.2	Cost capability mediates the relationship between PMIS and financial performance.	Partially Supported
H4.2.2.a	Cost capability mediates the relationship between broad scope and financial performance.	Supported
H4.2.2.b	Cost capability mediates the relationship between integration and financial performance.	Rejected
H4.2.2.c	Cost capability mediates the relationship between timeliness and financial performance.	Rejected
H4.2.2.d	Cost capability mediates the relationship between benchmarking and financial performance.	Supported

4.10. SUMMARY OF MAJOR FINDINGS AND RESULTS OF THE HYPOTHESES

Synthesising from the analyses, the hypotheses that are supported and those which have been rejected are indicated in Table 4.44. As a reiteration, the following are the major findings gathered through this study testing regime:

1. Out of the independent variables, three (broad scope, integration and timeliness of PMIS) have a significant positive influence on one of the dependent variables (non-financial performance) and significant positive influence also one of the mediating variables (quality capability), whereas, broad scope, integration and

benchmarking of PMIS have a significant positive influence on financial performance, and broad scope, timeliness and benchmarking of PMIS have a significant positive influence on cost capability;

2. Furthermore, only benchmarking has a significant positive influence on one of the dependent variables (financial) and one of the mediating variables (cost capability);
3. Both mediator variables (quality capability and cost capability) have a significant postive effect on both dependent variables (non-financial performance and financial performance);
4. Quality capability is not mediated through the relationship between benchmarking of PMIS and non-financial performance as well as not being mediated through the relationship between timeliness and benchmarking and financial performance;
5. Quality capability acts as a partial mediator in the relationship between broad scope and non-financial performance, while it appears as fully mediator in the relationship between integration and timeliness, and non-financial performance; and
6. Finally, cost capability acts as a partial mediator in the relationship between broad scope and timeliness, and non-financial performance and as a partial mediator in the relationship between benchmarking, and financial performanc, while it acts as a fully mediator in the relationship between broad scope and financial performance.

4.11. SUMMARY OF THE CHAPTER

This chapter displayed the statistical results for the study. The findings begin by the companies' profile, then the factor analysis which resulted in an adjusted research framework. Eight (08) main hypotheses were tested. Most of the hypotheses were partially support. Even so, in the next chapter, the results and findings would be further scrutinised and discussed in terms of their implications, then limitations, suggestions and conclusions of study are reported.

CHAPTER 5

DISCUSSION AND CONCLUSIONS

5.1. INTRODUCTION

This chapter summarises and discusses the results of the data analysis. The conclusions emerging from the research findings are illustrated initially, followed by a discussion of the results in light of prior studies. The implications of the findings for theoretical and management purposes are then developed. Next, the limitations and directions for future study are identified. Finally, an overall conclusion of this study is made.

5.2. RECAPITULATION OF THE STUDY FINDINGS

The results from the analyses are posted in this chapter, taking into consideration the concepts and discussions on the performance measurement information systems (broad scope, integration, timeliness and benchmarking) and organisational performance (non-financial and financial), and at the same time, the competitive capabilities (quality and cost) as mediator constructs among Malaysian companies in the E&E manufacturing industry. The manufacturing companies were selected not only because of their role in the overall well-being of the Malaysian economy, but also due to their active role in taking an interest in information systems and the associated high competitiveness issues within the manufacturing industry.

The research questions are repeated here to facilitate the discussion as follows:

1. What are valid measurement of PMIS and extent the level of PMIS design, level of competitive capability and performance among E & E manufacturing companies in Malaysia?;
2. Is there a direct relationship between a PMIS and organisational performance?.
3. Is there a relationship between a PMIS and competitive capability?.
4. Is there a relationship between competitive capability and organisational performance?.
5. What extent does competitive capability mediate of the relationship between PMIS and the organizational performance?.

Based on the literature review, this study identified the variables to be focused on which are the four components of PMIS (broad scope, integration, timeliness and benchmarking), and the two dimensions of organisational performance (non-financial and financial). This is in addition to the two types of competitive capabilities (quality and cost).

The data for this study was obtained from a cross-sectional survey among E&E manufacturing companies in Malaysia. A survey was carried out on a sample of 118 manufacturing industry of E&E companies, which are registered with the Federation of Malaysian Manufacturers (FMM). Data collection was undertaken through a structured questionnaire directed to either the chief executive officers, or general managers in each company. The response rate achieved from the survey was 18%, which was considered satisfactory for the purposes of this study. To determine whether a non-response bias was present in this study, early respondents were compared with late respondents along all the descriptive response items in the survey. The Chi-square test showed no significant differences between the early and late respondents. It means that, non-response bias was not a serious problem in this study.

The factor analysis and reliability tests were conducted to ensure Goodness of measurement. Factor analysis was used to test for validity of the measurement of all the variables of study. Specifically, Varimax rotation was utilised to identify the dimensionality of the variables of study. The results indicated that the extracted factors fit the conceptualised variables. The reliability of empirical measurement was obtained by internal consistency method using Cronbach’s Alpha test. The results of the reliability analysis confirmed that all the scales display a satisfactory level of reliability.

The result of descriptive analysis showed that most of the respondent companies were electric products followed next by electronic products then electric & electronic products. In terms of the size of the companies, the respondents were approximately divided between large-sized, and small and medium-sized companies. Therefore, the study's samples have fulfilled the necessary composition in terms of the existing companies in generalising the study to E&E manufacturing companies in Malaysia. The the average annual revenue of the respondents companies was approximately 60 Million Malaysian Ringgit. Based on the ownership status of the respondents companies, the majority of respondents were Malaysian fully owned. With respect to companies keeping a record on customer complaints, the vast majority of the respondent companies were keeping records and just a handful of companies were not keeping record on customer complaints. In addition, the great majority of them were using a computerised system in their daily activities, and only a handful of companies were not using computerised systems at all in their daily activities.

To describe the characteristics of surveyed companies and all variables under study, this study used descriptive statistics in addition to t-test and ANOVA. The results indicated that the Malaysian E & E manufacturing companies, on average, adopt a relatively high level of PMIS design (mean average=3.70 “on a 5-point scale”) as indicated by information characteristics. Whereupon the average of the each characteristic is as follows: broad scope (mean=3.69), integration (mean=3.70), timeliness (mean=3.76) and benchmarking (mean=3.64). The results indicated that the Malaysian E&E manufacturing companies emphasised more on timeliness followed by integration then broad scope, and the lowest component of PMIS was benchmarking. A PMIS design can be interpreted as relevantly high satisfactory by the companies surveyed.

The result of the t-test revealed that the larger companies had a higher level of PMIS design than the smaller-sized companies. The result also showed that companies (89%) are using computerized system in daily activities which had a higher level of PMIS design than the companies which did not use a computerised system.

Descriptive analysis was also conducted on the mediator variable of competitive capability. The results indicated that the Malaysian E&E manufacturing companies have achieved high levels of competitive capabilities as indicated by a mean value of 3.83 (on a 5-point scale). They have achieved a higher level of quality capability than their cost capability. Where, the average of the each types are as follows: quality capability is high level (mean=4.15) and cost capability is moderately satisfied level (mean=3.50).

The results of the t-test revealed that competitive capabilities were higher in large-sized companies compared with the small and medium-sized companies, and the companies (88.1%) which are keeping record of customer complaints have a higher level of competitive capabilities than those companies not keeping record of customer complaints. Moreover, the descriptive analysis was conducted on the dependent variable (organisational performance). The results revealed that the Malaysian E&E manufacturing companies have achieved moderately satisfactory levels of performance during the last three years, on average (mean average=3.55 “on a 5-point scale”). Furthermore, they have achieved non-financial performance higher than the level of financial performance. Where, the average of the each dimension as following: non-financial (mean=3.64) and financial (mean=3.46).

The outcome of the t-test revealed that non-financial and financial performance is higher in large-sized companies compared with the small and medium-sized companies and indicates that organisational performance appears at a higher level in the companies which have a higher annual revenue than a lower one, this result had implications favouring consistent results between the objective and subjective measurements.

The results of the bivariate correlations between the constructs incorporated in both the measurement, and the theoretical framework shows that all the correlations are in the hypothesised positive relationship. Furthermore, the result of correlations indicated that the four components of PMIS are significantly correlated with the two dimensions of organisational performance. It also indicated that the relationship between all four components of PMIS and the two types of competitive capabilities are positive and statistically significant. Before testing hypotheses, the company's size showed significant effects on the focal variables of this study. This characteristic was considered as a control variable. For that, multiple regression analysis and hierarchical regression analysis were used to test the hypotheses of the study.

The first hypothesis predicts that there is a positive relationship between the four components of PMIS (broad scope, integration, timeliness and benchmarking) and both components of organisational performance (non-financial and financial). The result revealed that there is a positive relationship between the three components of PMIS and non-financial performance namely: broad scope, integration and timeliness. However, benchmarking shows no significant positive relationship with non-financial performance. Furthermore, the result revealed that there is a significant positive relationship between the three components of PMIS (broad scope, integration and benchmarking) and financial performance. However, timeliness shows no significant positive relationship with financial performance. Which imply that, in Malaysian E&E manufacturing companies the broad scope and integration of PMIS have a significant positive effect on organizational performance (non-financial and financial), whereas the timeliness of PMIS has a significant positive effect on non-financial performance, and benchmarking of PMIS has a significant positive effect on financial performance.

The second hypothesis in this study predicted that the four components of PMIS (broad scope, integration, timeliness and benchmarking) have a positive relationship with the both types of competitive capabilities (quality and cost). The result revealed that there is a significant positive relationship between the three components of PMIS (broad scope, integration and timeliness) and quality capability. However, benchmarking shows no significant positive relationship with quality capability. Moreover, the result revealed that there is a significant positive relationship between the three components of PMIS (broad scope, timeliness and benchmarking) and cost capability. At the same time, integration shows no significant positive relationship with cost capability. That is meaning that, in Malaysian E&E manufacturing companies the broad scope and timeliness of PMIS have a significant positive effect on both types of competitive capabilities (quality capability and cost capability), whereas the integration of PMIS has a significant positive effect on quality capability, and benchmarking of PMIS has a significant positive effect on cost capability.

The third hypothesis predicts that competitive capabilities (quality and cost) have a significant positive relationship with organisational performance (non-financial and financial). The result implied that there is a significant positive relationship between both types of competitive capabilities and non-financial. As well, the result revealed that there is a significant positive relationship between both types of competitive capabilities and financial performance. Which mean that, in Malaysian E&E manufacturing companies the both types of competitive capabilities have a significant positive effect both dimanations of organizational performance (non-financial and financial).

The fourth hypothesis predicts that two types of competitive capabilities (quality and cost) mediate the relationship between the four components of PMIS (broad scope, integration, timeliness and benchmarking) and the two dimensions of organisational performance (non-financial and financial). The result revealed that the quality capability is mediate the relationship between the broad scope and integration of PMIS and organisational performance (non-financial and financial). the cost capability is mediate the relationship between the broad scope of PMIS and organisational performance (non-financial and financial). This is implies that, in Malaysian E&E manufacturing companies the broad scope, integration and timeliness of PMIS influenced non-financial performance through quality capability, and broad scope and integration of PMIS influenced financial performance through quality capability. At the same time, the broad scope and timeliness of PMIS influenced non-financial performance through cost capability, and broad scope and benchmarking of PMIS influenced financial performance through cost capability. In Malaysian E&E manufacturing industry, the broad scope of PMIS appears to be the most important in effect the competitive capabilities and organisational performance.

5.3. DISCUSSION

Based on the preceding section, this section further discusses the study findings. The discussion is derived from the theoretical perspective, empirical evidence and conceptual studies that are considered to be suitable for this study. In other words, this section provides justification, against each of the formulated research questions. In addition, all aspects possible that support and affect the model under study are given due to consideration, due to previous studies undertaken an empirical evidence. The discussion covers the measurement of PMIS, competitive capabilities and organisational performance. Furthermore, the discussion covers the mediating effect of competitive capabilities between PMIS and organisational performance.

5.3.1. The Level of PMS Design, Competitive Capabilities and Organisational Performance in Malaysian E&E Manufacturing Companies

This study has attempted to answer the first research question that was related to investigate and measure the level of sophisticated PMS design, competitive capabilities and organisational performance among Malaysian E&E manufacturing companies. Discussions on the findings as follows:

a) The Level of PMS Design in Malaysian E&E Manufacturing Companies

The first part of first research question was related to investigate and measure the level of PMIS design among Malaysian E & E manufacturing companies. In addition, this study sought to validate the measurement scales of PMIS. As noted in Chapter One, relatively little systematic efforts have been dedicated to validating measures of PMIS. Moreover, there is a lack of empirical researches that explore the existence of PMISs in Malaysia. Therefore, this study sought, firstly, to validate the new measure of PMIS among Malaysian manufacturing companies.

The findings of this study support the assertion that PMIS is a multi-diminution, consisting of four components, among which are the broad scope, integration, timeliness and benchmarking. The measurement scales were assessed for content and construct validity. The reliability of the scales was assessed by internal consistency using Cronbach's Alpha. These results indicate that the scale successfully meets the standards set for validity and reliability. Therefore, this result fully fills the gaps in previous literature regarding the validity of the multi-diminution measurements of PMIS.

The findings of this study highlight some interesting insights at the level of the PMS design from the information system perspective in Malaysia. The results indicated that the Malaysian E&E manufacturing companies, on average, adopt a relatively high level of PMIS design as indicated by information characteristics. Whereupon the average of the characteristics (broad scope, integration, timeliness and benchmarking) are ranging from 3.64 to 3.76. Farther, the large sized is highest level than small and medium sized.

The results of this study draw conclusions about the real existence of PMSs in companies in the Malaysian manufacturing sector in general, and E&E manufacturing companies in particular, whereby academics have not completed exploration in that regard. Consequently, some vital points could be drawn from the relatively high level of PMISs design among E&E manufacturing companies in

Malaysia. Generally, the high level of PMISs design may be due to the sample respondent companies being selected from what are called high-technology companies (E&E manufacturing). Previous studies found that the high-technology companies are more active in management accounting system issues (Bruggeman and Slagmulder, 1995; Ong and Teh, 2008, and Ismail and Isa, 2011), the high-technology industry likely to be more receptive to adopting innovative methods such as a higher level of information technology. Furthermore, Dechow, et. al., (2006) stated that information technology was important for accounting systems role in the organisation, and Choe (2004) reported that there is a positive correlation between the advanced manufacturing technology level and the amount of management accounting information. The level of PMIS is relatively high not high, that may be due to the respondent companies which were mixed size between large-sized, and small and medium-sized.

This was noticeable due to the descriptive statistic which showed that the great majority of companies (89%) are using computerised system in their daily activities, indicating that these companies which used computerised system in daily activities might be more willing and able to get a higher level of sophisticated PMS design. This is consistent with the results of Ismail and Isa (2011) which found that a company with higher technology is more willing and able to adopt management accounting systems.

Another explanation for the relatively high level of PMIS design is the fact that most of the companies' respondents in this study are companies of which 74.6% were established more than 10 years ago. Well-established companies have demostrated their willingness to adopt a high level of management accounting techniques (Ong and Teh, 2008). The result further indicating that timeliness of PMIS is highest level of the other three components of PMIS; this could be due to the characteristic of the sample of study, due to the technology driven aspect of malaysian E&E industry, which use computerised systems in daily activities..

b) Level of Competitive Capabilities among Malaysian E&E Manufacturing Companies

The competitive capabilities of manufacturing industry in Malaysia are also interpreted through another competitive capabilities' indicator, i.e. quality capability and cost capability. The second part of first research question was related to validate a measurement scale of competitive capabilities and to investigate the extent of this measure among Malaysian E&E manufacturing companies. As mentioned in Chapter One, there is relatively little there is empirical studies that explore the existence of competitive capabilities in Malaysian E&E manufacturing companies.

In this study including of two types of competitive capabilities which are: quality capability and cost capability, the measurement scales were assessed for content and construct validity. The reliability of the scales was assessed by internal consistency using Cronbach's Alpha. These results indicate that the scale successfully meets the standards set for validity and reliability. The findings of this study highlight some interesting insights into the extent of the competitive capabilities of the Malaysian E&E manufacturing companies. The results of the study displayed that the Malaysian E&E manufacturing companies, on average, achieve a high level of competitive capabilities as indicated by quality capability and cost capability. Where, the average of the two types are as follows: quality capability is a high level (mean=4.15) and cost capability is a relatively high level (mean=3.50).

The results of this study draw conclusions about the existence of competitive capabilities of companies in the Malaysian manufacturing sector in general and E&E manufacturing sub-sector in particular. Consequently, some vital points could be drawn from the high extent of competitive capabilities among E&E manufacturing companies in Malaysia. Overall, since the respondent companies were from high technology companies (E&E manufacturing), which may explain why the high level of competitive capabilities. This was noticeable due to the descriptive statistic which showed that great majority of the Malaysian E&E manufacturing companies (88.1%) are keeping a record on customer complaints, which indicates that these the companies keeping record of customer complaints are more focused on their customers, and might be more willing to achieve higher levels of competitive capabilities. This result is consistent with previous studies that found that cost reduction and high quality are often the principal reason for the adoption of advanced manufacturing technology (Hyvönen, 2007). Malaysian manufacturing has production efficiency (Jusoh and Parnell, 2008). The results of this study indicate that quality capability has been at a higher level of achievement in comparison to cost capability. This could be due to the characteristic of the sample of study as they were from the electrical and electronic industry which produces high quality products. The results of this study can be generalised to the entire population; these companies (E&E manufacturing companies) received somewhat above a high level of satisfaction experience within the malaysian E&E industry.

c) The Level of Organisational Performance among Malaysian E&E Manufacturing Companies

The findings of this study supported the claim that organisational performance is a multi-diminution, in this study it consists of two dimensions which are non-financial and financial performance. The measurement scales were assessed for content and construct validity. The reliability of the scales was assessed by internal consistency using Cronbach's Alpha. These results indicate that the scale successfully meets the standards set for validity and reliability. The findings of this study highlight some interesting insights into the extent of the organisational performance in Malaysian E&E manufacturing companies. The results of study showed that Malaysian E&E manufacturing companies, on average, achieved a relatively high level of organisational performance as indicated by non-financial and financial measures. The average of the each dimension is as follows: non-financial (mean=3.64) and financial (mean=3.46). The results from this study draw conclusions about the real existence of organisational performance of companies in the Malaysian manufacturing sector in general and E&E manufacturing companies in particular. Consequently, some vital points could be drawn from the high extent of organisational performance among E&E manufacturing companies in Malaysia. Generally, the high level of organisational performance may be because the sample respondent companies were selected from what called high-technology companies (E&E manufacturing). This result is consistent with previous studies which found that the high-technology companies are more able to achieve a relatively high level of performance (Choe, 2004, and Hyvönen, 2007). This was noticeable in the descriptive statistic which showed that the companies surveyed have an average annual revenue of RM 60.39 Million. Whereas, the average of annual revenue of small and medium-sized was MR39.47 Million and for large-sized was RM82.46 million. The annual revenue is considered as an indicator for the level of a company's financial performance.

The results also indicated that non-financial, as a performance indicator, received a high level. This has to be interpreted by looking at the overall picture of Malaysia's manufacturing industry. The results of study can be generalised to the entire population; the E&E manufacturing companies received somewhat moderately level of satisfaction. The performance of manufacturing industry in Malaysia is also interpreted through another performance indicator; i.e. non-financial and financial performance is arguably the most-used ratio in the manufacturing industry to judge performance. Due to the measure incorporating both non-financial and financial, it provides an overall assessment of how well a company is achieving its non-financial and financial goals. This study suggested that malaysian E&E manufacturing companies were achieved above average level of performance and in order to command that, overall performance is satisfactory.

5.3.2. The Relationship between a PMIS and Organisational Performance

This study attempted to answer the question of whether independent variables, specifically the PMIS (broad scope, integration, timeliness and benchmarking) have a significant positive relationship with organisational performance (non-financial and financial). Reciprocity would be the basis whereby a high level of PMIS design would lead to a high level of organisational performance. Drawing from the handfull of findings, the PMIS was posited as having a positive relationship with organisational performance. While some of the findings are consistent with previous studies, some are contradictory. These results concerning the relationship between the independent variable of a PMIS and the dependent variable of organisational performance are discussed in the following sections according to the hypotheses of this study.

a) The Relationship between a PMIS and Non-financial Performance

The findings of this study revealed that three components of PMIS namely: broad scope, integration and timeliness information are significantly and positively related to non-financial performance. The results in general are consistent with previous studies indicating that companies are adapting a higher level of MAS design are more likely achieving higher levels of performance (Chenhall and Morris, 1986; Abdel-Kader and Luther, 2008). Various studies, such as (Malina (Malina and Selto, 2001; Said, et al., 2003; Ittner, et al., 2003b; Evans, 2004; Olsen, et al., 2007) reported that PMISs have a significant role assisting in the achievement of increased levels in performance. On the other hand, the result of the study revealed that benchmarking of PMIS has no significant positive relationship with respect to non-financial performance. The results imply that not all components of PMIS predict non-financial performance. Moreover, given that a PMIS is valuable tool within the organisational structure, the findings supported the contingency theory (Chenhall, 2003). The findings for each of the four components of PMIS with non-financial performance are discussed below.

