

MANAGEMENT RESPONSIBILITY AND BUSINESS PERFORMANCE BETWEEN ISO 9000 AND NON-ISO 9000 CERTIFIED CONTRACTORS IN MALAYSIA

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ABSTRACT: The construction industry is classified as one of the sectors that significantly contribute to the Gross Domestic Product (GDP) of a country. The success of the industry is partly relied upon the success of the construction companies. This study investigated the theoretical and empirical aspects of ISO 9000 and business performance, and the relationship between ISO 9000 and business performance of the Malaysian contractors. Data was gathered from 324 Grade G07 contractors registered with the Construction Industry Development Board (CIDB). The outcome of this research provided insights on the application of the Management Responsibility and Business Performance among Malaysian Contractors.

Keywords: ISO 9000, Management Responsibility, Business Performance, Malaysian Contractors

1. INTRODUCTION

As one of the main contributors to a country's Gross Domestic Product (GDP), it is imperative to keep the construction industry healthy. As one of the pillars of the domestic economy, it is too important to be allowed to stagnate. External factors such as unfavorable economic and political conditions had in the past negated the good job done by some members of the industry to improve their performance. But the industry players have to admit that, to move forward and become more resilient from outside pressures, they have to work collectively and come up with strategies that could cultivate sustainable business performance culture in construction companies. One of the initiatives they can consider using is quality management system. This paper seeks to examine and discuss the relationship between quality management system and business performance of construction companies.

The common strategies of any organization to compete are the ability to produce new products (Pan, 2003), deployment of new technology in production (Beckmerhagen, Berg, Karapetrovic and Willborn, 2003), training programs (Quazi and Jacobs, 2004), application of quality control techniques (Fuentes, Benavent, Moreno, Cruz and Val, 2003), and enhancing the relationship with suppliers (Bond III & Fink, 2003). However, these strategies need to be regularly reviewed and updated according to the changes of variables in the external environment. Thus, the improvement of organizational quality plays a substantial part in forming the main strategy for competition. It is clear that quality is one of the main determinants in making any organization to be more performance-driven and competitive domestically, and internationally. In addition, quality is often related to the main competitive strategy (Petersen, 1991) and survival issues (Garvin, 1988). Empirical studies had descriptively covered the importance of quality, and organizational improvement through quality approaches (Walton, 1986; Gabor, 1990; McAdam and Mckeown, 1999). As a testament to its importance, many high performance organizations have made quality as one of the main components in their competitive strategies (Chen & Lu 1996; Madu 1998).

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It is patently obvious that the ability of an organization to produce quality services and products is one of the main key factors to compete in the international market. Many concepts and techniques have been adopted to improve the standard of services and quality of products. One of them is ensuring that their organization adopts quality management systems in all activities of the organization. As such, ISO 9000 is now regarded as the basic strategy influencing competitiveness in the international market. ISO 9000 certification is needed and mandatory for any companies wanting to compete in the European market in industries such as electronics and pharmaceutical products (Tariq, 2002). ISO 9000 is always considered as a base towards the total quality management system. It helps to produce continuous improvement of the organizations. The effect of the continuous improvement of the organization is the enhancement of the performance of the organization. Empirically, ISO 9000 has been proven to help the improvement of performance in the manufacturing industry (Zain & Ahmad, 2000). Due to this success, many calls were made by the construction industry's leaders and academics for the adoption of ISO 9000 in construction organizations.

In Malaysia, the manufacturing industry was the first sector answering the calls for the implementation of ISO 9000 (Idris, Mcewan and Belavendram, 1996). Despite the vigorous promotion of the quality management system by the government, the Construction Industry Development Board (CIDB), and industry leaders, the construction industry were not quick to follow suit. The initial reaction by construction companies to the ISO 9000 certification was negative because the industry was hampered by problems of low productivity, inconsistent labor supply, misguided human resource management, bad workmanship, non-existence of quality management and the challenges to react to the advent of information technology (CIDB, 2002).

This study investigated the theoretical and empirical aspects of ISO 9000 and business performance, and the relationship between ISO 9000 and business performance of the Malaysian contractors. In addition, it attempted to establish the relationship between management responsibility and business performance of contractors in the Malaysian context.