The results of this study indicated that broad scope and integration information have a significant positive relationship with non-financial performance. This result is consistent with a considerable body of previous researches that has implied that broad scope of PMIS and integration of PMIS have a positive impact on performance (Gimbert, et al., 2010, and Bisbe and Malagueo, 2010). A system that provides a broad scope of information is relevant for managers in monitoring and controlling their organisation's actions with the purpose of improving its non-financial performance (Abdel-Kader and Luther, 2008). This relationship is justifiable since the broad scope of information emphasises positive impacts and reduces the negative effects of environmental uncertainty and other contingency factors (Gul, 1991, and Hall, 2008). The integration of PMIS helps in combining action to contribute towards added customer value and improving the organisational performance (Kuwaiti and Kay, 2000). From this perspective, the results indicate that broad scope and integration of PMIS may help Malaysian companies in generating performance information effectively, ultimately being of assistance to improve their non-financial performance.

Furthermore, the results of this study indicated that timeliness information has a significant positive effect on non-financial performance. This consistent with a considerable body of previous studies that has indicated that timeliness of PMIS has a positive impact on performance (Chia, 1995). This relationship is evident because timeliness information places an emphasis on positive effects with the aim to minimize the negative effects of environmental uncertainty and other contingency factors (Gul, 1991). From this view, the result implies that timeliness of PMIS may enable Malaysian E&E manufacturing companies in generating timely information, in order to improve their non-financial performance. The results of the study also revealed that benchmarking was insignificantly related to non-financial performance.

This finding is inconsistent with a wide body of research indicating that benchmarking information influences performance (Mia and Clarke, 1999). Though, the lack of significance to this finding may also be due to the sample frame, since the study focuses only on E&E manufacturing companies and not other types of industry. The insignificant relationship is explainable by the fact that high level of benchmarking focuses, would lead the attention to profitability indicators -easy comparability- more than non-financial indicators.

The results, therefore, indicate that E&E manufacturing companies in Malaysia wishing to increase their level of non-financial performance ought to focus more on broad scope, integration and timeliness of PMIS rather than benchmarking of PMIS in designing their systems.

b) The Relationship between a PMIS and Financial Performance

The findings of this study revealed that three components of PMIS namely: broad scope, integration and benchmarking are significantly and positively related to financial performance. Overall, it could be concluded that the results of this study are in line with previous studies, which indicated that companies are adapting a higher level of MAS design are more likely achieving higher levels of performance (Chenhall and Morris, 1986, and Abdel-Kader and Luther, 2008). Various studies (Malina and Selto, 2001; Ittner, et al., 2003b; Said, et al., 2003; Davis and Albright, 2004, and Waal, et al., 2009) identified that organisations implementing and using a PMIS could achieve an increase in revenue, an increase in profit and a higher return on assets (ROA). On the other hand, the result of the study revealed that timeliness of a PMIS has no significant positive relationship with respect to financial performance. The results imply that not all components of PMIS predict financial performance. The findings for each of the four components of PMIS with non-financial performance are discussed below.

The results of the study implied that broad scope and integration have a significant positive relationship with financial performance. This result is consistent with a considerable body of research that has indicated that broad scope of PMIS and integration of PMIS have a positive impact on performance (Gimbert, et al., 2010, and Bisbe and Malagueo, 2010). It can be concluded that this relationship is justifiable since broad scope and integration information emphasises positive impacts and reduces the negative effects of environmental uncertainty and other contingency factors (Chenhall and Morris, 1986, and Gul, 1991). A PMIS that provides a broad scope of information that is relevant for managers in that it assists them in monitoring and controlling their organisation’s activities with the aim of enhancing financial performance (Abdel-Kader and Luther, 2008). Integration of PMIS helps in combining action which contributes towards added value for the customer and enhances financial performance (Kuwaiti and Kay, 2000). From this perspective, the results indicate that broad scope and integration of PMIS can assist Malaysian companies in generating performance information in an effective way, leading to an improvement of their financial performance.

The findings of this study also revealed that benchmarking information has a significant positive impactes on financial performance. Whereas, this result is consistent with a considerable body of research that indicating that benchmarking of PMIS has a positive impact on performance (Mia and Clarke, 1999, and Gomes and Yasin, 2011). This relationship is justifiable since benchmarking information places an emphasis on positive impacts and in turn can reduce the negative effects of environmental uncertainty and other contingency factors (Gul, 1991, and Mia and Clarke, 1999). Benchmarking of PMIS, as a means of making a comparison to the way in which an organisation achieves a specific activity with that of its competitors, enables that organisation to learn how to decrease costs, reduce defects, increase quality, enhance performance or even identify some best practices, that are relevant to the excellence of the organisation (Donthu, et al., 2005). From this perspective, the results indicate that benchmarking of PMIS is expected to assist Malaysian companies in generating comparative information, ultimately with the capacity to lead to an improvement of their financial performance. Furthermore, the result of this study revealed that timeliness is insignificantly related to financial performance.

This result is not in line with a wide body of research which indicates that timeliness influences financial performance (Chia, 1995). Though, the lack of significance to this finding may be also due to sample frame, since the study focuses only on E&E manufacturing companies and not other types of industries. The insignificant relationship is explainable by the fact that strong timeliness focuses would lead the attention to non-financial indicators as profitability of acquiring potential or retaining existing partners. It thereby weakens the financial performance. The results, therefore, indicated that E&E manufacturing companies in Malaysia wishing to attain a higher level of financial performance ought to focus more on broad scope, integration and benchmarking of PMIS rather than timeliness of PMIS in designing their systems.

5.3.3. The Relationship between PMIS and Competitive Capabilities

This study has attempted to answer the question of whether PMIS has a significant positive relationship with competitive capabilities, specifically the PMIS (broad scope, integration, timeliness and benchmarking) and competitive capabilities (quality and cost). Reciprocity would provide the basis as to whether a high level of PMIS design would lead to high level of competitive capabilities. Drawing from the handful of findings, the PMIS was posited as having a positive relationship with competitive capabilities. Scrutinising the results revealed that some of the results were in line with prior researches, whilst some are not. Discussions on the relationship between the independent variable of PMIS and a mediator variable of competitive capabilities, are in accordance with the hypotheses of this study, as the following subsections confirm.

a) The Relationship between PMIS and Quality Capability

The findings of this study revealed that three components of PMIS namely: broad scope, integration and timeliness are significantly and positively related to quality capability. The results, in general, are consistent with previous studies indicating that companies with a higher level of MAS design are more likely to have higher level of competitive capabilities (Day and Wensley, 1988; Porter, 2001; Spanos and Lioukas, 2001; Hawawini, et al., 2003; Kim, et al., 2008, and Ismail, et al., 2010). Several studies (Malina and Selto, 2001; Said, et al., 2003; Ittner, et al., 2003b; Davis and Albright, 2004; Chenhall, 2005; Gosselin, 2005, and Olsen, et al., 2007) identified that organisations implementing and effectively using PMS could lead towards a course of action in the provision of a higher product quality. However, benchmarking of PMIS shows no significant positive relationship with quality capability. The results imply that not all components of PMIS produce quality capability. The findings for each of the four components of PMIS with quality capability are discussed below.

The results of the study indicated that broad scope and integration information have a significant positive relationship with quality capability. This result is in line with a considerable body of research that indicated that a broad scope of PMIS and integration of PMIS has a positive effect on competitive capability (Fitzgerald, et al., 1991; Kaplan and Norton, 1992; 1996; Simons, et al., 2000; Malina and Selto, 2001; Chenhall, 2005, and Campbell, et al., 2006); and is an important link to product development (Davila, 2000). The broad scope of information facilitates managers to consider a wider range of alternatives as the available information enables the managers to be better understand situation of their organization (Bouwens and Abernethy, 2000; Hall, 2011). The broad scope and integration of PMIS has been identified as a potentially important tool to implement and improve competitive strategy (Chenhall, 2005; Gimbert, et al., 2010; Bisbe and Malagueo, 2010, and Gosselin, 2005). This relationship is obvious because the broad scope information places emphasis on the positive effects and decreases the negative impacts of contingency factors and environmental uncertainty (Gul, 1991, and Hall, 2008). Based on this perspective, the results indicate that broad scope of PMIS and integration of PMIS may assist Malaysian companies in generating performance information effectively, leading to improved quality capability.

Additionally, the results of this study indicated that timeliness information has a significant positive relationship with quality capability. In this way, this result is consistent with a considerable body of research indicating that timeliness of PMIS has a positive effect on competitive capability (Mia and Patiar, 2001). From this viewpoint, this relationship is evident since the timeliness inforamtion places an emphasis on positive impacts and reduces the negative effects of environmental uncertainty and other contingency factors (Gul, 1991). Timely information provide pressure to motivate managers to be responsive to market changes (Ittner, et al., 2003b, and Chenhall, 2005). From this outlook, the timeliness of PMIS may well assist Malaysian E&E manufacturing companies in generating performance information effectively, which ought to lead to an improvement in their quality capability. Information in timely and frequent beneficial, because managers need to respond quickly to changes in their environment competitive (Gul, 1991).

The result of this study also revealed that benchmarking information was insignificantly related to quality capability which, however, is inconsistent with a wide body of research which indicates that benchmarking influences quality capability (Mia and Clarke, 1999). Though, the lack of significance to this finding may be due to sample frame, since the study focused only on E&E manufacturing companies and not other types of industry. The insignificant relationship may be explained by the notion that a high level of benchmarking information focuses the Malaysian E&E manufacturing companies' attention on cost capability. It might, therefore, be that some E&E companies focus only on a cost leadership strategy, which thereby weakens their quality capability. The results, therefore, point out that E&E manufacturing companies in Malaysia wishing to attain a higher quality capability ought to focus more on broad scope, integration and timeliness of PMIS rather than benchmarking of PMIS in designing their systems.

b) The Relationship between a PMIS and Cost Capability

The findings in this study presented that the three components of PMIS namely: broad scope, timeliness and benchmarking information were significantly and positively related to cost capability. Overall, the results are in line with previous studies indicating that companies with a higher level of MAS design are more likely to acheive higher level of competitive capability (Day and Wensley, 1988; Porter, 2001; Spanos and Lioukas, 2001; Hawawini, et al., 2003; Kim, et al., 2008, and Ismail, et al., 2010). Many previous studies such as (Malina and Selto, 2001; Said, et al., 2003; Ittner, et al., 2003b; Davis and Albright, 2004, and Olsen, et al., 2007) have identified that organisations implementing and using PMS could achieve a reduction in costs. However, the result of this study revealed that integration of PMIS has no significant positive relationship with cost capability.

The results implied that not all components of PMIS produce cost capability. The findings for each of the four components of PMIS with cost capability are discussed below.

The results of current study indicated that a broad scope information has a significant positive effects on the cost capability. Generally, this result is consistent with previous studies which indicating that a broad scope of PMIS has a positive effect on cost capability (Bromwich and Bhimani, 1996; Chenhall, 2005; Donthu, et al., 2005, and Vorhies and Morgan, 2005). This relationship is justifiable since the broad scope information places an emphasis on the positive impacts and reduces the negative effects of environmental uncertainty and other contingency factors (Gul, 1991). Based on this perspective, the results reveal that the broad scope of PMIS may assist Malaysian companies in generating performance information effectively, leading to an improvement of their cost capability.

The results of this study indicate that timeliness information has a significant positive effect on cost capability as well. This result is consistent with a considerable body of researches that has revealed that timeliness of PMIS has a positive effect on cost capability (Davis and Albright, 2004, and Olsen, et al., 2007). This relationship is obvious because the timeliness information places an emphasis on the positive impacts and reduces the negative effects of environmental uncertainty and other contingency factors, also, timely and frequent information is beneficial, as the managers are needed to respond rapidly to changes in their competitive environment (Gul, 1991, and Mia and Patiar, 2001). Thus, it can be concluded, that the timeliness of PMIS may assist Malaysian companies in generating performance information effectively, which ought to lead to the capacity to improve their cost capability. Mia and Patiar (2001) have found that the timeliness information is critical for improving the process of efficiency, and reduction of wastage.

The results of current study indicated that benchmarking has a significant positive effect on cost capability. In this way, this result is consistent with earlier researches, which revealing that benchmarking of PMIS has a positive impact on competitive capabilities (Mia and Clarke, 1999; Donthu, et al., 2005; Vorhies &

Morgan, 2005). This relationship is obvious because benchmarking information places an emphasis on the positive impacts and reduces the negative effects of environmental uncertainty (Mia and Clarke, 1999). Benchmarking information is a mechanism to compare the way in which an organisation performs a specific activity with that of its competitor or competitors and it enables the organisation to learn how to lessen the costs, reduce defects, improve performance or even identify some best practices related to organisation,s excellence (Donthu, et al., 2005). Father, this results reveal that benchmarking of PMIS may assist Malaysian companies in generating performance information effectively, which ought to assist in an improvement in their cost capability.

The results of this study also revealed that integration of PMIS was insignificantly related to cost capability which is, however, inconsistent with a previous studies that indicating that integration of PMIS influences cost capability (Chenhall, 2005). Though, the lack of significance to this finding may be due to sample frame, such as this study has focused only on E&E manufacturing companies and not other types of industries. The insignificant relationship is attributable to the notion that a high level of integration of PMIS focuses the Malaysian E&E manufacturing companies' attention to quality capability. Therefore, it might transpire that some companies focus only on differentiation strategy, which thereby weakens their cost capability.

The results, therefore, point out that E&E manufacturing companies in Malaysia wishing to attain a higher level of cost capability ought to focus more on broad scope, timeliness and benchmarking of PMIS rather than integration of PMIS in designing their systems.

5.3.4. The Relationship between Competitive Capabilities and Organisational Performance

This study has attempted to answer the question of whether competitive capabilities have a significant positive relationship with organisational performance, Specifically competitive capabilities in terms of cost, quality have statistically significant positive effects on organizational performance in terms of non-financial and financial. Reciprocity provides the basis whereby a higher levels of competitive capabilities would lead to a higher level of organisational performance. These relationships are important because previous studies had findings which were negligible with respect to the organisational performance domains that can be realised from the two key competitive capabilities. Drawing upon the handfull of findings, the competitive capabilities were posited as having a positive relationship with organisational performance. Scrutinising the results revealed that some of the findings were consistent with previous research. Discussions on the relationship between the mediator variable (competitive capabilities) and dependent variable (organisational performance) are according to the hypotheses of this study and are explained in the following subsections.

a) The Relationship between Competitive Capabilities and Non-Financial Performance

The current study discovered that both types of competitive capabilities (quality and cost) have a significant positive relationship with non-financial performance. The results also indicate that the two competitive capabilities do not equally influence non-financial performance of Malaysian E&E manufacturing companies. Quality capability has a higher level of significant relationship with non-financial performance than cost capability. The findings of this study, in general, provide support for the assertion made by scholars (Tracey, et al., 1999; Rosenzweig, et al., 2003; Kim, et al., 2008; Raduan, et al., 2009; Kristal, et al., 2010, and Tuan and Takahashi, 2010). In fact, some researchers, argue that gaining a competitive advantage might be lead to the achievement of a higher level of non-financial performance, (e.g; Majeed, 2011). Therefore, this study applied to Malaysian E&E manufacturing industry, those companies that develop a high level of quality capability have the capacity to achieve better non-financial performance, than those companies which develop a cost capability.

b) The Relationship between Competitive Capabilities and Financial Performance

The current study discovered that both types of competitive capabilities (quality and cost) have a significant positive relationship with financial performance. The results indicate that cost capability has the most significant relationship with financial performance compared with quality capability. The findings of this study, in general, provide support for the assertion made by scholars (Tracey, et al., 1999; Rosenzweig, et al., 2003; Raduan, et al., 2009; Kristal, et al., 2010, and Tuan and Takahashi, 2010). A different strategic positioning will lead to different financial performance (Kim, et al., 2008). In fact, some researchers, argue that gaining a competitive advantage might lead to the achievement of higher level of financial performance (e.g; Majeed, 2011). Superior levels of profitability can only logically arise from commanding a higher price than competitors or enjoying lower costs. Therefore, Malaysian E & E manufacturing companies that develop a cost capability ought to achieve better financial performance than if they develop a quality capability.

Generally, the results of this study indicated that competitive capabilities have a significant positive effect on organisational performance. Thus, this result is in line with the previous studies as mentioned above. Raduan, et al., (2009) and Bustinza, et al (2010) who argued that the competitive capabilities to adapt the changing market conditions and its a mechanism for reducing uncertainty, making these capabilities a catalyst for gaining competitive advantages that guidance companies to achieve high level of performance. Kim, et al., (2008) reported that a different strategic positioning would lead to a different level of organisational performance. This viewpoint is supported by the results of this study, that quality capability leads to more non-financial performance while cost capability leads to more financial performance. Therefore, this study applied to Malaysian E&E manufacturing industry, those companies that develop a cost capability will achieve better financial performance than those which develop a quality capability.

Lastly, this study suggested Malaysian E & E manufacturing companies that develop competitive capabilities would achieve better organisational performance.

5.3.5. The Mediating Effects of Competitive Capabilities

The fifth research question of this study is “the mediating effect of competitive capabilities (quality and cost) the relationship between the independent variables (PMIS) and dependent variables organisational performance. whether this relationship is generally important since the process, through which PMIS leads to organisational performance, has often been neglected in previous research. In testing the mediating effects of competitive capabilities. This study adopted Baron and Kenny’s (1986) guidelines. Although, theoretically, the links between PMIS, competitive capabilities and organisational performance were conceptualised as a conventional mediated relationship, the benchmarking of a PMIS was not statistically related to quality capability and non-financial performance, and the integration of PMIS was not statistically related to cost capability; also timeliness of PMIS was not statistically related to financial performance, these results did not allow for the traditional testing as described by Baron and Kenny (1986). The following subsections discuss the results of the mediating effects of the two types of competitive capabilities on the above-mentioned relationship.

a) The Mediating Effects of Quality Capability

This sub-section deals with the mediating effects of quality capability on the relationship between PMIS and organisational performance. The results do not support the notion of a mediating effect of quality capability on the relationship between benchmarking of PMIS and non-financial performance. Moreover the results do not support the mediating effect of quality capability on the relationship between timeliness and benchmarking of PMIS and financial performance. Even so, the results support the mediating effect of quality capability on the relationships between the three components of PMIS (broad scope, integration and timeliness) and non-financial performance. Additionally, the results support the mediating effect of quality capability on the relationship between the two components of PMIS (broad scope and integration) and financial performance. These results are consistent with a wide body of research indicating that PMS must be aligned with competitive strategy and capability to be effective and consistent with strategic choices (Henri, 2006); PMIS has indirectly impact on performance that via their impact on the strategic capabilities of an organization (Grafton, et.al. ,2010); and PMS has clear effects on the organisational processes that enhance organisational performance (Pavlov and Bourne, 2011); and have a facilitating role in socialisation processes, and a positive association with performance (Mahama, 2006). This means that an organisation's internal environment; in terms of a sophisticated PMS design can provide the basis for a strategy or practice and eventually affect the organizational performance (Hitt, et al, 1994). Additionally, the results are consistent with the theory, which illustrates the role of the variables that intervene in the relationship between management accounting management control systems and the desired outcomes.

The results indicated that quality capability partially mediated the relationship between broad scope, integration and timeliness of PMIS, and non-financial performance. This result revealed that by the introduction of quality capability as an intervening variable, the impact of broad scope, integration and timeliness of PMIS on non-financial performance became both direct and indirect. This has the implication that broad scope, integration and timeliness of PMIS could have a direct effect on non-financial performance, and though it is not strong, it still shows that quality capability provides an additional effect on the impact of broad scope, integration and timeliness of PMIS on non-financial performance.

The results indicated also that quality capability partially mediated the relationship between broad scope and integration of PMIS, and financial performance. These results revealed that by the introduction of quality capability as an intervening variable, the impact of broad scope and integration of PMIS on financial performance became both direct and indirect. This implies that quality capability provides an additional effect on the relationship between broad scope and integration of PMIS with non-financial performance, besides the direct impact of the two components on non-financial performance. This also indicates the company's ability to introduce a high quality product does also facilitate the additional effect on those relationships. Additionally, the results of the study demonstrate that the mediation effects of quality capability on the relationship between PMIS and non-financial performance is stronger than its mediation effect on the relationship between PMIS and financial performance.

b) The Mediating Effects of Cost Capability

This sub-section deals with the mediating effects of cost capability on the PMIS and organisational performance relationship. These results do not support the mediating effects of cost capability on the relationship between the integration of PMIS and benchmarking of PMIS and non-financial performance. These results do not support the mediating effects of cost capability on the relationship between the integration of PMIS and timeliness of PMIS and financial performance as well. Nevertheless, the results do support the mediating effect of cost capability on the relationships between the two components of PMIS (broad scope and timeliness) and non-financial performance. Farther, the results support the notion of the mediating effect of cost capability on the relationship between the two components of PMIS (broad scope and benchmarking) and financial performance. These results are consistent with a wide body of research indicating that PMIS ought to be aligned with capabilities in order to be effective and consistent with strategic outcomes (Henri, 2006; Grafton, et al., 2010), and PMIS has clear effects on the organisational processes that enhance organisational performance (Pavlov and Bourne, 2011). This means that an organisation's internal environment; in terms of level of PMIS design might provide a basis for strategic decision and eventually influence organisational performance (Hitt, et al., 1994). In addition, the results are consistent with a theory which explains the role of the variables that intervene in the relationship between management accounting and management control systems and the desired outcomes.