1.1 Problem Statement

According to Thiagaragan, Zairi and Dale (2001), the lack of theories and research in quality management portrays the actual development of a quality management system in an organization. He further claimed that the issue of quality management is a valid topic to be considered as a contribution to the body of knowledge, due to the scarcity of the theory itself. There were attempts by Anderson, Rungtunsanathan and Schroeder (1994) to apply the Deming's concept to the organizational behavior and quality management practices. However, the research was conducted in the manufacturing industry and does not reflect the construction industry, especially contractors.

This situational phenomenon, i.e. the lacking of theory to support the relationship between quality management and business performance of the contractors has created a gap in the available knowledge, especially in explaining the relationship of management responsibility and business performance. From the empirical perspectives, the issues of quality management system and organisational performance are issues of interest to the managers, academics, researchers and policy makers at the international level (Anderson & Sohal, 1999). Ho (1999) contended that ISO 9000 quality management system as one of the quality management system techniques could be a useful tool in improving organisational performance. She went further in her argument by suggesting that the implementation of ISO 9000 quality management system could lead to: 1)

improvement in corporate image, 2) improvement in the quality of service/product, 3) creation of competition, 4) new windows of opportunities to compete in the international market, 5) improved communication among employees, 6) cost savings, 7) reduced paperwork, 8) more organised design and output, 9) fewer quality audits, 10) a better trained workforce, and 11) increased customer confidence. Based on these arguments contractors should embrace the attitudinal shifts behind quality thinking. However, research that specifically explains the situation in the construction industry with regard to quality management and ISO 9000 quality management system is described, at best, as limited. Because of this, there is a need for the academia to study the implementation of ISO 9000 quality management system and business performance in the Malaysian construction industry. In the Malaysian context, although there is development in the awareness of the importance of quality in an organisation and business performance, the understanding on the relationship between ISO 9000 quality management system and business performance seems to be very limited (Bontis, Keow & Richardson, 2001). Zain *et al.* (2000) claimed that previous research in quality management systems in Malaysia only covered the solution of quality and organisational problems in the manufacturing and public sector. There have been efforts taken to investigate these shortcomings however, there seems to be no consistency in explaining the relationship between the implementation ISO 9000 and organisational performance in the Malaysian context.

On the other hand, from the construction industry in Malaysia viewpoint, especially dealing with contractors, it seems that research findings on the measurement of their performance are inadequate (Aziz, 2002). There has been research conducted in this industry, but this was concentrated on the development of standards of building materials, project delay, labour management and risk. Specific research on the measurement of the performance measurement of the Malaysian contractor is best described as none. Furthermore, the evidence of researchers that differentiate the performance of contractors with the ISO 9000 certification and without ISO 9000 certification, internationally and locally is very limited. Therefore, it is now clear that there is a gap in the relevant theories and empirical evidences, governing the issues of quality management based on ISO 9000:2000 and business performance of contractors especially in the Malaysian context. This study attempted to determine the relationship between quality management and business performance of Malaysian contracting organizations.

ISO 9000:2000 quality management system is a “four element structures” that includes management responsibility, resource management, product realisation, and measurement, analysis, and improvement. Therefore, this paper investigated one of the four elements in the ISO 9000 quality management system, i.e. management responsibility and its relationship with business performance between ISO 9000 and Non ISO 9000 certified contractors.

1.2 Research Objective

The objectives of this paper are:

- a. To establish differences between ISO 9000 certified contractors and non-ISO 9000 certified companies in terms of perceived business performance and management responsibility?
- b. To identify relationships between management responsibility and perceived business performance of contractors in Malaysia?

2. MALAYSIAN CONSTRUCTION INDUSTRY, MANAGEMENT RESPONSIBILITY AND BUSINESS PERFORMANCE

2.1 The Malaysian Construction Industry

Fryer (1990) measured the influence of construction industry in any country's economy by using two aggregates, *i.e.* the contribution to the Gross Domestic Product (GDP) and the contribution made by the construction industry towards fixed *capital formation*. The effect of construction industry towards other industries is far-reaching because it could help to generate the growth of these other industries through the completion of wealth after the completion of construction activities. A supermarket wanting to increase their turnover by two-fold in five year time period for example, would surely need to consider extending their building and warehouses to stock more products and goods. Because of this 'multiplier effects' any nation cannot afford to see the industry from stagnating for fear of negative pressures it could impact towards the economy as a whole. The construction industry contributes 3.3% to 5.4% to the Malaysian GDP for the last 20 years (1985-2005), and these contributions are on the upward trends for the foreseeable futures.