These results revealed that cost capability partially mediated the relationship between broad scope and timeliness of PMIS, and non-financial performance. By the introduction of cost capability as an intervening variable, the results indicated that the impact of broad scope and timeliness of PMIS on non-financial performance became both direct and indirect. This demonstrates that broad scope and timeliness of PMIS could have a direct effect on non-financial performance, though it is not strong, it still shows that cost capability provides an additional effect on the impact of broad scope and timeliness of PMIS on non-financial performance.

The results further implied that cost capability partially mediated the relationship between broad scope and benchmarking of PMIS, and financial performance. By the introduction of quality capability as an intervening variable, the results revealed that the impact of a broad scope of PMIS and benchmarking of PMIS on financial performance became both direct and indirect. This then implies that the cost capability provides an additional effect on the relationship between broad scope and benchmarking of PMIS with financial performance besides the direct impact of the two components on financial performance. This also implies a company's ability to introduce a low cost product does also facilitate the additional effect on those relationships. Additionally, the result of the study demonstrated that the mediation effects of cost capability on the relationship between PMIS and financial performance is stronger than its mediation effect on the relationship between PMIS and non-financial performance.

Generally, the results revealed that quality capability and cost capability both have a partial mediation role, which means they provide an additional effect on organisational performance. However, quality capability has the stronger effect on the non-financial performance, and cost capability has the stronger effect on the financial performance. Lastly, the intervening role of quality capability and cost capability clearly reveals these competitive capabilities as the processes playing an important role in influencing the improvement of the relationships between PMIS and organisational performance. At a practical level, the results suggested that if Malaysian manufacturing companies desire to improve their performance, they ought to develop more of its PMSs with both cost and quality capability.

5.3.6. The Effect of a Control Variable

To provide better estimates of the hypothesised variables, this study initially suggested one control variable; that is a company's size. However, the tests of differences indicate a company's size appears to have an impact on all of the variables of this study. The control variable is included in the multiple regression models, and the results again confirmed a company's size as the control variable, suggesting the appropriateness of having included them in the regression analysis.

A company's size showed a significant impact on both dimensions of organisational performance (non-financial and financial). The results concurred with previous studies revealing a company's size effects the overall performance (Tam, 1998; Li and Ye, 1999; Zhang, 2005, and Ismail, et al., 2010). This outcome can be related to the notion that large-sized companies have more established roles and more likely to select the most attractive market and adapt their competitive strategy to accommodate the specific needs of the market, therefore, they are able to diminish the risk of failure in the marketplace (Ismail, et al., 2010). Hence these results indicate large-sized Malaysian manufacturing companies might enjoy higher organisational performance compared with small and medium-sized companies.

5.4. MAJOR RESULTS OF THE STUDY

Based on the discussion above the major results of this study are as follows: A Performance Measurement Information System (PMIS) is multi-dimensional consisting of four components, among which are the broad scope, integration, timeliness and benchmarking of PMIS can be measured using the 24 questionnaire items developed in this study:

1. A PMS is a highly adopted practice within Malaysian E&E manufacturing companies. Whereas, it has been demonstrated that the highest adopted component of PMIS is timeliness; with the lowest component of PMIS being benchmarking;
2. A PMIS has the greatest positive relationship with non-financial compared to financial performance. The Malaysian E&E manufacturing companies are most emphasis on the timeliness of PMIS appears to be the second important component after the broad scope of PMIS for accomplishing non-financial performance, Even so, this variable has not significantly effect on financial performance. Whereas, the broad scope of PMIS appears to be the second important component after benchmarking of PMIS for accomplishing financial performance. The Malaysian E&E manufacturing companies lowest emphasis on the benchmarking of PMIS appears to be the most important component of PMIS for accomplishing financial performance. Even so, this variable has not significantly effect on non-financial performance.
3. A PMIS has the greatest positive relationship with quality capability compared to cost capability. The focus on integration after timeliness of PMIS from E&E manufacturing companies appears to be the second most important PMIS component for accomplishing quality capability. However, this variable has not significantly effect on cost capability. Whereas, the timeliness of PMIS appears to be the second important component after benchmarking of PMIS for accomplishing cost capability. The Malaysian E&E manufacturing companies lowest emphasis on the benchmarking of PMIS appears to be the most important component of PMIS for accomplishing cost capability. Even so, this variable has not significantly effect on quality capability.
4. Of the two competitive capabilities, quality capability is more influential on non-financial performance than cost capability. On the other hand, cost capability is more influential on financial performance than quality capability. In Malaysian E&E manufacturing companies quality capability is higher level than cost capability.

5. Strong competitive capabilities as the mediator for Malaysian E&E manufacturing companies is a feature requiring a major contribution by way of quality capability with broad scope, integration and timeliness of PMIS effect non-financial performance, and with broad scope and integration of PMIS effect financial performance. On another side, Strong competitive capabilities as the mediator for Malaysian E&E manufacturing companies is a feature requiring a major contribution by way of cost capability with broad scope and timeliness of PMIS effect non-financial performance, and with broad scope and benchmarking of PMIS effect the financial performance.

5.5. IMPLICATIONS OF THE STUDY

In this section, the findings of the study are presented in terms of their implications. Firstly, the theoretical implications of the study are identified. Next, the practical contributions of the study are then displayed.

5.5.1. Theoretical Implications

This research has enriched the current knowledge of the performance measurement information system (PMIS) within the context of E&E manufacturing companies, underlining a contingency theory. The contingency theory of management accounting outlines that there is no universally applicable management accounting system and management control system; moreover, the select of a suitable system and control techniques is dependent upon the circumstances' environment surrounding a specific organisation (D. Otley, 1999). This research has contributed significantly to the body of management accounting research through its investigation of the variables and the relationships as follows:

The first theoretical contribution is related to a new concept which validates a new measure of PMIS. The available measures from previous literature are limited in number and these measures were occasionally neither based on theory nor developed based on systematical procedures for scale development. Primarily, it encompasses a more comprehensive variable set than the ones developed by past studies. Furthermore, this study varies from previous ones in that a diversified sample from the E&E manufacturing companies was chosen, whereas earlier studies tended to focus on the entire manufacturing industry, whereby their applications did not consider the inter-differences within the industry. Specifically, this study is the only one to date that has achieved an operationally validated four-component information characteristic of the PMIS. At the very least, this study ought to have sufficient properties to serve as a stepping stone in the development of better and more complete measures of PMISs. The results support the suggestion that a PMIS provides multi-dimensional information, which consists of four components, measured in this study by twenty four items scales;

The second theoretical contribution of study deals with the relationship between PMISs, competitive capabilities and organisational performance. According to the contingency theory, the organisation's structure will have an impact on organisational performance. In this study, the PMIS was conceptualised as an information system with information characteristics which measured the level of a PMIS design. The results of this study implies that attention to a higher level of PMIS design enhances competitive capabilities and organisational performance. However, one interesting insight provided by this study is that while there is a direct relationship between timeliness of PMIS and financial performance. The relationship between benchmarking of PMIS and non-financial performance was positive, but unsignificant. Moreover, the relationship between benchmarking of a PMIS and quality capability, integration of PMIS and cost capability were positive but again not significant. Thus, the results provide evidence that not all components of a PMIS have equal effects on the competitive capabilities (quality and cost) on organisational performance (financial and non-financial).

The third theoretical contribution of this study deals with the mediating effect of competitive capabilities on the relationship between PMISs and organisational performance. The findings of this study with respect to this relationship has several theoretical implications. Initially, these results provide support for the theoretical explanations of organisational performance based on organisation-specific structure and type and level of competitive capabilities (Chenhall, 2005; Gimbert, et al., 2010). Subsequently, the results indicated that there are differences in the mediation effect among the types of competitive capabilities through the components of a PMIS and their affects on organisational performance. This impies that not all competitive capabilities have an equal effect on the relationship between PMIS and organisational performance.

5.5.2. Practical Implications

Based on the theoretical implications as presented above, the present study contributes towards management practice. From a management perspective, the results of the study validated the arguments in the literature of management accounting and PMISs, whereby it is implied that a PMIS design, as an information system plays an important role in helping an organisation improve its competitive capabilities in order to achieve a higher level of performance. Initially, this study eases to identify the major fields a manager ought to address. Therefore, validating such a parsimonious instrument can help managers to better realise the importance of PMIS. It will also assist them to pinpoint areas of weakness and enable them to take corrective action. In other words, it provides a management tool to assist their companies' performance levels. The results also suggest that a PMIS design which provides information characterised by broad scope, integration, timeliness and benchmarking is significantly related to competitive capabilities. These competitive capabilities are a basis for attaining superior organisational performance, meaning that by enhancing both competitive capabilities of quality and cost, an organisation would be better able to develop its financial and non-financial performance.

This study provides an operational framework for the relationship of performance measurement systems, competitive capabilities, and organisational performance. This framework could act as a practical guide for managers by enhancing their understanding of the mechanism of the performance measurement system to assist them to measure, manage and improve the performance through improving their companies' competitive capabilities. A manager must understand the key information characteristics of PMIS, which can help in managing the performance to set objectives and measure progress against stated strategic goals. The adoption of a multi-dimensional PMIS design can influence managerial actions by focusing attention on factors critical to the success of their company.

Besides identifying the key domains, a manager ought to address the measures of a PMIS in order to facilitate them to better understand how to operate and as a guide to better learn how to get optimum benefits from PMIS. Moreover, the study discovers that broad scope of PMIS affects both types of competitive capabilities and both dimensions of organisational performance, whilst integration of PMIS affects quality capability and both dimensions of organisational performance. Timeliness of PMIS affects both types of competitive capabilities and non-financial performance. However, benchmarking of PMIS has more affect on the cost capability and financial performance. This means that managers can use the performance measurement systems as a positioning tool for products and for their company's market positioning. Ultimately, the four components of a performance measurement system may serve to develop appropriate training programs that can help improve managers' understanding of how to manage their companies' competitive strategies and performance.

Based on the findings of this study, PMISs as an information system can enable organisations to develop key competitive capabilities. In general, this result could serve as a practical guide for managers by enhancing their understanding of the market-driven benefits and competitive advantages when integrating their business strategy with the PMIS. Particularly, the result of this study has proven that broad scope and timeliness of PMIS have a significant positive effect overall on competitive capabilities. The results have also demonstrated that broad scope and integration of PMIS have a significant positive effect on the overall organisational performance. This means that the broad scope of PMIS has proven to have a significant positive effect on competitive capabilities and on organisational performance, which indicates that the broad scope of PMIS is the most important component of PMIS for Malaysian E&E manufacturing companies to improve their competitive capabilities and performance. While the results of the study demonstrate support for impacts of the two types of competitive capabilities on a organisational performance, with different degrees, whereas linking these capabilities with the overall of organisational performance provides management with an effective tool, one which is important in that it is able to detect the degree to which different competitive capabilities affect several operational indicators of a company's performance. The implications of these results is to provide specific information to the managers indicating that a strong reputation capability is evident at the top of these competitive capabilities. This means that managers of the Malaysian E&E manufacturing companies ought to consider certain attributes, which reflect a good deal of information about companies as well as managers considering that the two types of competitive capabilities are important for improving their overall organisational performance.

5.6. LIMITATIONS OF THIS STUDY

This study contributes to an increased understanding of performance measurement and management systems through testing the relationship between a PMIS design and from an information perspective through competitive capabilities and organisational performance in the Malaysian context. The researcher provided questionnaires to only one member representing the senior level of management within each company. Thus, the current study was conducted at the organisational level; whereas, It assumes that the view from a single member of the senior management enough to represent the general view of the company. Like many other past studies, this study is not without any limitations. Thereby, the results must be interpreted with caution because of those limitations.

Firstly, the data was based on 118 respondents, which may not be sufficiently large. This study demonstrates sufficient construct, with internal and external validity. This study also investigated the relationships between performance measurement system, competitive capabilities and organisational performances in its inclusiveness of a sample taken from the Malaysian E&E industry with manufacturing companies registered with the Federation of

Malaysian Manufactures (FMM). This sample potentially limits its generaliability to other manufacturing sub-sectors and other industry contexts such as the services sector. Hence, should be dealt with the results of this study with caution when applied to other manufacturing sub-sectors other industry contexts.

Secondly, the cross-sectional nature of this study implies that conclusions must be restricted to those of association. The dynamic effect of the performance measurement system was not analysed. Therefore, the findings of this study are time-specific and may not provide solid conclusions. A study conducted in a longitudinal frame would throw light on causal relationships between the variables of concern and thus give results that are more valid.

Thirdly, self-reporting measures using a single-informant approach, while widely used in management accounting research, raises doubts about the findings as it is possible that a social desirability bias may occur. However, the use of self-reported measures for managerial perceptions about performance measurement systems, competitive capabilities and organisational performance is justified due to the difficulty in obtaining archival data.

Finally, with respect to performance measurement information systems, this study only measured the four information characteristics. From the literature, there is a number of information characteristics, which can be used to measure any information systems. However, this study focused only on the dimensions (characteristics) which are more applicable to the study context. In this study, perceptions taken from senior management personnel were measured to the extent to which the four characteristics of the performance measurement information system was available. Furthermore, this study included two of the available competitive capabilities; those which related to the quality-based and cost-based of a product. A competitive services-based capability was not considered. This is because the competitive capabilities related to the quality-based and cost-based being more suitable and applicable to the environment of this body of research. Regarding organisational performance, although it covered both financial and non-financial items, it is based on the subjective measure for the average of the last three years. Prior literature mentions that it is difficult to get an objective measure of performance, particularly when involving non-financial measures such as customer satisfaction, market share, and due to confidentiality issues, however, the questionnaire does include additional questions regarding real average annual revenue for the last three years to confirm the answer for organiational performance items. Notwithstanding there is evidence in favor of consistent results between objective and subjective measurements, these results should be interpreted with caution taking into consideration the potential for bias.

5.7. SUGGESTIONS FOR FUTURE RESEARCH

This study illustrates an early effort to build and examine a theoretical framework of a PMIS. However, depended on the limitations of the study, as mentioned above, this study provided few suggestions for future research. These suggestions are as follows:

Firstly, future studies can replicate this study using a larger sample, with the possibility to use any of statistical techniques employed, and by using different contexts such as a different manufacturing sub-sectors or other sectors or applying the study to other countries. This would not only enlarge the sample size, but also more importantly grant the opportunity for direct comparison of a model of efficacy based on either company size or designated country/region. Consequently, this would help resolve the issue of generalisability and allow for a richer analysis of the validity of hypothesised relationships as well the proposed overall model.

Secondly, although it could well be costly and time-consuming, a longitudinal study is better suited to a clearer understanding of the dynamic, interactive and reversible nature of the relationship between performance measurement information systems, competitive capabilities and organisational performance. Moreover, this study relies fully on primary data by using a single-informant approach. Although archival data may be more objective, it does not allow the researcher to access the perceptions and other subjective factors that influence managerial decisions. Therefore, future studies may be replicated using archival data instead of the perceptual ones used in this study, or collect data through more than one source, combining both perceptual and archival data. It would be useful also to obtain a broader sample of managers in future research. Furthermore, future research could expand of study using the case study methods and conduct a longitudinal study to investigate how companies design their PMIS based on information characteristics are needed, and how PMIS assists in managing organiational performance.

Thirdly, furtther research is required to investigate the insignificant relationship between timeliness of PMIS and financial performance, the relationship between the integration of PMIS and cost capability, the relationship between benchmarking of PMIS and non-financial, and the relationship between benchmarking of PMIS and quality capability.

Finally, further study could include other information characteristics of the performance measurement system other than those under examination in this study, and measuring the extent of use/usefulness and importance of the information characteristics within the context of day-to-day decisions could be explored. Future study may also be useful to investigate how PMIS assists in managing these organisations. It would be interesting to extend this research by examining the effects of different dimensions of PMIS on an individual's perceptions of information, and their judgments based on the PMIS dimensions using theories from psychology. It could investigate competitive capabilities in relation to the services-based industry. This study could also be useful for objective and subjective measurement of organisational performance.

5.7. CONCLUSION

This study is an attempt to heighten the understanding of the measurement and importance of PMIS. In this regard, the current study made an attempt to teat and validate a new measure of PMISs in the context of E&E manufacturing companies in Malaysia. This body of research has investigated the linkage between PMISs and organiational performance exploring the role that key competitive capabilities play in mediating that relationship. This study was conducted among

118 E&E manufacturing companies affiliated with the Federation of Malaysian Manufacturing. The study has also established from its empirical results that the PMIS consists of four information characteristics as dimensions/components of the system (broad scope, integration, timeliness and benchmarking information) and which was measured using 24 questionnaire items, to validate its content and constructs. The results also found that E&E manufacturing companies in Malaysia adopt a high level of PMIS design. In respect of the importance of a performance measurement system, the findings provide some revealing insights into how companies have managed to improve their performance through adopt high level of PMIS design. Competitive capabilities are extensively undertaken to provide various additional improvements in organisational performance. In other words, this study provided empirical evidence that performance measurement systems can lead Malaysian E&E manufacturing companies to improve their competitive capabilities and improve performance in terms of financial and non-financial.

In summary, this study has outlined several objectives as previously mentioned, and which it hoped effectively to accomplish. The most significant contribution of study lies primarily in its theoretical and practical implications, but it also has the ability to motivate and incite future academic endeavours. Accordingly, the findings of this study can be used as a basis for more research in the future. If the results in future replications of this study support the findings, the message to managers is clear. Rather than relying only on traditional performance measurement systems, companies ought to use their performance measurement systems in a way in which to improve competitive capabilities to achieve a higher level of organisational performance.

APPENDICES

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APPENDICES

APPENDIX "A"

QUESRIONNAIRE

Questionnaire Survey

PART.1: CENTRAL PROFILE OF YOUR COMPANY

1-1. What is the industry type of this company?.
(please speacify) ------------------

1-2. **What is the approximate number of employees (full time) in this company?**
(..........) Employees.

1-3. How long has this company being in business?. (.......) Years.

1-4. **How much is the average annual revenue of this company (approximate) in last three years?.** RM (.......) Million.

1-5. What is the ownership status of this company?.
☐ Local-owned;
☐ Joint-owned
☐ Foreign-owned

1.6. Does this company use computerised system in daily activities?.
☐ Yes. ☐ No.

1.7. Does this company keep a record on customer complaints?.
☐ Yes. ☐ No.

PART.2: PERFORMANCE MEASUREMENTINFORMATION SYSTEM

The survey in this part, is interested in the extent to which your company's performance measurement system provides information about the performance. **Please circle** the number that accurately reflects your company's present conditions and the extent to which a series of characteristics are provided by your company's PMIS. The item scales are five-point Likert's type scales as follow:

Not at all	To a little extent	To moderate extent	To large extent	To very great extent
1	2	3	4	5

2-1		**Broad scope of PMIS:** This dimension (characteristic) of PMIS is considered as an aspect involves broader scope performance information include financial and non-financial information,that are useful in prediction of future events.						
2-1-1		The PMIS provides a diverse set of measures related to the key performance areas of the company.	1	2	3	4	5
2-1-2		The PMS provides borad range of measures that cover the critical areas of the organizations's operations	1	2	3	4	5
2-1-3		The PMIS provides financial indicators (e.g. Return on investment, Economic value-added, Sales Revenue, Operating income, Cash flows ...)	1	2	3	4	5
2-1-4		The PMIS provides non-financial indicators as follows:					
	A	Customers indicators (e.g. customer satisfaction, customer response time, Number of overdue deliveries, Number of warranty claims ...).	1	2	3	4	5
	B	Internal business processes indicators (e.g. manufacturing efficiency, quality, defect rate, cycle time...).	1	2	3	4	5
	C	Learing and growth indicators (e.g. Employee training, employee retention, Number of new product launches, Number of new patents. ...).	1	2	3	4	5
2-1-5		The PMS provides information on different dimensions of the organization's performance.	1	2	3	4	5
2-1-6		The PMIS provides a variety of indicators about important aspects of the organization's operations	1	2	3	4	5
2-1-7		The PMS provides leading indicators (early warning signals) e.g. customer requirements, planned improvements.	1	2	3	4	5
2-1-8		The PMIS provides lagging indicators (of past performance) e.g. rejects, customer complaints, past profits.	1	2	3	4	5
2-2		**Integration of PMIS:** This dimension (characteristic) of PMIS is considered as an aspect involves information that provides an understanding of cause-effect linkages between operations, strategy and goals.					
2-2-1		The PMIS is provided consistent reinforcing links between current operating performance and long term strategies of the company.	1	2	3	4	5
2-2-2		The PMIS provides indicators about how activities of this business unit affect activities of other units within the company.	1	2	3	4	5
2-2-3		The PMIS provides indicators about link all business unit activities to the achievement of goals and objectives of the company.	1	2	3	4	5

2-2-4	The PMIS is produced in a fully documented form, which provides a record for evaluating performance.	1	2	3	4	5
2-2-5	The PMIS provides indicators about link activities of business units to suppliers.	1	2	3	4	5
2-2-6	The PMIS provides indicators about link activities of business units to customers.	1	2	3	4	5
2-3	**Timeliness of PMIS:** This dimension (characteristic) of PMIS is considered as an aspect involves information, which refers to frequent and age of the information.					
2-3-1	The PMIS provides frequently reports on a systematic basis (e.g. daily reports, weekly reports, monthly reports).	1	2	3	4	5
2-3-2	The PMIS provides frequently reports on a regular basis (e.g. weekly reports, monthly reports).	1	2	3	4	5
2-3-3	The PMIS provides the information automatically upon its receipt.	1	2	3	4	5
2-3-4	The PMIS provides the requested information immediately upon request.	1	2	3	4	5
2-3-5	The PMIS provides information automatically as soon as processing is completed.	1	2	3	4	5
2-3-6	There is no delay between an event occurring and relevant information being reported by the PMIS.	1	2	3	4	5
2-4	**Benchmarking of PMIS:** This dimension (characteristic) of PMIS is considered as an aspect involves information related to the process of continuous measuring, comparing company's performance elements with those best practices of relevant companys.					
2-4-1	The PMIS provides competing indicators on various aspects of performance.	1	2	3	4	5
2-4-2	The PMIS provides indicators that for comparing performance of company against the performance of other companies in the same sector.	1	2	3	4	5
2-4-3	The PMIS provides indicators that for comparing performance of similar business units in our company.	1	2	3	4	5
2-4-4	The PMIS provides indicators that for comparing our performance of business units with similar business units in other companies in same industry.	1	2	3	4	5
2-4-5	The PMIS provides indicators that for comparing performance of company against the performance of previous years.	1	2	3	4	5
2-4-6	The PMIS provides indicators on fluctuations and explanation (trend) in performance of our company during previous years.	1	2	3	4	5

PART.3: COMPETITIVE CAPABILITIES

The survey in this part, is interested in the extent to which your company's ability to create a defensible position over its competitors by represent the actual its strength rather than an objective, goal or plan to be achieved. **Please circle** the appropriate number to indicate the extent to which you agree or disagree with each statement. The item scales are five-point Likert's type scales as follow:

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

3-1	**Quality Capability:** a company is capable of competing against major competitors based on quality of products.					
3-1-1	This company is able to compete based on quality.	1	2	3	4	5
3-1-2	This company is offering products that are highly reliable.	1	2	3	4	5
3-1-3	This company is offering products that are highly durable.	1	2	3	4	5
3-1-4	This company is offering high quality products to our customer.	1	2	3	4	5
3-1-5	This company is offering products that function according to customer needs.	1	2	3	4	5
3-1-6	This company is respond well to customer demand for "new" features.	1	2	3	4	5
3-2	**Cost Capability:** a company is capable of competing against major competitors based on cost of products.					
3-2-1	This company is offer competitive prices.	1	2	3	4	5
3-2-2	This company is able to offer prices lower than our competitors.	1	2	3	4	5
3-2-3	Our manufacturing costs are lower than our competitors.	1	2	3	4	5
3-2-4	This company has efficient internal operation system.	1	2	3	4	5
3-2-5	This company's economy of scale enables us to achieve cost advantage.	1	2	3	4	5
3-2-6	The company has achieved a cost leadership position in its industry	1	2	3	4	5
3-2-7	This company's human capital enables us to achieve cost advantage.	1	2	3	4	5

PART.4: ORGANIZATIONAL PERFORMANCE

The survey in this part, is interested in the extent to which your company's performance may be viewed as the extent to which it has been successful in attaining its planned targets. **Please circle** the appropriate number which best indicates to the level of these performance criteria to your company in comparison to its competitors in industry average of last three years. The item scales are five-point Likert scales as follow.

Very low	Low	Neutral	High	Very high
1	2	3	4	5

4-1	**Non-financial performance:** how well a company achieves its non-financial goals.					
4-1-1	Level of market share growth that this company has achieved.	1	2	3	4	5
4-1-2	Level of sales growth that this company has achieved.	1	2	3	4	5
4-1-3	Level of new customers acquisition that this company has achieved.	1	2	3	4	5
4-1-4	Level of customer satisfaction that this company has achieved.	1	2	3	4	5
4-1-5	Level of customer response time that this company has achieved.	1	2	3	4	5
4-1-6	Level of retaining valued customers that this company has achieved.	1	2	3	4	5
4-2	**Financial performance:** how well a company achieves its financial goals.					
4-2-1	Level of return on investment (ROI) that this company has achieved.	1	2	3	4	5
4-2-2	Level of return on assets (ROA) that this company has achieved.	1	2	3	4	5
4-2-3	Level of return on equity (ROE) that this company has achieved.	1	2	3	4	5
4-2-4	Level of profit margin on sales that this company has achieved.	1	2	3	4	5
4-2-5	Level of operating income that this company has achieved.	1	2	3	4	5
4-2-6	Level of generation of cash flow that this company has achieved.	1	2	3	4	5

PART. 5: RESPONDENT DETAILS

Please provide some detail about yuorself. The folowing information is only used to categorize the survey responses. There is no attempt will be made to identify any individual on organization in any publication.

5-1. What is your position in the firm?

☐ General Manager. ☐ Chief Executive.

☐ Senior Vice-presidents. ☐ Others (please specify) ------------------

5-2. How long have you been in your current position?

☐ less than 5 years. ☐ 5-10 years. ☐ 11-20 years. ☐ more than 20 years.

5-3. What is your education level?

☐ Pre- degree. ☐ Degree. ☐ Masters. ☐ PhD. ☐ Others(please specify) -------------

5-4. What is your gender?

☐ Male. ☐ Female.

5-5. What is your age?

☐ 21-30 years. ☐ 31-40 years. ☐ 41-50 years. ☐ Over 50 years.

If you have any comments or suggestion on the questionnaire, please provide it on the space below:

1/ ....

2/ ....

3/ ....

4/ ....

"End of questionnaire"

Thank you very much for your time and participation

APPENDIX "B" LETTERS

APPENDIX "B1" COVER LETTER

Dear Managers,,,

I am a doctoral candidate in Faculty of Technology Management at University Malaysia Pahang. I am exploring several issues about performance measurement system and organizational performance and competitive capability.

The purpose of this study is to learn how the underlying information characteristics of performance measurement system is important for managing the company and effects desired organizational performance. The result of this study will help better understand about the role of performance measurement information system in improving organizational performance through company's competitive capability.

kindly, panel complete a haded the questionnaire survey. It will take approximately 10-15 minutes of your time and your participation is again critical for the success of this study. The survey is anonymous and your response will be treated in utmost confidential. The result will be used for academic research purposes and only summary information will be reported. There is no attempt will be made to identify any individual or companys in any publication.

If you have any question regarding to this survey, I can be of any assistance, feel free to contact me. My contact information is below.

Thank you in advance for your time and participation. Your assistance is greatly appreciated.

Sincerely,

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APPENDIX "B1"

REMINDER LETTER

Dear Managers,,,

This is Ibrahim Ali, a doctoral candidate at University Malaysia Pahang. Kindly accept my sincere apology for mailing you in this critical period because I understand the scarcity of this period. .

I would like to remind you that, I posted the questionnaire survey to your company two weeks ago, and I have not received your response yet. So the copy of survey is attached if you would like to fill up online, and send it back through this email (i.abushaiba@yahoo.com).

Hopefully I receive your response as soon as possible. Your support on this matter will be highly appreciated.

Thanks for your cooperation.

My best regards

IBRAHIM A. ABUSHAIBA
PhD. Candidate
University Malaysia Pahang
H.P./ +60174760607
Email / PPT10009@stdmail.ump.edu.my.

APPENDIX "C"

SAMPLE PROFILE

APPENDIX "C1"
COMPANIES' PROFILE

Products Type

		Frequency	Percent	Valid Percent	Cumulative %
Valid	Electrical	22	18.6	18.6	18.6
	Electronics	49	41.5	41.5	60.2
	E&E	47	39.8	39.8	100.0
	Total	118	100.0	100.0	

Employee Numper

		Frequency	Percent	Valid Percent	Cumulative %
Valid	Up To501	24	20.3	20.3	20.3
	51-150	38	32.2	32.2	52.5
	151-500	38	32.2	32.2	84.7
	More Than 500	18	15.3	15.3	100.0
	Total	118	100.0	100.0	

Age of Company

		Frequency	Percent	Valid Percent	Cumulative %
Valid	Up To 10	30	25.4	25.4	25.4
	11-20	46	39.0	39.0	64.4
	More Than 20	42	35.6	35.6	100.0
	Total	118	100.0	100.0	

Annual Revenue

		Frequency	Percent	Valid Percent	Cumulative %
Valid	Up To 10	35	29.7	31.5	31.5
	11-50	43	36.4	38.7	70.3
	51-100	24	20.3	21.6	91.9
	more than 100	9	7.6	8.1	100.0
	Total	111	94.1	100.0	
Missing	System	7	5.9		
Total		118	100.0		

Ownership

		Frequency	Percent	Valid Percent	Cumulative %
Valid	Local-Owned	49	41.5	41.5	41.5
	Joint-Owned	32	27.1	27.1	68.6
	Foreign-Owned	37	31.4	31.4	100.0
	Total	118	100.0	100.0	

computerized system

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	13	11.0	11.0	11.0
	YES	105	89.0	89.0	100.0
	Total	118	100.0	100.0	

Record Customers' complaints

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	14	11.9	11.9	11.9
	yes	104	88.1	88.1	100.0
	Total	118	100.0	100.0	

APPENDIX "C2"

COMPANIES ANNUAL REVENUE AND SIZE

Annual Revenue * Employee Number Cross-tabulation

Count

		Employee Numper		Total
		Up to 150	More Than 150	
Annual Revenue	Up To 10	29	6	35
	11-50	26	17	43
	51-100	2	22	24
	more than 100	0	9	9
Total		57	54	111

APPENDIX "C3"

RESPONDENTS PROFILE

Position in firm

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	General Manager	23	19.5	28.0	28.0
	Chief Executive Officer	42	35.6	51.2	79.3
	Senior Vice-presidents	13	11.0	15.9	95.1
	others	4	3.4	4.9	100.0
	Total	82	69.5	100.0	
Missing	System	36	30.5		
Total		118	100.0		

Years with firm

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than 5 years	13	11.0	15.9	15.9
	5-10 years	42	35.6	51.2	67.1
	11-20 years.	20	16.9	24.4	91.5
	more than 20 years	7	5.9	8.5	100.0
	Total	82	69.5	100.0	
Missing	System	36	30.5		
Total		118	100.0		

Education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Pre-degree	9	7.6	11.0	11.0
	Degree	43	36.4	52.4	63.4
	Masters	18	15.3	22.0	85.4
	PhD	8	6.8	9.8	95.1
	others	4	3.4	4.9	100.0
	Total	82	69.5	100.0	
Missing	System	36	30.5		
Total		118	100.0		

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	male	64	54.2	78.0	78.0
	female	18	15.3	22.0	100.0
	Total	82	69.5	100.0	
Missing	System	36	30.5		
Total		118	100.0		

R Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	21-30 years.	9	7.6	11.0	11.0
	31-40 years	34	28.8	41.5	52.4
	41-50 years	29	24.6	35.4	87.8
	Over 50 years	10	8.5	12.2	100.0
	Total	82	69.5	100.0	
Missing	System	36	30.5		
Total		118	100.0		

APPENDIX "D"
Test for response bias between early and late respondents

APPENDIX "D1"
EARLY AND LATE GROUPS STATISTICS

Group Statistics

	early & late	N	Mean	Std. Deviation	Std. Error Mean
MPBS	Early	53	3.6586	.47845	.06572
	Late	65	3.7128	.51741	.06418
PMIN	Early	53	3.6541	.56976	.07826
	Late	65	3.7333	.51858	.06432
PMTI	Early	53	3.7585	.50742	.06970
	Late	65	3.7692	.53295	.06610
PMBE	Early	53	3.6415	.54537	.07491
	Late	65	3.6410	.50280	.06236
CCPQ	Early	53	4.1447	.53911	.07405
	Late	65	4.1590	.58142	.07212
CCPC	Early	53	3.4566	.50441	.06929
	Late	65	3.5292	.51772	.06422
OPNF	Early	53	3.5472	.60019	.08244
	Late	65	3.7077	.63549	.07882
OPF	Early	53	3.4214	.56292	.07732
	Late	65	3.4949	.53923	.06688

APPENDIX "D2"

Independent Sample Test of Variables

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
MPBS	Equal variances assumed	.364	.548	-.586	116	.559	-.05424	.09260	-.23764	.12916
	Equal variances not assumed			-.590	114.133	.556	-.05424	.09186	-.23621	.12773
PMIN	Equal variances assumed	.344	.559	-.790	116	.431	-.07925	.10033	-.27797	.11948
	Equal variances not assumed			-.782	106.496	.436	-.07925	.10130	-.28008	.12159
PMTI	Equal variances assumed	.050	.824	-.111	116	.912	-.01074	.09655	-.20196	.18048
	Equal variances not assumed			-.112	113.203	.911	-.01074	.09606	-.20105	.17957
PMBE	Equal variances assumed	.635	.427	.005	116	.996	.00048	.09667	-.19098	.19194
	Equal variances not assumed			.005	107.213	.996	.00048	.09747	-.19274	.19371
CCPQ	Equal variances assumed	.694	.406	-.137	116	.891	-.01432	.10417	-.22064	.19200
	Equal variances not assumed			-.139	114.054	.890	-.01432	.10337	-.21909	.19045
CCPC	Equal variances assumed	.098	.755	-.767	116	.445	-.07263	.09472	-.26023	.11498
	Equal variances not assumed			-.769	112.349	.444	-.07263	.09447	-.25980	.11454
OPNF	Equal variances assumed	.005	.943	-1.399	116	.164	-.16052	.11473	-.38776	.06672
	Equal variances not assumed			-1.407	113.477	.162	-.16052	.11406	-.38649	.06544
OPF	Equal variances assumed	.166	.685	-.722	116	.472	-.07349	.10179	-.27509	.12811
	Equal variances not assumed			-.719	109.237	.474	-.07349	.10224	-.27611	.12914

APPENDIX "D3"

Chi-Square Test for Differences between Early and Late Response

Products Type * early & late

Crosstab

Count

		early & late		
		Early	Late	Total
Products Type	Electrical	9	13	22
	Electronics	23	26	49
	E&E	21	26	47
Total		53	65	118

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.225[a]	2	.894
Likelihood Ratio	.226	2	.893
Linear-by-Linear Association	.037	1	.847
N of Valid Cases	118		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 9.88.

Employee Number * early & late

Crosstab

Count

		early & late		
		Early	Late	Total
Employee Numper	Up To501	9	15	24
	51-150	14	24	38
	151-500	21	17	38
	More Than 500	9	9	18
Total		53	65	118

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.367[a]	3	.338
Likelihood Ratio	3.378	3	.337
Linear-by-Linear Association	2.021	1	.155
N of Valid Cases	118		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 8.08.

Age of Company * early & late

Crosstab

Count

		early & late		
		Early	Late	Total
Age of Company	Up To 10	17	13	30
	11-20	20	26	46
	More Than 20	16	26	42
Total		53	65	118

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.502[a]	2	.286
Likelihood Ratio	2.501	2	.286
Linear-by-Linear Association	2.312	1	.128
N of Valid Cases	118		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 13.47.

Annual Revenue * early & late

Crosstab

Count

		early & late		
		Early	Late	Total
Annual Revenue	Up To 10	18	17	35
	11-50	19	24	43
	51-100	10	14	24
	more than 100	2	7	9
Total		49	62	111

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.567[a]	3	.463
Likelihood Ratio	2.697	3	.441
Linear-by-Linear Association	2.137	1	.144
N of Valid Cases	111		

a. 1 cells (12.5%) have expected count less than 5. The minimum expected count is 3.97.

Ownership * early & late

Crosstab

Count

		early & late		Total
		Early	Late	
Ownership	Local-Owned	24	25	49
	Joint-Owned	13	19	32
	Foreign-Owned	16	21	37
Total		53	65	118

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.607[a]	2	.738
Likelihood Ratio	.607	2	.738
Linear-by-Linear Association	.322	1	.570
N of Valid Cases	118		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 14.37.

Computerized system * early & late

Crosstab

Count

		early & late		Total
		Early	Late	
computerised system	NO	5	8	13
	YES	48	57	105
Total		53	65	118

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.246[a]	1	.620		
Continuity Correction[b]	.040	1	.841		
Likelihood Ratio	.249	1	.618		
Fisher's Exact Test				.770	.424
Linear-by-Linear Association	.244	1	.621		
N of Valid Cases	118				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.84.

b. Computed only for a 2x2 table

Record Customer * early & late

Crosstab

Count

		early & late		Total
		Early	Late	
Record Customer	No	6	8	14
	yes	47	57	104
Total		53	65	118

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.027[a]	1	.869		
Continuity Correction[b]	.000	1	1.000		
Likelihood Ratio	.027	1	.869		
Fisher's Exact Test				1.000	.551
Linear-by-Linear Association	.027	1	.870		
N of Valid Cases	118				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.29.

b. Computed only for a 2x2 table

Position in company * early & late

Crosstab

Count

		early & late		Total
		Early	Late	
Position in firm	General Manager	8	15	23
	Chief Executive Officer	12	30	42
	Senior Vice-presidents	4	9	13
	others	0	4	4
Total		24	58	82

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.017[a]	3	.569
Likelihood Ratio	3.121	3	.373
Linear-by-Linear Association	1.071	1	.301
N of Valid Cases	82		

a. 3 cells (37.5%) have expected count less than 5. The minimum expected count is 1.17.

Years with firm * early & late

Crosstab

Count

		early & late		Total
		Early	Late	
Years with firm	less than 5 years	5	8	13
	5-10 years	9	33	42
	11-20 years.	7	13	20
	more than 20 years	3	4	7
Total		24	58	82

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.719[a]	3	.437
Likelihood Ratio	2.717	3	.437
Linear-by-Linear Association	.295	1	.587
N of Valid Cases	82		

a. 3 cells (37.5%) have expected count less than 5. The minimum expected count is 2.05.

Education * early & late

Crosstab

Count

		early & late		Total
		Early	Late	
Education	Pre-degree	4	5	9
	Degree	14	29	43
	Masters	2	16	18
	PhD	3	5	8
	others	1	3	4
Total		24	58	82

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.390[a]	4	.356
Likelihood Ratio	4.871	4	.301
Linear-by-Linear Association	.894	1	.345
N of Valid Cases	82		

a. 4 cells (40.0%) have expected count less than 5. The minimum expected count is 1.17.

Gender * early & late

Crosstab

Count

		early & late		Total
		Early	Late	
Gender	male	17	47	64
	female	7	11	18
Total		24	58	82

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.031[a]	1	.310		
Continuity Correction[b]	.522	1	.470		
Likelihood Ratio	.993	1	.319		
Fisher's Exact Test				.381	.232
Linear-by-Linear Association	1.019	1	.313		
N of Valid Cases	82				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.27.

b. Computed only for a 2x2 table

Age * early & late

Crosstab

Count

		early & late		Total
		Early	Late	
R Age	21-30 years.	2	7	9
	31-40 years	8	26	34
	41-50 years	11	18	29
	Over 50 years	3	7	10
Total		24	58	82

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.811[a]	3	.613
Likelihood Ratio	1.795	3	.616
Linear-by-Linear Association	.884	1	.347
N of Valid Cases	82		

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 2.63.