2.2 The Malaysian Contracting Organisations

In Malaysia, all contractors are required to register their companies with two government agencies before they are able to offer their services to the clients. The two agencies are Service Centre for Contractors and the Construction Industry Development Board Malaysia (CIDB). The criteria for consideration of contractors are as follows: 1) Capital and financial capability, 2) Management organisation and personnel, 3) Company's and management staffs' experience, 4) Plant, and 5) Equity Structure. The registration of contractors under the CIDB is classified into seven grades. Table 1 shows the classification of contractors and the corresponding value of projects that they can undertake. Table 1 indicates that G07 is the largest grade and G01 is the smallest ones.

Table 1: Classification of Contractors

Grade	Value of Projects (RM)
G01	Not Exceeding 0.1 Million
G02	Not Exceeding 0.5 Million
G03	Not Exceeding 1 Million
G04	Not Exceeding 3 Million
G05	Not Exceeding 5 Million
G06	Not Exceeding 10 Million
G07	No Limit

Source: CIDB (2002)

2.3 ISO 9000 Quality Management System and Management Responsibility

The implementation of ISO 9000 quality management system can lead to the accrument of many benefits to organizations. Therefore, the construction industry and contractors should take advantage to all the benefits of ISO 9000 quality management system certification. A review of the literature reveals that the potential benefits of the ISO 9000 implementation are: 1) Marketing contribution, 2) Improve quality of products, 3) Modernisation of the company's internal organisation and operation, 4) Greater employee quality awareness, 5) Better documentation, 6) Enhanced internal communication, 7) Systematic approach to personnel training, 8) Competitive advantage, 9) Improved customer demand and easier attraction of new customer, and 10) Increase of the company's reputation and trust in its products.

Since ISO 9000 quality management system standards were first introduced to companies in 1987, it has become an accepted norm for many organisations, regardless of their sizes, products, and business natures. The ISO 9000 certification series has received worldwide recognition and acknowledgement from various institutions, companies, and quality researchers (Chua, Goh and Wan, 2003). On a macro level, empirical survey results of companies, in Greece (Lipovatz, 1998), the United Kingdom (Buttle, 1996), Singapore (Quazi and Padibjo, 1998), Hong Kong (Lee, Leung and Chan, 1999), Australia (Jones, 1997), and Taiwan (Jeng, 1998) indicate favourable outcome from ISO 9000 quality management system certification.

In recent years, the links between reasons for seeking ISO 9000 quality management system certification, with perceived benefits of ISO 9000 have received the attention of several quality researchers. Statistical methodology has been employed in seeking out the existence of such relationship. The underlying argument of this link is that the companies that seek ISO 9000 certification for developmental purposes or internally driven forces will benefit more from implementation of ISO when compared with companies with non-developmental reasons or externally driven forces. Lee (1998) indicates that companies pressured by customers to adopt ISO 9000 experienced fewer benefits than did internally driven, ones. Jones (1997), using 272 ISO 9000 quality management system certified companies, indicated a similar result. In particular, these internal benefits are: 1) greater standardisation of operational procedures, 2) fewer mistakes and less defective work, 3) fewer customer complaints, 4) more business, and 5) lower operating costs.

On the other hand, a study by Wiele and Brown (1998) revealed that companies that adopt ISO due to external pressure show improvement only in five short-term benefits, they are: 1) efficiency, 2) awareness, 3) organisational control, 4) staying in business, and 5) customer relationship. However, companies that are internally influenced were found positively correlated with not only the five short-term benefits mentioned above, but also three long-term improvements, they are: 1) internal efficiency and effectiveness, 2) human resource aspects, and 3) financial aspects and market share. Lee *et al.* (1999) found that few companies that seek certification to satisfy customers' requirements have indicated benefits that outweigh cost, as compared to companies seeking certification due to internal development. All these arguments, point towards the greater benefits that can be achieved by the internally driven companies than those companies driven by external forces in their implementation of ISO implementation.