APPENDIX "E"
Descriptive Statistics

APPENDIX "E1"

Descriptive Statistics of Variables

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
MPBS	118	2.48	4.86	3.6885	.49891
PMIN	118	2.50	4.83	3.6977	.54125
PMTI	118	2.60	4.80	3.7644	.51945
PMBE	118	2.50	4.83	3.6412	.52008
CCPQ	118	3.00	5.00	4.1525	.56048
CCPC	118	2.40	4.60	3.4966	.51090
OPNF	118	2.20	5.00	3.6356	.62245
OPF	118	2.17	4.50	3.4619	.54885
Valid N (listwise)	118				

APPENDIX "E2"

T-test for Companies' Size and Study Variables

Group Statistics

	Employee Number	N	Mean	Std. Deviation	Std. Error Mean
MPBS	Up to 150	60	3.5349	.47888	.06182
	More Than 150	58	3.8473	.47231	.06202
PMIN	Up to 150	60	3.4861	.49412	.06379
	More Than 150	58	3.9167	.50267	.06600
PMTI	Up to 150	60	3.6000	.44797	.05783
	More Than 150	58	3.9345	.53690	.07050
PMBE	Up to 150	60	3.4722	.50624	.06536
	More Than 150	58	3.8161	.47827	.06280
CCPQ	Up to 150	60	3.9528	.48914	.06315
	More Than 150	58	4.3592	.55830	.07331
CCPC	Up to 150	60	3.3300	.47131	.06085
	More Than 150	58	3.6690	.49638	.06518
OPNF	Up to 150	60	3.3867	.59928	.07737
	More Than 150	58	3.8931	.53929	.07081
OPF	Up to 150	60	3.1972	.50932	.06575
	More Than 150	58	3.7356	.44703	.05870

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
MPBS	Equal variances assumed	.050	.823	-3.566	116	.001	-.31237	.08759	-.48585	-.13889
	Equal variances not assumed			-3.567	115.952	.001	-.31237	.08757	-.48581	-.13893
PMIN	Equal variances assumed	.052	.820	-4.692	116	.000	-.43056	.09177	-.61231	-.24880
	Equal variances not assumed			-4.691	115.695	.000	-.43056	.09179	-.61237	-.24874
PMTI	Equal variances assumed	2.834	.095	-3.679	116	.000	-.33448	.09091	-.51453	-.15443
	Equal variances not assumed			-3.668	110.976	.000	-.33448	.09118	-.51517	-.15379
PMBE	Equal variances assumed	.469	.495	-3.790	116	.000	-.34387	.09073	-.52356	-.16418
	Equal variances not assumed			-3.794	115.941	.000	-.34387	.09064	-.52339	-.16435
CCPQ	Equal variances assumed	1.049	.308	-4.210	116	.000	-.40642	.09654	-.59762	-.21521
	Equal variances not assumed			-4.200	112.912	.000	-.40642	.09676	-.59811	-.21472
CCPC	Equal variances assumed	.164	.686	-3.805	116	.000	-.33897	.08909	-.51541	-.16252
	Equal variances not assumed			-3.802	115.150	.000	-.33897	.08916	-.51558	-.16235
OPNF	Equal variances assumed	.439	.509	-4.820	116	.000	-.50644	.10507	-.71454	-.29833
	Equal variances not assumed			-4.829	115.417	.000	-.50644	.10488	-.71418	-.29870
OPF	Equal variances assumed	1.083	.300	-6.095	116	.000	-.53841	.08834	-.71337	-.36345
	Equal variances not assumed			-6.108	114.945	.000	-.53841	.08814	-.71300	-.36382

APPENDIX "E3"

T-test for Using Computerized System and PMIS

Group Statistics

	computerized system	N	Mean	Std. Deviation	Std. Error Mean
MPBS	NO	13	3.0842	.36221	.10046
	YES	105	3.7633	.46218	.04510
PMIN	NO	13	3.1538	.49750	.13798
	YES	105	3.7651	.50936	.04971
PMTI	NO	13	3.2154	.52575	.14582
	YES	105	3.8324	.47888	.04673
PMBE	NO	13	2.9103	.40606	.11262
	YES	105	3.7317	.45848	.04474

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
MPBS	Equal variances assumed	.957	.330	-5.100	116	.000	-.67902	.13315	-.94274	-.41530
	Equal variances not assumed			-6.166	17.245	.000	-.67902	.11012	-.91110	-.44693
PMIN	Equal variances assumed	.461	.499	-4.091	116	.000	-.61123	.14941	-.90715	-.31532
	Equal variances not assumed			-4.168	15.287	.001	-.61123	.14666	-.92333	-.29914
PMTI	Equal variances assumed	.702	.404	-4.336	116	.000	-.61700	.14229	-.89881	-.33518
	Equal variances not assumed			-4.029	14.574	.001	-.61700	.15312	-.94420	-.28979
PMBE	Equal variances assumed	.552	.459	-6.163	116	.000	-.82149	.13329	-1.08549	-.55749
	Equal variances not assumed			-6.779	16.041	.000	-.82149	.12118	-1.07833	-.56465

APPENDIX "E4"

T-test for Record Customer Complaints and Competitive Capabilities

Group Statistics

	Record Customer	N	Mean	Std. Deviation	Std. Error Mean
CCPQ	No	14	3.7857	.53281	.14240
	yes	104	4.2019	.54796	.05373
CCPC	No	14	3.0857	.59077	.15789
	yes	104	3.5519	.47582	.04666

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
CCPQ	Equal variances assumed	.698	.405	-2.676	116	.009	-.41621	.15552	-.72423	-.10819
	Equal variances not assumed			-2.735	16.922	.014	-.41621	.15220	-.73743	-.09499
CCPC	Equal variances assumed	.688	.408	-3.342	116	.001	-.46621	.13951	-.74252	-.18990
	Equal variances not assumed			-2.832	15.355	.012	-.46621	.16464	-.81643	-.11599

APPENDIX "E5"

T-test for Annual Revenue and Organizational Performance

Group Statistics

	Annual Revenue	N	Mean	Std. Deviation	Std. Error Mean
OPNF	Up To 50	77	3.4701	.57744	.06581
	more than 50	33	4.0303	.59186	.10303
OPF	Up To 50	77	3.3268	.51685	.05890
	more than 50	33	3.7929	.49657	.08644

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
OPNF	Equal variances assumed	.158	.692	-4.628	108	.000	-.56017	.12104	-.80010	-.32025
	Equal variances not assumed			-4.582	5.928	.000	-.56017	.12225	-.80478	-.31557
OPF	Equal variances assumed	.120	.730	-4.384	108	.000	-.46609	.10630	-.67680	-.25538
	Equal variances not assumed			-4.456	6.290E1	.000	-.46609	.10460	-.67512	-.25705

APPENDIX “F”

GOODNESS OF MEASURES

APPENDIX “F1”

Factor analysis on PMIS

		PMBS 1	MPBS 3	PMBS 4	PMBS 5	PMBS 6	PMBS 7	PMBS 8	PMIN 1	PMIN 2	PMIN 3	PMIN 4	PMIN 5	PMIN 6
Anti-image Correlation	PMBS1	.875[a]	-.095	-.185	-.244	-.082	-.119	.152	-.100	-.189	-.126	.083	.182	.041
	PMBS3	-.095	.922[a]	-.344	.202	-.120	-.151	-.021	-.009	-.076	.043	-.023	.025	.097
	PMBS4	-.185	-.344	.890[a]	-.134	.000	-.136	-.251	-.016	.202	-.144	.025	-.122	-.179
	PMBS5	-.244	.202	-.134	.871[a]	-.394	.001	-.225	.071	.024	-.010	-.067	-.174	.130
	PMBS6	-.082	-.120	.000	-.394	.881[a]	-.135	-.023	-.109	.188	-.017	.170	.051	.015
	PMBS7	-.119	-.151	-.136	.001	-.135	.919[a]	-.286	.042	.003	-.039	-.334	.030	-.020
	PMBS8	.152	-.021	-.251	-.225	-.023	-.286	.870[a]	-.205	-.194	.031	.138	.242	-.117
	PMIN1	-.100	-.009	-.016	.071	-.109	.042	-.205	.914[a]	-.179	-.128	-.134	-.301	.062
	PMIN2	-.189	-.076	.202	.024	.188	.003	-.194	-.179	.891[a]	-.152	-.162	-.113	-.079
	PMIN3	-.126	.043	-.144	-.010	-.017	-.039	.031	-.128	-.152	.925[a]	-.136	-.233	.076
	PMIN4	.083	-.023	.025	-.067	.170	-.334	.138	-.134	-.162	-.136	.911[a]	-.045	-.235
	PMIN5	.182	.025	-.122	-.174	.051	.030	.242	-.301	-.113	-.233	-.045	.774[a]	-.263
	PMIN6	.041	.097	-.179	.130	.015	-.020	-.117	.062	-.079	.076	-.235	-.263	.924[a]
	PMTI1	-.050	-.117	.004	-.157	.124	-.022	.037	.004	.060	-.100	-.034	-.069	-.082
	PMTI2	.087	-.093	.111	.068	-.125	-.011	.028	-.029	.027	-.124	-.047	.072	-.105
	PMTI4	.166	.097	-.176	.031	.015	-.144	-.092	.131	-.249	.249	.105	-.126	.142
	PMTI5	-.157	.009	.237	.043	-.171	.007	.044	-.001	.208	-.125	-.139	-.102	-.084
	PMTI6	.081	-.148	-.059	-.221	.018	.099	.101	-.196	-.140	-.018	-.057	.469	-.115
	PMBE1	.028	.119	-.176	-.017	-.040	-.155	.222	-.113	-.210	-.070	.146	.276	-.117
	PMBE2	-.089	.063	-.095	.137	-.049	-.010	-.125	.133	-.086	.176	.087	-.348	.160
	PMBE3	.106	-.068	.178	-.013	-.159	.039	-.145	.157	-.029	.010	-.025	-.250	.003
	PMBE4	-.137	.009	-.162	.085	-.054	.092	.047	-.039	-.033	-.048	.012	-.030	-.072
	PMBE5	-.144	-.067	-.035	.027	.114	.163	-.114	-.001	.073	.022	-.163	-.059	.004
	PMBE6	.081	-.070	.068	-.050	-.157	-.035	-.029	.021	.012	-.013	-.074	-.008	-.156

a. Measures of Sampling Adequacy(MSA)

		PMTI1	PMTI2	PMTI4	PMTI5	PMTI6	PMBE1	PMBE2	PMBE3	PMBE4	PMBE5	PMBE6
nti-image Correlation	PMBS1	-.050	.087	.166	-.157	.081	.028	-.089	.106	-.137	-.144	.081
	PMBS3	-.117	-.093	.097	.009	-.148	.119	.063	-.068	.009	-.067	-.070
	PMBS4	.004	.111	-.176	.237	-.059	-.176	-.095	.178	-.162	-.035	.068
	PMBS5	-.157	.068	.031	.043	-.221	-.017	.137	-.013	.085	.027	-.050
	PMBS6	.124	-.125	.015	-.171	.018	-.040	-.049	-.159	-.054	.114	-.157
	PMBS7	-.022	-.011	-.144	.007	.099	-.155	-.010	.039	.092	.163	-.035
	PMBS8	.037	.028	-.092	.044	.101	.222	-.125	-.145	.047	-.114	-.029
	PMIN1	.004	-.029	.131	-.001	-.196	-.113	.133	.157	-.039	-.001	.021
	PMIN2	.060	.027	-.249	.208	-.140	-.210	-.086	-.029	-.033	.073	.012
	PMIN3	-.100	-.124	.249	-.125	-.018	-.070	.176	.010	-.048	.022	-.013
	PMIN4	-.034	-.047	.105	-.139	-.057	.146	.087	-.025	.012	-.163	-.074
	PMIN5	-.069	.072	-.126	-.102	.469	.276	-.348	-.250	-.030	-.059	-.008
	PMIN6	-.082	-.105	.142	-.084	-.115	-.117	.160	.003	-.072	.004	-.156
	PMTI1	.894[a]	-.537	-.097	-.057	-.098	-.108	.019	.047	.131	.078	-.157
	PMTI2	-.537	.857[a]	-.180	.003	.029	.056	-.019	-.168	.025	-.044	.150
	PMTI4	-.097	-.180	.782[a]	-.418	-.158	.016	-.004	.076	-.027	-.022	.010
	PMTI5	-.057	.003	-.418	.838[a]	-.212	-.033	-.109	.000	-.053	-.020	.138
	PMTI6	-.098	.029	-.158	-.212	.836[a]	.241	-.221	-.213	.050	-.027	-.181
	PMBE1	-.108	.056	.016	-.033	.241	.855[a]	-.135	-.317	-.030	-.209	-.077
	PMBE2	.019	-.019	-.004	-.109	-.221	-.135	.877[a]	.021	-.217	-.149	-.030
	PMBE3	.047	-.168	.076	.000	-.213	-.317	.021	.892[a]	-.253	-.259	.048
	PMBE4	.131	.025	-.027	-.053	.050	-.030	-.217	-.253	.926[a]	.060	-.147
	PMBE5	.078	-.044	-.022	-.020	-.027	-.209	-.149	-.259	.060	.921[a]	-.322
	PMBE6	-.157	.150	.010	.138	-.181	-.077	-.030	.048	-.147	-.322	.932[a]

a. Measures of Sampling Adequacy (MSA)

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.886
Bartlett's Test of Sphericity	Approx. Chi-Square	1510.965
	df	276
	Sig.	.000

Communalities

	Initial	Extraction
MPBS1	1.000	.539
MPBS3	1.000	.525
PMBS4	1.000	.697
PMBS5	1.000	.601
MPBS6	1.000	.594
PMBS7	1.000	.628
PMBS8	1.000	.551
PMIN1	1.000	.587
PMIN2	1.000	.515
PMIN3	1.000	.648
PMIN4	1.000	.682
PMIN5	1.000	.600
PMIN6	1.000	.610
PMTI1	1.000	.710
PMTI2	1.000	.675
PMTI3	1.000	.606
PMTI4	1.000	.577
PMTI5	1.000	.570
MPBE1	1.000	.511
MPBE2	1.000	.641
MPBE3	1.000	.660
MPBE4	1.000	.619
MPBE5	1.000	.638
MPBE6	1.000	.543

Extraction Method: Principal Component Analysis.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	9.681	40.336	40.336	9.681	40.336	40.336	4.164	17.349	17.349
2	1.741	7.253	47.588	1.741	7.253	47.588	3.842	16.009	33.358
3	1.603	6.678	54.267	1.603	6.678	54.267	3.578	14.910	48.268
4	1.503	6.263	60.530	1.503	6.263	60.530	2.943	12.262	60.530
5	.992	4.134	64.664						
6	.956	3.985	68.649						
7	.775	3.231	71.880						
8	.726	3.027	74.907						
9	.678	2.825	77.732						
10	.602	2.507	80.239						
11	.538	2.240	82.479						
12	.491	2.046	84.524						
13	.453	1.886	86.410						
14	.418	1.743	88.153						

15	.415	1.728	89.881						
16	.393	1.638	91.519						
17	.388	1.616	93.135						
18	.348	1.451	94.586						
19	.293	1.221	95.807						
20	.267	1.112	96.919						
21	.210	.875	97.794						
22	.201	.839	98.634						
23	.180	.752	99.385						
24	.148	.615	100.000						

Extraction Method: Principal Component Analysis.

Rotated Component Matrix[a]

	Component			
	1	2	3	4
MPBS5	.723	.133	.124	.214
MPBS4	.709	.317	.306	
PMBS6	.672		.256	.273
PMBS8	.670	.180	.218	.147
MPBS1	.668	.209	.208	
MPBS7	.641	.401		.223
MPBS3	.600	.297	.150	.234
PMIN4	.199	.743	.138	.269
PMIN3	.313	.725	.139	
PMIN6	.182	.641	.328	.242
PMIN1	.383	.635	.189	
PMIN5		.624	.446	.110
PMIN2	.231	.569	.351	.121
MPBE4	.196		.740	.231
MPBE2	.227	.176	.732	
MPBE3	.159	.262	.678	.326
MPBE5	.236	.304	.671	.199
MPBE1	.251	.275	.608	
MPBE6	.387	.302	.506	.215
PMTI4	.126		.199	.742
PMTI2		.413		.704
PMTI5		.124	.251	.700
PMTI1	.254	.487		.639
PMTI6	.413		.240	.577

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 6 iterations.

Component Transformation Matrix

Component	1	2	3	4
1	.558	.533	.499	.394
2	-.560	.110	-.131	.811
3	.612	-.383	-.577	.382
4	.002	-.747	.633	.205

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.886
Bartlett's Test of Sphericity	Approx. Chi-Square	1510.965
	df	276

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

APPENDIX “F2”

Factor analysis on competitive capabilities

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.856
Bartlett's Test of Sphericity	Approx. Chi-Square	796.628
	df	55
	Sig.	.000

Anti-image Matrices

		OPNF1	OPNF2	OPNF3	OPNF4	OPNF5	OPF1	OPF2	OPF3	OPF4	OPF5	OPF6
Anti-image Covariance	OPNF1	.118	-.099	-.054	.021	-.045	.056	-.009	-.036	-.033	.081	.036
	OPNF2	-.099	.107	.031	-.027	.016	-7.253	.006	.030	.018	-.083	-.038
	OPNF3	-.054	.031	.427	-.119	-.030	-8.160	-.024	-.042	-.020	-.085	-.032
	OPNF4	.021	-.027	-.119	.569	-.203	.033	-.025	-.014	-.008	.016	-.006
	OPNF5	-.045	.016	-.030	-.203	.509	.019	-.035	-.055	.022	-.046	-.009
	OPF1	.056	-.073	-.082	.033	.019	.407	-.117	-.140	-.002	.062	-.018
	OPF2	-.009	.006	-.024	-.025	-.035	-1.166	.417	-.090	-.100	-.088	.009
	OPF3	-.036	.030	-.042	-.014	-.055	-1.401	-.090	.429	-6.064E-5	-.019	-.069
	OPF4	-.033	.018	-.020	-.008	.022	-2.172	-.100	-6.064E-5	.565	-.064	-.177
	OPF5	.081	-.083	-.085	.016	-.046	.062	-.088	-.019	-.064	.517	-.110
	OPF6	.036	-.038	-.032	-.006	-.009	-1.769	.009	-.069	-.177	-.110	.527
Anti-image Correlation	OPNF1	.724[a]	-.880	-.242	.081	-.182	.256	-.041	-.160	-.127	.329	.144
	OPNF2	-.880	.746[a]	.145	-.111	.068	-3.466	.026	.139	.071	-.350	-.158
	OPNF3	-.242	.145	.926[a]	-.240	-.065	-1.956	-.057	-.098	-.041	-.181	-.067
	OPNF4	.081	-.111	-.240	.890[a]	-.377	.068	-.050	-.028	-.013	.029	-.011
	OPNF5	-.182	.068	-.065	-.377	.911[a]	.042	-.075	-.118	.040	-.089	-.018
	OPF1	.256	-.347	-.196	.068	.042	8.513	-.283	-.335	-.005	.134	-.038
	OPF2	-.041	.026	-.057	-.050	-.075	-2.829	.929[a]	-.213	-.207	-.190	.020
	OPF3	-.160	.139	-.098	-.028	-.118	-3.353	-.213	.916[a]	.000	-.040	-.144
	OPF4	-.127	.071	-.041	-.013	.040	-4.528	-.207	.000	.915[a]	-.119	-.325
	OPF5	.329	-.350	-.181	.029	-.089	.134	-.190	-.040	-.119	.836[a]	-.211
	OPF6	.144	-.158	-.067	-.011	-.018	-3.8192	.020	-.144	-.325	-.211	.904[a]

a. Measures of Sampling Adequacy(MSA)

Communalities

	Initial	Extraction
OPNF1	1.000	.744
OPNF2	1.000	.737
OPNF3	1.000	.643
OPNF4	1.000	.565
OPNF5	1.000	.642
OPF1	1.000	.570
OPF2	1.000	.652
OPF3	1.000	.602
OPF4	1.000	.598
OPF5	1.000	.563
OPF6	1.000	.655

Extraction Method: Principal Component Analysis.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.914	53.766	53.766	5.914	53.766	53.766	3.503	31.843	31.843
2	1.056	9.603	63.369	1.056	9.603	63.369	3.468	31.526	63.369
3	.796	7.239	70.608						
4	.730	6.633	77.241						
5	.540	4.912	82.153						
6	.459	4.176	86.329						
7	.437	3.970	90.299						
8	.383	3.482	93.781						
9	.326	2.961	96.742						
10	.302	2.741	99.484						
11	.057	.516	100.000						

Extraction Method: Principal Component Analysis.

Rotated Component Matrix[a]

	Component	
	1	2
OPNF1	.812	.290
OPNF5	.776	.201
OPNF2	.754	.411
OPNF4	.733	.166
OPNF3	.638	.486
OPF6	.170	.791
OPF4	.197	.747
OPF5	.219	.718
OPF2	.429	.684
OPF1	.432	.619
OPF3	.492	.599

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

Component Transformation Matrix

Component	1	2
1	.710	.705
2	-.705	.710

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

APPENDIX “F3”

Factor analysis on organizational performance

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.859
Bartlett's Test of Sphericity	Approx. Chi-Square	643.109
	df	55
	Sig.	.000

Anti-image Matrices

		CCPQ1	CCPQ2	CCPQ3	CCPQ4	CCPQ5	CCPQ6	CCCL2	CCCL3	CCCL4	CCCL5	CCCL7
Anti-image Covariance	CCPQ1	.551	-.027	-.060	-.110	-.077	.036	.064	-.066	.000	.000	-8.054
	CCPQ2	-.027	.411	-.178	.037	-.032	-.029	-.026	-.088	-7.368	.015	.034
	CCPQ3	-.060	-.178	.305	-.139	.055	-.042	-.024	-.002	.011	.019	-7.502
	CCPQ4	-.110	.037	-.139	.341	-.133	.016	-.024	.123	-7.252	-.107	.073
	CCPQ5	-.077	-.032	.055	-.133	.418	-.211	-.071	-.029	-2.861	.086	.016
	CCPQ6	.036	-.029	-.042	.016	-.211	.432	-.028	-.039	-4.246	-.048	-4.327
	CCPC2	.064	-.026	-.024	-.024	-.071	-.028	.564	-.162	.098	-.121	-1.124
	CCPC3	-.066	-.088	-.002	.123	-.029	-.039	-.162	.569	-1.195	-.058	.011
	CCPC4	.000	-.074	.011	-.073	-.003	-.042	.098	-.119	.472	-.117	-1.264
	CCPC5	.000	.015	.019	-.107	.086	-.048	-.121	-.058	-1.169	.497	-1.205
	CCPC7	-.081	.034	-.075	.073	.016	-.043	-.112	.011	-1.264	-.121	.538
Anti-image Correlation	CCPQ1	.918[a]	-.058	-.147	-.253	-.160	.074	.115	-.119	-1.006	.000	-1.479
	CCPQ2	-.058	8.733	-.501	.099	-.076	-.068	-.054	-.181	-1.673	.033	.073
	CCPQ3	-.147	-.501	.838[a]	-.429	.155	-.114	-.059	-.005	.030	.048	-1.851
	CCPQ4	-.253	.099	-.429	.798[a]	-.351	.041	-.056	.280	-1.806	-.259	.171
	CCPQ5	-.160	-.076	.155	-.351	8.050	-.497	-.147	-.060	-6.442	.189	.033
	CCPQ6	.074	-.068	-.114	.041	-.497	8.845	-.056	-.078	-9.405	-.104	-8.979
	CCPC2	.115	-.054	-.059	-.056	-.147	-.056	.869[a]	-.286	.189	-.228	-2.040
	CCPC3	-.119	-.181	-.005	.280	-.060	-.078	-.286	8.422	-2.304	-.109	.019
	CCPC4	-.001	-.167	.030	-.181	-.006	-.094	.189	-.230	8.903	-.241	-2.507
	CCPC5	.000	.033	.048	-.259	.189	-.104	-.228	-.109	-2.414	8.717	-2.330
	CCPC7	-.148	.073	-.185	.171	.033	-.090	-.204	.019	-2.507	-.233	8.790

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.859
Bartlett's Test of Sphericity	Approx. Chi-Square	643.109
	df	55

a. Measures of Sampling Adequacy(MSA)

Communalities

	Initial	Extraction
CCPQ1	1.000	.586
CCPQ2	1.000	.572
CCPQ3	1.000	.700
CCPQ4	1.000	.754
CCPQ5	1.000	.589
CCPQ6	1.000	.567
CCPC2	1.000	.549
CCPC3	1.000	.607
CCPC4	1.000	.569
CCPC5	1.000	.580
CCPC7	**1.000**	**.574**

Extraction Method: Principal Component Analysis.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.507	50.066	50.066	5.507	50.066	50.066	3.526	32.053	32.053
2	1.141	10.372	60.438	1.141	10.372	60.438	3.122	28.385	60.438
3	.865	7.859	68.298						
4	.726	6.600	74.898						
5	.618	5.619	80.517						
6	.543	4.935	85.452						
7	.509	4.629	90.081						
8	.354	3.219	93.300						
9	.292	2.652	95.953						
10	.270	2.457	98.410						
11	.175	1.590	100.000						

Extraction Method: Principal Component Analysis.

Component Transformation Matrix

component	1	2
1	.739	.674
2	-.674	.739

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

Rotated Component Matrix[a]

	Component	
	1	2
CCPQ4	.854	.157
CCPQ3	.748	.374
CCPQ1	.742	.190
CCPQ5	.738	.212
CCPQ2	.604	.456
CCPQ6	.597	.460
CCPC3	.107	.771
CCPC7	.264	.710
CCPC2	.230	.704
CCPC5	.297	.701
CCPC4	.446	.608

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

APPENDIX "F4"

Reliability Analysis

Reliability Analysis

Cronbach's Alpha	N of Items
.866	7

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
MPBS1	22.3023	9.103	.574	.858
MPBS3	21.8446	9.251	.609	.851
PMBS4	22.2458	9.332	.749	.836
PMBS5	22.0734	9.005	.651	.846
MPBS6	22.1921	9.241	.607	.852
PMBS7	22.3870	8.822	.681	.841
PMBS8	21.8701	9.369	.637	.848

Reliability Statistics

Cronbach's Alpha	N of Items
.860	6

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PMIN1	18.5085	7.261	.660	.836
PMIN2	18.6695	7.796	.624	.842
PMIN3	18.4831	7.363	.667	.834
PMIN4	18.1441	7.492	.690	.830
PMIN5	18.6186	7.554	.623	.842
PMIN6	18.5085	7.705	.650	.837

Reliability Statistics

Cronbach's Alpha	N of Items
.809	5

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PMTI1	14.9153	4.557	.651	.756
PMTI2	14.9322	4.730	.619	.767
PMTI4	15.0932	4.359	.572	.781
PMTI5	15.1780	4.524	.600	.770
PMTI6	15.1695	4.450	.555	.785

Reliability Statistics

Cronbach's Alpha	N of Items
.861	6

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
MPBE1	18.0254	7.153	.623	.842
MPBE2	18.3559	7.377	.601	.846
MPBE3	18.1017	6.605	.709	.827
MPBE4	18.5424	7.088	.613	.844
MPBE5	17.9576	6.656	.733	.822
MPBE6	18.2542	6.824	.638	.840

Reliability Statistics

Cronbach's Alpha	N of Items
.873	6

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
CCPQ1	20.7627	8.422	.621	.861
CCPQ2	20.7542	8.272	.659	.855
CCPQ3	20.7966	7.616	.752	.838
CCPQ4	20.6864	7.841	.714	.845
CCPQ5	20.6864	8.183	.662	.854
CCPQ6	20.8898	7.979	.645	.857

Reliability Statistics

Cronbach's Alpha	N of Items
.811	5

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
CCCL2	14.0339	4.426	.563	.785
CCCL3	14.1102	4.321	.556	.789
CCCL4	13.9492	4.271	.610	.771
CCCL5	13.9322	4.389	.651	.760
CCCL7	13.9068	4.461	.623	.768

Reliability Statistics

Cronbach's Alpha	N of Items
.871	5

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
OPNF1	14.5847	5.903	.782	.821
OPNF2	14.5424	5.994	.776	.823
OPNF3	14.6864	6.832	.678	.849
OPNF4	14.4576	6.661	.597	.868
OPNF5	14.4407	6.608	.659	.852

Reliability Statistics

Cronbach's Alpha	N of Items
.862	6

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
OPF1	17.2627	7.836	.657	.838
OPF2	17.2119	7.245	.727	.824
OPF3	17.3136	7.875	.681	.834
OPF4	17.3559	7.735	.618	.845
OPF5	17.3729	8.065	.599	.848
OPF6	17.3390	7.679	.646	.840

APPENDIX "G"

Testing the Assumptions of Multiple Regression

APPENDIX "G1"

Collinearity Diagnostic Test-PMIS

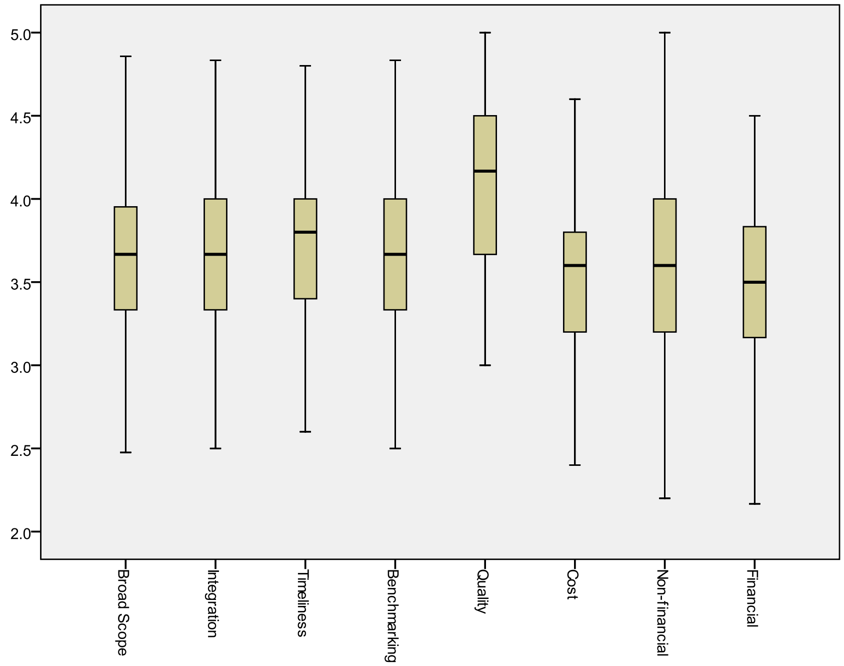
Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	Broad Scope	.512	1.954
	Integration	.482	2.073
	Timeliness	.621	1.611
	Benchmarking	.483	2.070

a. Dependent Variable: Financial

APPENDIX “G2”

Outliers Test



APPENDIX “G3”

Histogram Graph for Normality

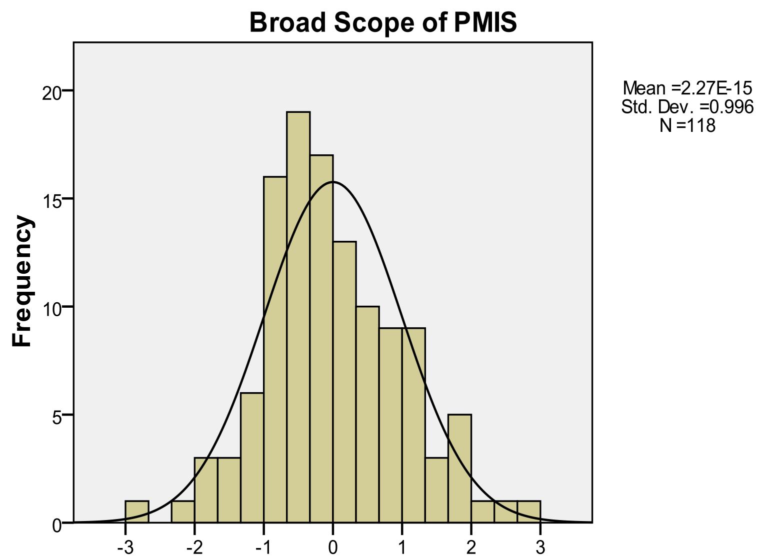
Descriptive Statistics

	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
Broad Scope	118	.230	.223	-.086	.442
Integration	118	.062	.223	-.408	.442
Timeliness	118	-.078	.223	-.148	.442
Benchmarking	118	-.148	.223	-.446	.442
Quality	118	-.154	.223	-.837	.442
Cost	118	-.097	.223	-.370	.442
Non-financial	118	.029	.223	-.454	.442
Financial	118	-.278	.223	-.652	.442
Valid N (listwise)	118				

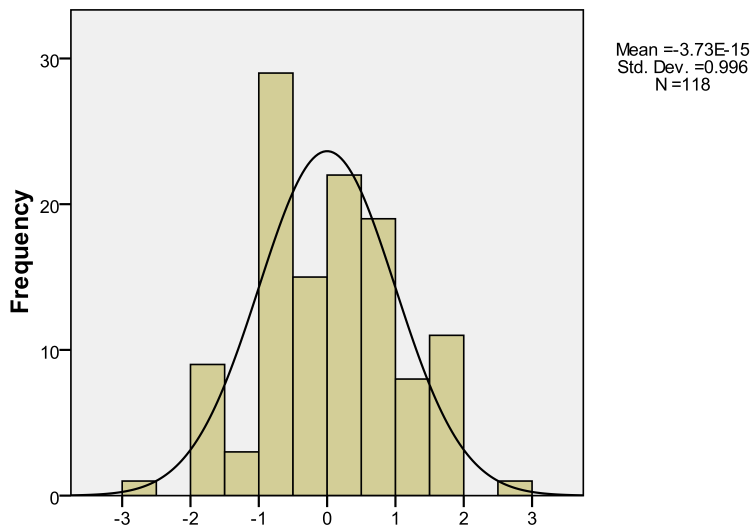
Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Broad Scope	.074	118	.169	.983	118	.151
Integration	.073	118	.171	.980	118	.078
Timeliness	.113	118	.001	.969	118	.008
Benchmarking	.088	118	.026	.977	118	.043
Quality	.110	118	.001	.955	118	.001
Cost	.106	118	.003	.975	118	.025
Non-financial	.082	118	.049	.984	118	.172
Financial	.090	118	.021	.970	118	.010

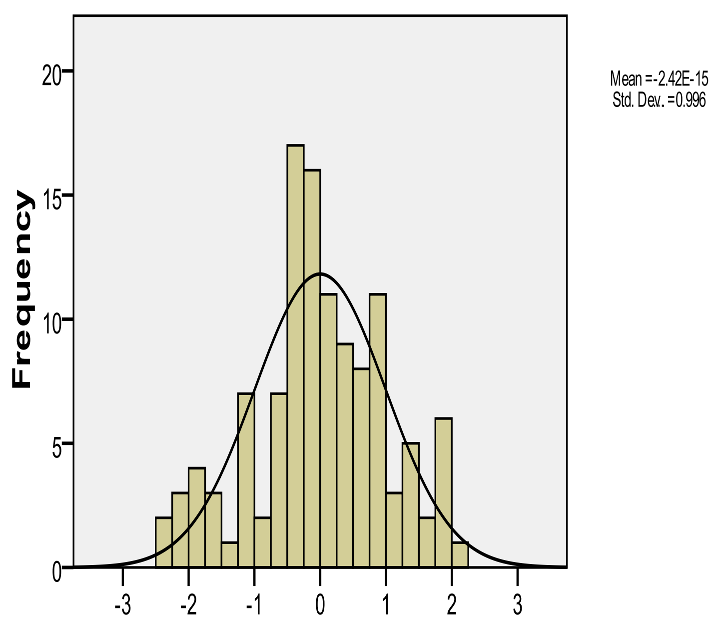
a. Lilliefors Significance Correction

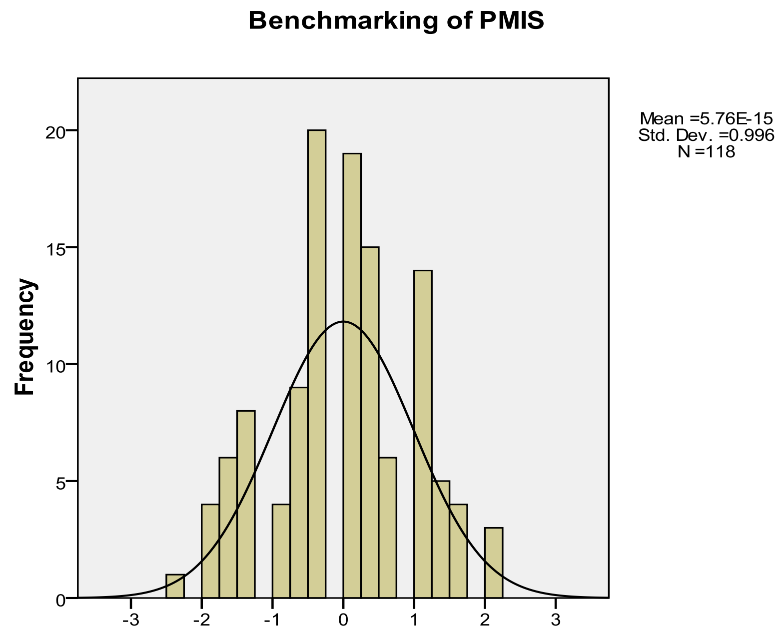


Integration of PMIS



Timeliness of PMIS




Benchmarking of PMIS
Mean =5.76E-15
Std. Dev. =0.996
N =118
Frequency
0
5
10
15
20
-3
-2
-1
0
1
2
3

APPENDIX "H"

Correlation Analysis

Pearson Correlations Coefficient for All Variables

0		Broad Scope	Integration	Timeliness	Benchmarking	Quality	Cost	Non-financial	Financial
Broad Scope	P. Correlation	1	.614**	.532**	.619**	.598**	.593**	.588**	.579**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.000
	N	118	118	118	118	118	118	118	118
Integration	P. Correlation	.614**	1	.539**	.648**	.606**	.551**	.598**	.599**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000	.000
	N	118	118	118	118	118	118	118	118
Timeliness	P. Correlation	.532**	.539**	1	.530**	.581**	.568**	.559**	.453**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000	.000
	N	118	118	118	118	118	118	118	118
Benchmarking	P. Correlation	.619**	.648**	.530**	1	.543**	.616**	.544**	.602**
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000	.000
	N	118	118	118	118	118	118	118	118
Quality	P. Correlation	.598**	.606**	.581**	.543**	1	.674**	.654**	.608**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.000
	N	118	118	118	118	118	118	118	118
Cost	P. Correlation	.593**	.551**	.568**	.616**	.674**	1	.600**	.695**
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000	.000
	N	118	118	118	118	118	118	118	118
Non-financial	P. Correlation	.588**	.598**	.559**	.544**	.654**	.600**	1	.712**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000		.000
	N	118	118	118	118	118	118	118	118
Financial	P. Correlation	.579**	.599**	.453**	.602**	.608**	.695**	.712**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	
	N	118	118	118	118	118	118	118	118

**. Correlation is significant at the 0.01 level (2-tailed).

APPENDIX “I”

Multiple Regression Analysis

APPENDIX “I1”
Regression - PMIS and Non-financial Performance

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Size of Company[a]	.	Enter
2	Broad Scope, Timeliness, Benchmarking, Integration[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Non-financial

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.408[a]	.167	.160	.57059
2	.708[b]	.501	.479	.44936

a. Predictors: (Constant), Size of Company

b. Predictors: (Constant), Size of Company, Broad Scope, Timeliness, Benchmarking, Integratio

c. Dependent Variable: Non-financial

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.564	1	7.564	23.233	.000[a]
	Residual	37.767	116	.326		
	Total	45.331	117			
2	Regression	22.715	5	4.543	22.499	.000[b]
	Residual	22.615	112	.202		
	Total	45.331	117			

a. Predictors: (Constant), Size of Company
b. Predictors: (Constant), Size of Company, Broad Scope, Timeliness, Benchmarking, Integration
c. Dependent Variable: Non-financial

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.880	.165		17.426	.000
	Size of Company	.506	.105	.408	4.820	.000

2	(Constant)	-.036	.363		-.098	.922
	Size of Company	.181	.091	.146	1.981	.050
	Broad Scope	.292	.116	.234	2.509	.014
	Integration	.248	.113	.216	2.203	.030
	Timeliness	.265	.102	.221	2.599	.011
	Benchmarking	.112	.115	.093	.971	.334

a. Dependent Variable: Non-financial

Excluded Variables[b]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	Broad Scope	.510[a]	6.716	.000	.531	.901
	Integration	.517[a]	6.522	.000	.520	.840
	Timeliness	.477[a]	6.099	.000	.494	.895
	Benchmarking	.459[a]	5.779	.000	.474	.890

a. Predictors in the Model: (Constant), Size of Company

b. Dependent Variable: Non-financial

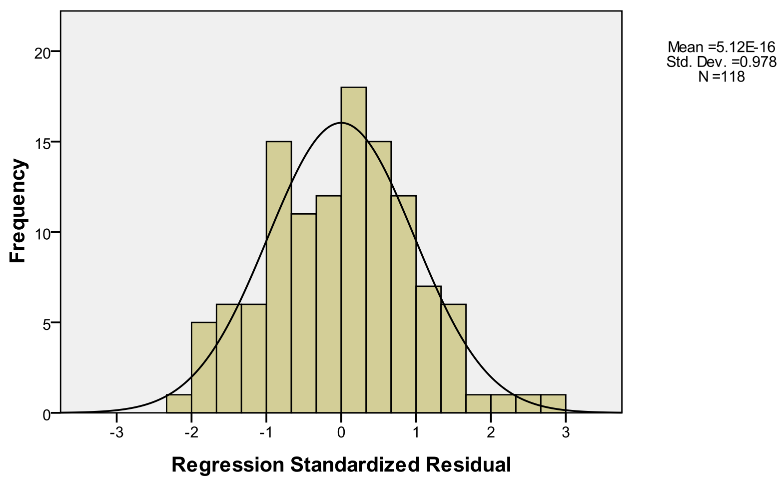
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.5695	4.6687	3.6356	.44062	118
Std. Predicted Value	-2.419	2.345	.000	1.000	118
Standard Error of Predicted Value	.061	.164	.099	.023	118
Adjusted Predicted Value	2.5410	4.6732	3.6364	.44133	118
Residual	-.92098	1.26169	.00000	.43965	118
Std. Residual	-2.050	2.808	.000	.978	118
Stud. Residual	-2.116	2.869	.000	1.005	118
Deleted Residual	-.98206	1.31701	-.00077	.46421	118
Stud. Deleted Residual	-2.150	2.967	.000	1.015	118
Mahal. Distance	1.168	14.585	4.958	2.804	118
Cook's Distance	.000	.093	.009	.015	118
Centered Leverage Value	.010	.125	.042	.024	118

a. Dependent Variable: Non-financial

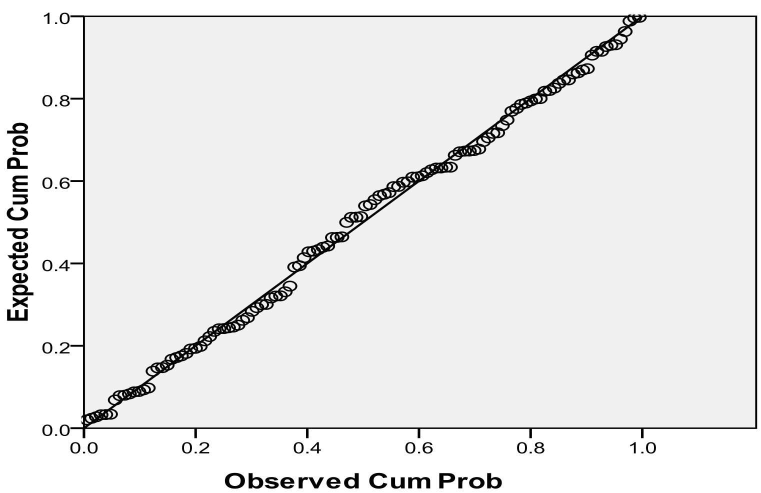
Histogram

Dependent Variable: Non-financial



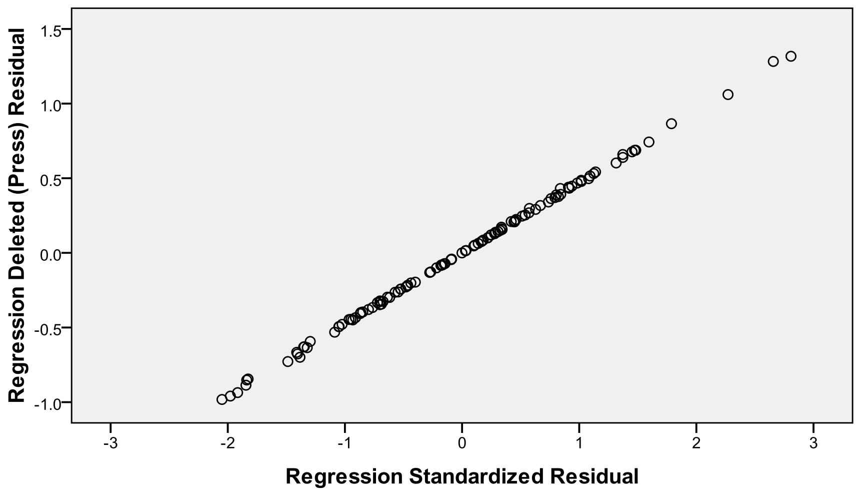
Normal P-P Plot of Regression Standardized Residual

Dependent Variable: Non-financial



Scatterplot

Dependent Variable: Non-financial



Appendix “I2”

Regression - PMIS and Financial Performance

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Size of Company[a]	.	Enter
2	Broad Scope, Timeliness, Benchmarking, Integration[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Financial

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.493[a]	.243	.236	.47973
2	.725[b]	.526	.505	.38629

a. Predictors: (Constant), Size of Company

b. Predictors: (Constant), Size of Company, Broad Scope, Timeliness, Benchmarking, Integration

c. Dependent Variable: Financial

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8.549	1	8.549	37.148	.000[a]
	Residual	26.696	116	.230		
	Total	35.245	117			
2	Regression	18.532	5	3.706	24.839	.000[b]
	Residual	16.713	112	.149		
	Total	35.245	117			

a. Predictors: (Constant), Size of Company

b. Predictors: (Constant), Size of Company, Broad Scope, Timeliness, Benchmarking, Integration

c. Dependent Variable: Financial

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.659	.139		19.133	.000
	Size of Company	.538	.088	.493	6.095	.000
2	(Constant)	.414	.312		1.326	.188
	Size of Company	.284	.079	.259	3.608	.000
	Broad Scope	.237	.100	.216	2.371	.019
	Integration	.195	.097	.192	2.015	.046
	Timeliness	.020	.088	.019	.232	.817
	Benchmarking	.261	.099	.247	2.640	.009

a. Dependent Variable: Financial

Excluded Variables[b]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	Broad Scope	.471[a]	6.416	.000	.513	.901
	Integration	.479[a]	6.270	.000	.505	.840
	Timeliness	.328[a]	4.093	.000	.357	.895
	Benchmarking	.493[a]	6.777	.000	.534	.890

a. Predictors in the Model: (Constant), Size of Company

b. Dependent Variable: Financial

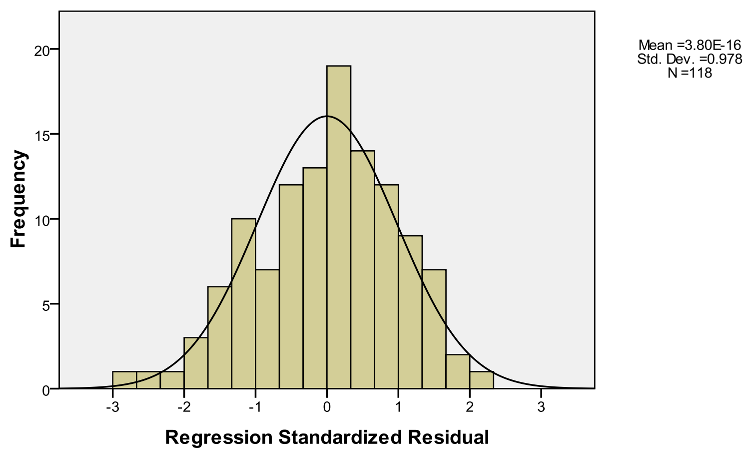
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.5389	4.3557	3.4619	.39799	118
Std. Predicted Value	-2.319	2.246	.000	1.000	118
Standard Error of Predicted Value	.052	.141	.085	.020	118
Adjusted Predicted Value	2.5010	4.4022	3.4635	.39996	118
Residual	-1.08898	.79677	.00000	.37795	118
Std. Residual	-2.819	2.063	.000	.978	118
Stud. Residual	-2.938	2.101	-.002	1.006	118
Deleted Residual	-1.18262	.82706	-.00162	.40005	118
Stud. Deleted Residual	-3.044	2.135	-.004	1.015	118
Mahal. Distance	1.168	14.585	4.958	2.804	118
Cook's Distance	.000	.124	.010	.017	118
Centered Leverage Value	.010	.125	.042	.024	118

a. Dependent Variable: Financial

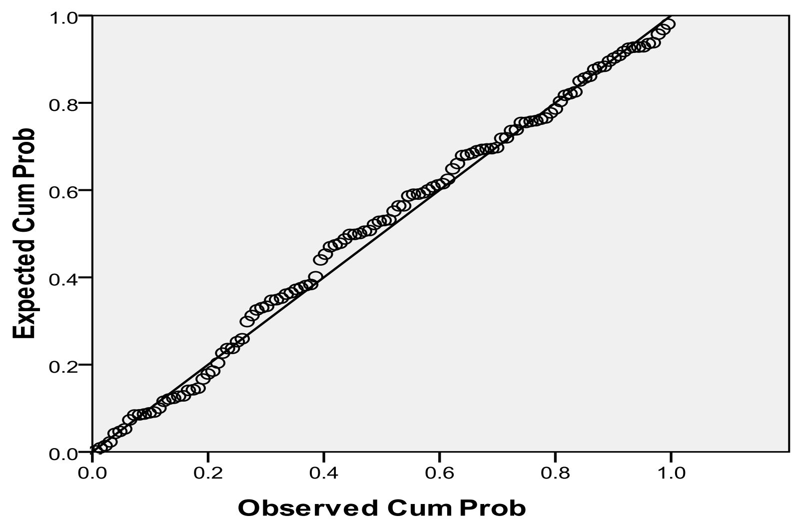
Histogram

Dependent Variable: Financial



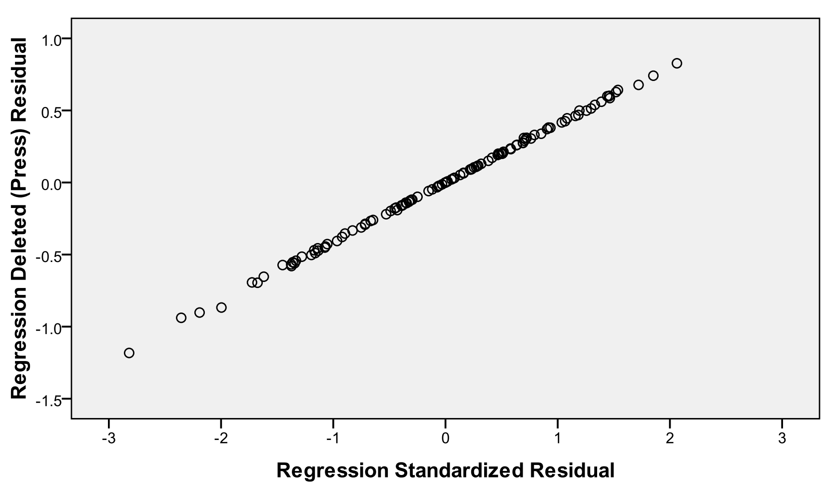
Normal P-P Plot of Regression Standardized Residual

Dependent Variable: Financial



Scatterplot

Dependent Variable: Financial



APPENDIX "I3"

Regression - PMIS and Quality Capability

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Size of Company[a]	.	Enter
2	Broad Scope, Timeliness, Benchmarking, Integration[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Quality

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.364[a]	.133	.125	.52426
2	.714[b]	.509	.487	.40130

a. Predictors: (Constant), Size of Company

b. Predictors: (Constant), Size of Company, Broad Scope, Timeliness, Benchmarking, Integration

c. Dependent Variable: Quality

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.871	1	4.871	17.723	.000[a]
	Residual	31.883	116	.275		
	Total	36.754	117			
2	Regression	18.717	5	3.743	23.245	.000[b]
	Residual	18.037	112	.161		
	Total	36.754	117			

a. Predictors: (Constant), Size of Company
b. Predictors: (Constant), Size of Company, Broad Scope, Timeliness, Benchmarking, Integration
c. Dependent Variable: Quality

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.546	.152		23.352	.000
	Size of Company	.406	.097	.364	4.210	.000
2	(Constant)	.762	.324		2.349	.021
	Size of Company	.096	.082	.086	1.171	.244
	Broad Scope	.273	.104	.243	2.621	.010
	Integration	.242	.101	.234	2.409	.018
	Timeliness	.279	.091	.259	3.060	.003
	Benchmarking	.081	.103	.075	.791	.431

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Size of Company[a]	.	Enter
2	Broad Scope, Timeliness, Benchmarking, Integration[a]	.	Enter

a. All requested variables entered.

a. Dependent Variable: Quality

Excluded Variables[b]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	Broad Scope	.536[a]	6.998	.000	.546	.901
	Integration	.548[a]	6.863	.000	.539	.840
	Timeliness	.518[a]	6.636	.000	.526	.895
	Benchmarking	.474[a]	5.873	.000	.480	.890

a. Predictors in the Model: (Constant), Size of Company

b. Dependent Variable: Quality

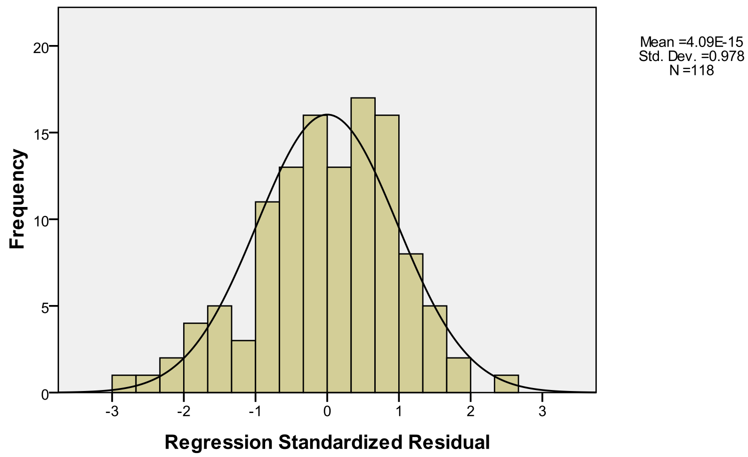
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	3.1724	5.0979	4.1525	.39997	118
Std. Predicted Value	-2.450	2.364	.000	1.000	118
Standard Error of Predicted Value	.055	.146	.088	.021	118
Adjusted Predicted Value	3.1523	5.1044	4.1515	.40127	118
Residual	-1.18695	.95449	.00000	.39263	118
Std. Residual	-2.958	2.378	.000	.978	118
Stud. Residual	-3.005	2.470	.001	1.006	118
Deleted Residual	-1.22480	1.02894	.00104	.41544	118
Stud. Deleted Residual	-3.119	2.528	.000	1.016	118
Mahal. Distance	1.168	14.585	4.958	2.804	118
Cook's Distance	.000	.079	.010	.016	118
Centered Leverage Value	.010	.125	.042	.024	118

a. Dependent Variable: Quality

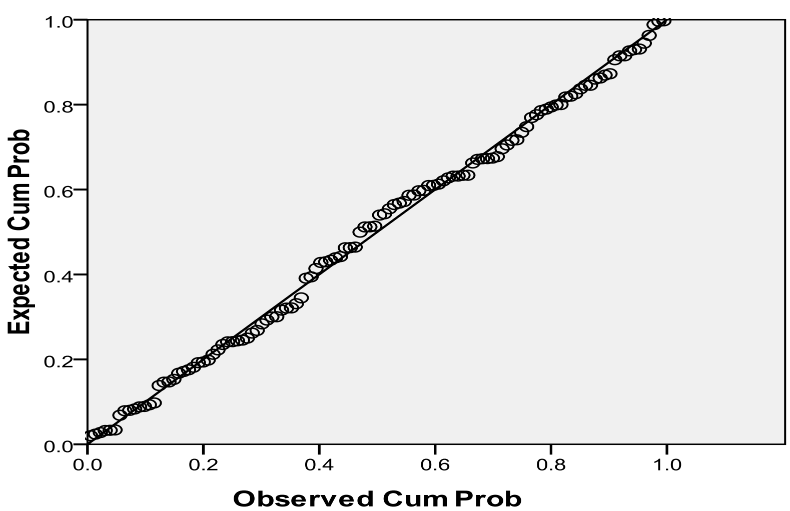
Histogram

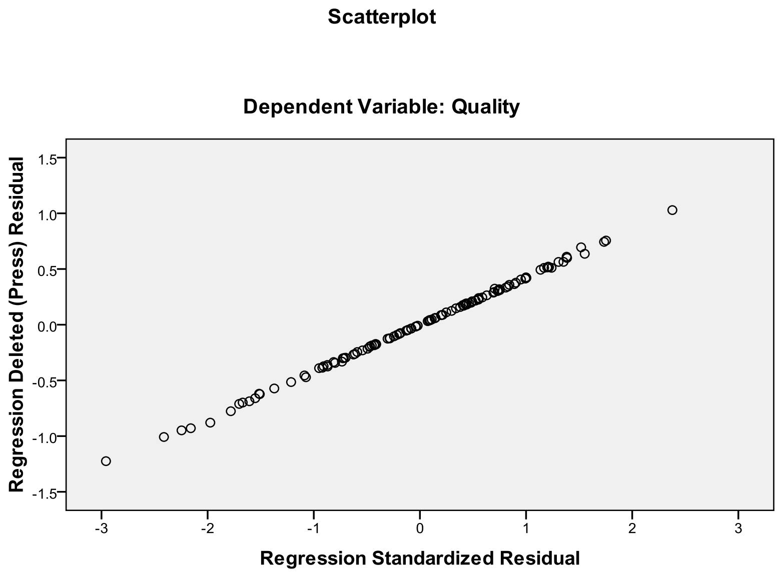
Dependent Variable: Quality



Normal P-P Plot of Regression Standardized Residual

Dependent Variable: Non-financial





APPENDIX "I4"

` Regression - PMIS and Cost Capability

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Size of Company[a]	.	Enter
2	Broad Scope, Timeliness, Benchmarking, Integration[a]	.	Enter

a. All requested variables entered. b. Dependent Variable: Cost

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.333[a]	.111	.103	.48379
2	.710[b]	.505	.483	.36750

a. Predictors: (Constant), Size of Company
b. Predictors: (Constant), Size of Company, Broad Scope, Timeliness, Benchmarking, Integration.
c. Dependent Variable: Cost

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.389	1	3.389	14.478	.000[a]
	Residual	27.150	116	.234		
	Total	30.539	117			
2	Regression	15.413	5	3.083	22.825	.000[b]
	Residual	15.126	112	.135		
	Total	30.539	117			

a. Predictors: (Constant), Size of Company
b. Predictors: (Constant), Size of Company, Broad Scope, Timeliness, Benchmarking, Integration
c. Dependent Variable: Cost

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.991	.140		21.343	.000
	Size of Company	.339	.089	.333	3.805	.000
2	(Constant)	.397	.297		1.337	.184
	Size of Company	.062	.075	.061	.833	.406
	Broad Scope	.232	.095	.226	2.431	.017
	Integration	.073	.092	.078	.797	.427
	Timeliness	.234	.083	.238	2.807	.006
	Benchmarking	.274	.094	.279	2.914	.004

a. Dependent Variable: Cost

Excluded Variables[b]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	Broad Scope	.541[a]	6.974	.000	.545	.901
	Integration	.497[a]	5.916	.000	.483	.840
	Timeliness	.514[a]	6.464	.000	.516	.895
	Benchmarking	.568[a]	7.411	.000	.569	.890

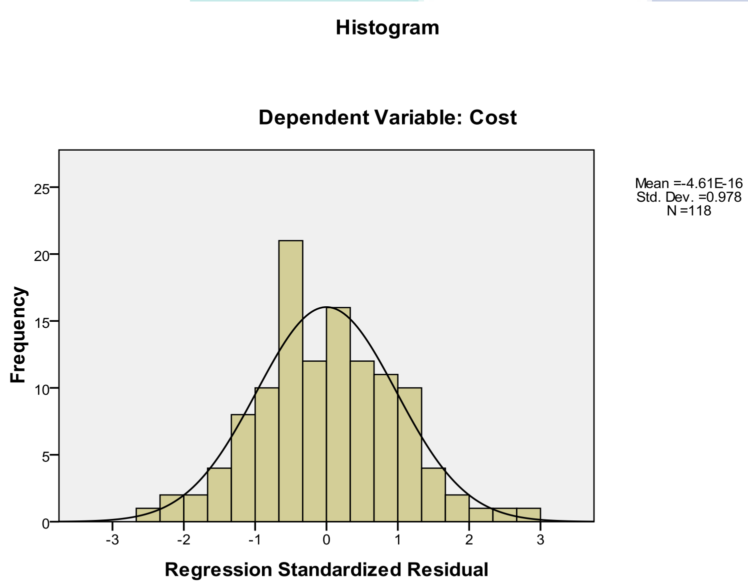
a. Predictors in the Model: (Constant), Size of Company

b. Dependent Variable: Cost

Residuals Statistics[a]

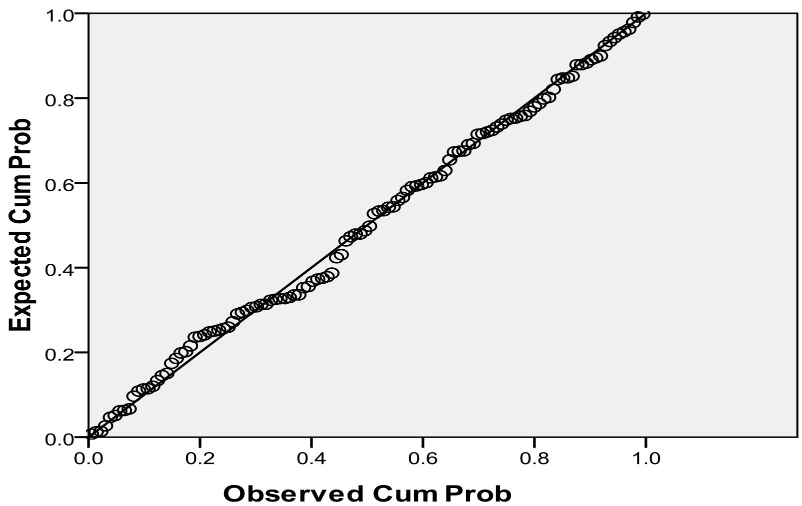
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.5788	4.3487	3.4966	.36295	118
Std. Predicted Value	-2.529	2.348	.000	1.000	118
Standard Error of Predicted Value	.050	.134	.081	.019	118
Adjusted Predicted Value	2.5754	4.3332	3.4982	.36248	118
Residual	-.90128	1.05049	.00000	.35956	118
Std. Residual	-2.453	2.859	.000	.978	118
Stud. Residual	-2.601	2.954	-.002	1.004	118
Deleted Residual	-1.01362	1.12185	-.00154	.37862	118
Stud. Deleted Residual	-2.671	3.063	-.002	1.014	118
Mahal. Distance	1.168	14.585	4.958	2.804	118
Cook's Distance	.000	.141	.009	.017	118
Centered Leverage Value	.010	.125	.042	.024	118

a. Dependent Variable: Cost



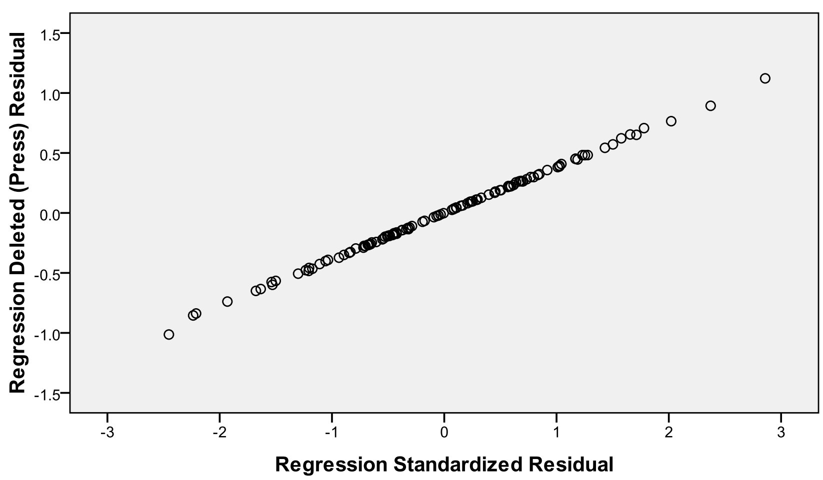
Normal P-P Plot of Regression Standardized Residual

Dependent Variable: Cost



Scatterplot

Dependent Variable: Cost



APPENDIX "I5"

Regression - Competitive Capabilities and Non-financial Performance

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Size of Company[a]	.	Enter
2	Cost, Quality[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Non-financial

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.408[a]	.167	.160	.57059
2	.706[b]	.498	.485	.44658

a. Predictors: (Constant), Size of Company.
b. Predictors: (Constant), Size of Company, Cost, Quality.
c. Dependent Variable: Non-financial

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.564	1	7.564	23.233	.000[a]
	Residual	37.767	116	.326		
	Total	45.331	117			
2	Regression	22.595	3	7.532	37.767	.000[b]
	Residual	22.735	114	.199		
	Total	45.331	117			

a. Predictors: (Constant), Size of Company
b. Predictors: (Constant), Size of Company, Cost, Quality.
c. Dependent Variable: Non-financial

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.880	.165		17.426	.000
	Size of Company	.506	.105	.408	4.820	.000
2	(Constant)	.287	.325		.883	.379
	Size of Company	.211	.089	.170	2.365	.020
	Quality	.460	.102	.414	4.517	.000
	Cost	.321	.110	.264	2.913	.004

a. Dependent Variable: Non-financial

Excluded Variables[b]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	Quality	.582[a]	7.925	.000	.594	.867
	Cost	.522[a]	6.858	.000	.539	.889

a. Predictors in the Model: (Constant), Size of Company
b. Dependent Variable: Non-financial

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.6495	4.4871	3.6356	.43946	118
Std. Predicted Value	-2.244	1.938	.000	1.000	118
Standard Error of Predicted Value	.058	.139	.080	.018	118
Adjusted Predicted Value	2.6409	4.5330	3.6358	.44002	118
Residual	-.96136	1.01054	.00000	.44081	118
Std. Residual	-2.153	2.263	.000	.987	118
Stud. Residual	-2.186	2.295	.000	1.003	118
Deleted Residual	-.99116	1.03908	-.00026	.45490	118
Stud. Deleted Residual	-2.223	2.339	-.001	1.009	118
Mahal. Distance	.980	10.280	2.975	1.919	118
Cook's Distance	.000	.067	.008	.011	118
Centered Leverage Value	.008	.088	.025	.016	118

a. Dependent Variable: Non-financial

APPENDIX “I6”

Regression - Competitive Capabilities and Financial Performance

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Size of Company[a]	.	Enter
2	Cost, Quality[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Financial

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.493[a]	.243	.236	.47973
2	.760[b]	.578	.567	.36115

a. Predictors: (Constant), Size of Company
b. Predictors: (Constant), Size of Company, Cost, Quality
c. Dependent Variable: Financial

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8.549	1	8.549	37.148	.000[a]
	Residual	26.696	116	.230		
	Total	35.245	117			
2	Regression	20.376	3	6.792	52.073	.000[b]
	Residual	14.869	114	.130		
	Total	35.245	117			

a. Predictors: (Constant), Size of Company
b. Predictors: (Constant), Size of Company, Cost, Quality
c. Dependent Variable: Financial

Coefficients[a]

Model		Unstandardized Coefficients		Stand. Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.659	.139		19.133	.000
	Size of Company	.538	.088	.493	6.095	.000
2	(Constant)	.463	.263		1.759	.081
	Size of Company	.289	.072	.264	4.011	.000
	Quality	.184	.082	.188	2.234	.027
	Cost	.516	.089	.480	5.783	.000

a. Dependent Variable: Financial

Excluded Variables[b]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	Quality	.494[a]	6.681	.000	.529	.867
	Cost	.597[a]	9.100	.000	.647	.889

a. Predictors in the Model: (Constant), Size of Company

b. Dependent Variable: Financial

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.5421	4.3339	3.4619	.41732	118
Std. Predicted Value	-2.204	2.090	.000	1.000	118
Standard Error of Predicted Value	.047	.112	.065	.015	118
Adjusted Predicted Value	2.5350	4.3685	3.4626	.41802	118
Residual	-1.11455	.75582	.00000	.35649	118
Std. Residual	-3.086	2.093	.000	.987	118
Stud. Residual	-3.222	2.113	-.001	1.005	118
Deleted Residual	-1.21483	.77071	-.00075	.36948	118
Stud. Deleted Residual	-3.365	2.146	-.002	1.013	118
Mahal. Distance	.980	10.280	2.975	1.919	118
Cook's Distance	.000	.233	.009	.023	118
Centered Leverage Value	.008	.088	.025	.016	118

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Size of Company[a]	.	Enter
2	Cost, Quality[a]	.	Enter

a. All requested variables entered.

a. Dependent Variable: Financial

APPENDIX "J"

Hierarchical Regression Analysis

APPENDIX "J1"

Regression - Mediating Effect of Quality Capability on the Relationship between PMIS and Non-financial Performance

1	Size of Company[a]	.	Enter
2	Broad Scope, Timeliness, Integration[a]	.	Enter
3	Quality[a]	.	Enter

a. All requested variables entered.
b. Dependent Variable: Non-financial

Model Summary[d]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.408[a]	.167	.160	.57059	.167	23.233	1	116	.000
2	.705[b]	.497	.479	.44924	.330	24.710	3	113	.000
3	.738[c]	.545	.525	.42914	.048	11.835	1	112	.001

a. Predictors: (Constant), Size of Company
b. Predictors: (Constant), Size of Company, Broad Scope, Timeliness, Integration
c. Predictors: (Constant), Size of Company, Broad Scope, Timeliness, Integration, Quality
d. Dependent Variable: Non-financial

ANOVA[d]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.564	1	7.564	23.233	.000[a]
	Residual	37.767	116	.326		
	Total	45.331	117			
2	Regression	22.525	4	5.631	27.902	.000[b]
	Residual	22.806	113	.202		
	Total	45.331	117			
3	Regression	24.705	5	4.941	26.829	.000[c]
	Residual	20.626	112	.184		
		45.331	117			

Excluded Variables[c]

Model		Beta In	t	Sig.	Partial Correlation	Collin. Statistics Tolerance
1	Broad Scope	.510[a]	6.716	.000	.531	.901
	Integration	.517[a]	6.522	.000	.520	.840
	Timeliness	.477[a]	6.099	.000	.494	.895
	Quality	.582[a]	7.925	.000	.594	.867
2	Quality	.312[b]	3.440	.001	.309	.493

a. Predictors in the Model: (Constant), Size of Company

b. Predictors in the Model: (Constant), Size of Company, Broad Scope, Timeliness, Integration

c. Dependent Variable: Non-financial

Coefficients[a]

Mode l		Unstandardized Coefficients		Stand. Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.880	.165		17.426	.000
	Size of Company	.506	.105	.408	4.820	.000
2	(Constant)	.024	.358		.067	.947
	Size of Company	.186	.091	.150	2.037	.044
	Broad Scope	.327	.111	.262	2.947	.004
	Integration	.287	.105	.250	2.723	.007
	Timeliness	.284	.100	.237	2.830	.006
3	(Constant)	-.255	.351		-.726	.469
	Size of Company	.152	.088	.122	1.727	.087
	Broad Scope	.224	.110	.179	2.031	.045
	Integration	.193	.104	.168	1.852	.067
	Timeliness	.182	.100	.152	1.820	.071
	Quality	.347	.101	.312	3.440	.001

a. Dependent Variable: Non-financial

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.5323	4.6394	3.6356	.45951	118
Std. Predicted Value	-2.401	2.185	.000	1.000	118
Standard Error of Predicted Value	.057	.160	.094	.023	118
Adjusted Predicted Value	2.5145	4.6420	3.6358	.46050	118
Residual	-.96218	1.09571	.00000	.41987	118
Std. Residual	-2.242	2.553	.000	.978	118
Stud. Residual	-2.322	2.610	.000	1.003	118
Deleted Residual	-1.03208	1.14521	-.00022	.44129	118
Stud. Deleted Residual	-2.369	2.681	-.001	1.010	118
Mahal. Distance	1.104	15.306	4.958	3.050	118
Cook's Distance	.000	.071	.009	.012	118
Centered Leverage Value	.009	.131	.042	.026	118

ANOVA[d]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.564	1	7.564	23.233	.000[a]
	Residual	37.767	116	.326		
	Total	45.331	117			
2	Regression	22.525	4	5.631	27.902	.000[b]
	Residual	22.806	113	.202		
	Total	45.331	117			
3	Regression	24.705	5	4.941	26.829	.000[c]
	Residual	20.626	112	.184		
		45.331	117			

Excluded Variables[c]

Model		Beta In	t	Sig.	Partial Correlation	Collin. Statistics
						Tolerance
1	Broad Scope	.510[a]	6.716	.000	.531	.901
	Integration	.517[a]	6.522	.000	.520	.840
	Timeliness	.477[a]	6.099	.000	.494	.895
	Quality	.582[a]	7.925	.000	.594	.867
2	Quality	.312[b]	3.440	.001	.309	.493

a. Predictors in the Model: (Constant), Size of Company

b. Predictors in the Model: (Constant), Size of Company, Broad Scope, Timeliness, Integration

a. Dependent Variable: Non-financial

APPENDIX "J2"

Regression - Mediating Effect of Quality Capability on the Relationship between PMIS and financial Performance

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Size of Company[a]	.	Enter
2	Broad Scope, Integration[a]	.	Enter
3	Quality[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Financial

Model Summary[d]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.493[a]	.243	.236	.47973	.243	37.148	1	116	.000
2	.703[b]	.494	.481	.39551	.251	28.329	2	114	.000
3	.729[c]	.531	.515	.38238	.037	8.968	1	113	.003

a. Predictors: (Constant), Size of Company

b. Predictors: (Constant), Size of Company, Broad Scope, Integration

c. Predictors: (Constant), Size of Company, Broad Scope, Integration, Quality

d. Dependent Variable: Financial

ANOVA[d]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8.549	1	8.549	37.148	.000[a]
	Residual	26.696	116	.230		
	Total	35.245	117			
2	Regression	17.412	3	5.804	37.103	.000[b]
	Residual	17.833	114	.156		
	Total	35.245	117			
3	Regression	18.723	4	4.681	32.014	.000[c]
	Residual	16.522	113	.146		
	Total	35.245	117			

a. Predictors: (Constant), Size of Company

b. Predictors: (Constant), Size of Company, Broad Scope, Integration

c. Predictors: (Constant), Size of Company, Broad Scope, Integration, Quality

d. Dependent Variable: Financial

Coefficients[a]

Model		Unstandardized Coefficients		Stand. Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.659	.139		19.133	.000
	Size of Company	.538	.088	.493	6.095	.000
2	(Constant)	.637	.293		2.178	.031
	Size of Company	.302	.080	.276	3.779	.000
	Broad Scope	.339	.093	.308	3.630	.000
	Integration	.304	.089	.300	3.416	.001
3	(Constant)	.331	.301		1.100	.273
	Size of Company	.268	.078	.245	3.439	.001
	Broad Scope	.238	.096	.216	2.471	.015
	Integration	.213	.091	.210	2.326	.022
	Quality	.257	.086	.262	2.995	.003

a. Dependent Variable: Financial

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.5765	4.3355	3.4619	.40003	118
Std. Predicted Value	-2.213	2.184	.000	1.000	118
Standard Error of Predicted Value	.051	.142	.077	.018	118
Adjusted Predicted Value	2.5460	4.3904	3.4638	.40148	118
Residual	-.83546	.81815	.00000	.37578	118
Std. Residual	-2.185	2.140	.000	.983	118
Stud. Residual	-2.256	2.165	-.002	1.004	118
Deleted Residual	-.89041	.83741	-.00195	.39236	118
Stud. Deleted Residual	-2.298	2.201	-.004	1.010	118
Mahal. Distance	1.067	15.170	3.966	2.618	118
Cook's Distance	.000	.078	.009	.012	118
Centered Leverage Value	.009	.130	.034	.022	118

a. Dependent Variable: Financial

Excluded Variables[c]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	Broad Scope	.471[a]	6.416	.000	.513	.901
	Integration	.479[a]	6.270	.000	.505	.840
	Quality	.494[a]	6.681	.000	.529	.867
2	Quality	.262[b]	2.995	.003	.271	.540

a. Predictors in the Model: (Constant), Size of Company

b. Predictors in the Model: (Constant), Size of Company, Broad Scope, Integration

c. Dependent Variable: Financial

APPENDIX “J3”

The Mediating Effect of Cost Capability on the Relationship between PMIS and Non-financial Performance

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Size of Company[a]	.	Enter
2	Broad Scope, Timeliness[a]	.	Enter
3	Cost[a]	.	Enter

a. All requested variables entered.
b. Dependent Variable: Non-financial

Model Summary[d]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.408[a]	.167	.160	.57059	.167	23.233	1	116	.000
2	.681[b]	.464	.450	.46171	.297	31.582	2	114	.000
3	.709[c]	.503	.485	.44660	.039	8.841	1	113	.004

a. Predictors: (Constant), Size of Company.
b. Predictors: (Constant), Size of Company, Broad Scope, Timeliness.
c. Predictors: (Constant), Size of Company, Broad Scope, Timeliness, Cost.
d. Dependent Variable: Non-financial

ANOVA[d]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.564	1	7.564	23.233	.000[a]
	Residual	37.767	116	.326		
	Total	45.331	117			
2	Regression	21.029	3	7.010	32.882	.000[b]
	Residual	24.302	114	.213		
	Total	45.331	117			
3	Regression	22.792	4	5.698	28.568	.000[c]
	Residual	22.539	113	.199		
	Total	45.331	117			

a. Predictors: (Constant), Size of Company
b. Predictors: (Constant), Size of Company, Broad Scope, Timeliness
c. Predictors: (Constant), Size of Company, Broad Scope, Timeliness, Cost.
d. Dependent Variable: Non-financial

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Stand. Coefficients Beta	t	Sig.
1	(Constant)	2.880	.165		17.426	.000
	Size of Company	.506	.105	.408	4.820	.000
2	(Constant)	.229	.360		.638	.525
	Size of Company	.243	.091	.196	2.662	.009
	Broad Scope	.458	.103	.367	4.457	.000
	Timeliness	.360	.099	.301	3.641	.000
3	(Constant)	.014	.355		.039	.969
	Size of Company	.208	.089	.168	2.336	.021
	Broad Scope	.330	.108	.265	3.052	.003
	Timeliness	.255	.102	.213	2.500	.014
	Cost	.324	.109	.266	2.973	.004

a. Dependent Variable: Non-financial

Excluded Variables[c]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
1	Broad Scope	.510[a]	6.716	.000	.531	.901
	Timeliness	.477[a]	6.099	.000	.494	.895
	Cost	.522[a]	6.858	.000	.539	.889
2	Cost	.266[b]	2.973	.004	.269	.550

a. Predictors in the Model: (Constant), Size of Company.
b. Predictors in the Model: (Constant), Size of Company, Broad Scope, Timeliness.
c. Dependent Variable: Non-financial

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.5593	4.6351	3.6356	.44137	118
Std. Predicted Value	-2.439	2.265	.000	1.000	118
Standard Error of Predicted Value	.059	.148	.090	.021	118
Adjusted Predicted Value	2.5430	4.6605	3.6361	.44090	118
Residual	-1.01030	1.13773	.00000	.43890	118
Std. Residual	-2.262	2.548	.000	.983	118
Stud. Residual	-2.319	2.603	.000	1.003	118
Deleted Residual	-1.06199	1.18799	-.00055	.45693	118
Stud. Deleted Residual	-2.366	2.673	.000	1.011	118
Mahal. Distance	1.039	11.862	3.966	2.332	118
Cook's Distance	.000	.067	.008	.013	118
Centered Leverage Value	.009	.101	.034	.020	118

a. Dependent Variable: Non-financial

APPENDIX “J4”

Regression - Mediating Effect of Cost Capability on the Relationship between PMIS and financial Performance

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Size of Company[a]	.	Enter
2	Broad Scope, Benchmarking[a]	.	Enter
3	Cost[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Financial

Model Summary[d]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.493[a]	.243	.236	.47973	.243	37.148	1	116	.000
2	.712[b]	.507	.494	.39043	.264	30.566	2	114	.000
3	.776[c]	.602	.588	.35224	.095	27.057	1	113	.000

a. Predictors: (Constant), Size of Company

b. Predictors: (Constant), Size of Company, Broad Scope, Benchmarking

c. Predictors: (Constant), Size of Company, Broad Scope, Benchmarking, Cost

d. Dependent Variable: Financial

ANOVA[d]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8.549	1	8.549	37.148	.000[a]
	Residual	26.696	116	.230		
	Total	35.245	117			
2	Regression	17.868	3	5.956	39.072	.000[b]
	Residual	17.377	114	.152		
	Total	35.245	117			
3	Regression	21.225	4	5.306	42.766	.000[c]
	Residual	14.020	113	.124		
	Total	35.245	117			

a. Predictors: (Constant), Size of Company

b. Predictors: (Constant), Size of Company, Broad Scope, Benchmarking

c. Predictors: (Constant), Size of Company, Broad Scope, Benchmarking, Cost

d. Dependent Variable: Financial

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.659	.139		19.133	.000
	Size of Company	.538	.088	.493	6.095	.000
2	(Constant)	.569	.291		1.953	.053
	Size of Company	.322	.077	.294	4.175	.000
	Broad Scope	.311	.093	.283	3.339	.001
	Benchmarking	.348	.090	.330	3.868	.000
3	(Constant)	.230	.271		.848	.398
	Size of Company	.274	.070	.250	3.900	.000
	Broad Scope	.161	.089	.146	1.812	.073
	Benchmarking	.179	.087	.169	2.045	.043
	Cost	.452	.087	.421	5.202	.000

a. Dependent Variable: Financial

Excluded Variables[c]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	Broad Scope	.471[a]	6.416	.000	.513	.901
	Benchmarking	.493[a]	6.777	.000	.534	.890
	Cost	.597[a]	9.100	.000	.647	.889
2	Cost	.421[b]	5.202	.000	.440	.538

a. Predictors in the Model: (Constant), Size of Company, b. Predictors in the Model: (Constant), Size of Company, Broad Scope, Benchmarking, c. Dependent Variable: Financial.

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.4627	4.4700	3.4619	.42592	118
Std. Predicted Value	-2.346	2.367	.000	1.000	118
Standard Error of Predicted Value	.047	.111	.071	.015	118
Adjusted Predicted Value	2.4249	4.5012	3.4616	.42698	118
Residual	-1.32162	.78955	.00000	.34617	118
Std. Residual	-3.752	2.242	.000	.983	118
Stud. Residual	-3.790	2.265	.000	1.003	118
Deleted Residual	-1.34845	.80617	.00024	.36083	118
Stud. Deleted Residual	-4.039	2.308	-.002	1.016	118
Mahal. Distance	1.107	10.641	3.966	2.159	118
Cook's Distance	.000	.059	.008	.011	118
Centered Leverage Value	.009	.091	.034	.018	118

a. Dependent Variable: Financial