It can be deduced from the literature that quality has become a competition factor in the construction industry. Quality management, through the ISO 9000 quality management system is also now generally accepted, as the companies own internal measures to control the quality of its own products, from start to finish. The objective is to carry out the task as efficiently as possible, thereby contributing to increased profitability. Therefore, the search for improvement has become a permanent process, both on company and project level.

Quality in construction industry is basically to produce - as productively, efficiently, and economically as possible - the best in market according to the wishes and needs of clients (Aziz, 2002). This will guarantee in the long run high demand, big production, and low production costs. The competition advantage can also be achieved either by cost savings or revenue increase. Cost savings will be greater, if defects are found and eliminated, as early as possible. Frequently, the initiative to begin quality improvement is imposed by some clients (Low & Hennie, 1997; Low & Yeo, 1998). Demanding clients actually list quality as number one factor that

motivates the launch of a formal quality improvement process. Therefore, Carr (1997) and Carr (1998) claimed that in order to get better quality project, quality must be build in the project. It will not appear without planning.

The most important principle of quality management in construction industry, in the long run, is to satisfy the needs of the end users, i.e. the clients (Low *et al.*, 1997). Defining the needs and requirements of clients is becoming a key issue in quality management. Because of this, quality management can never be accused of placing less emphasis on their clients needs in favour of improvement to their internal operations and procedures.

The second principle of quality management in construction is to organise the process, its tasks, responsibilities and authorities from a "quality viewpoint" (Low *et al.*, 1998), i.e. in such a way that the outcome of the process will fulfil the requirements. In building processes, this means defining activities and tasks, assigning qualified, authorised personnel to execute, supervise, manage and control the activities. It should be noted that each project is individual. One cannot find the ultimate building process with activities.

The third principle is, what the other industries have utilised for two decades: prevention, not detection of errors (Aziz, 2002). In today's building process, in which the number of contributing parties can sometimes be counted in hundreds, the only way the client organisation can keep the project together is to control the contractors and subcontractors, and their suppliers and their processes by inspection and control. The emphasis is slowly shifting toward evaluation of risks, before the actual building process, creating the right conditions for the work and providing it with the right people and resources to prevent things from going wrong. Inspection and control still remain, but the responsible party for performing most of the checking is the one responsible for the work itself.

Finally, the collecting and using feedback for continuous improvement of either the process or the end products themselves is one particular area of interest (Kangari *et al.*, 1997). Today, feedback and measured data from any design solution or construction activity are gained slowly and unsystematically that no databases containing structured information to back up decision making during the process have been created. The construction industry should look at two different types of feedback information. The first is the first experiences gained during the building process. Designers should be given immediate feedback of their solutions from the site. The second emphasis on feedback is how to find ways to collect and analyse data emerging during the use of the building. Therefore, the structure of ISO 9000 quality management system has a systematic approach of implementing quality system in the construction organisation.

It is deduced that the ISO 9000 quality management system that is "customer-focussed" or "product-quality" group, are all based on the "process-approach", which fosters running an organisation as a set of interdependent processes. The ISO 9000 quality management system has four-element structure (ISO, 2000): 1) Management responsibility, 2) Resource Management, 3) Product Realisation, and 4) Measurement, Analysis and Improvement.

2.4 Business Performance

The concept of Business Performance (BP) seems to be rather fuzzy and imprecise as it is an abstract concept rather than a concrete concept (Otley, 1999). The existing literature reveals that there are two other terms associated with Business Performance, i.e. "Performances" and "Organizational Performance". Performance equals "achievement" (Merriam-Webster's Collegiate Dictionary, 1993). Also, the same dictionary defines performance as "how well it does or how successful it is".

According to the European Quality model (EFQM, 1999) and Baldrige Quality Award model (Hart and Bogan, 1992) performances include: 1) Customer satisfaction, 2) People satisfaction, 3) Business performance, and 4) Impact on society and environment, due to a quality management programme. It seems that the term "performances" has a broader meaning with the involvement of many aspects of success including business performance as well. According to Sun (2000), performance involves five dimensions, which are: 1) Product quality and customer satisfaction, 2) Productivity and profitability, 3) Market position and competitiveness, 4) Employee satisfaction, and 5) Environment protection.

Sun's (2000) conceptualization seems to be in-line with the European Quality model and Baldrige Quality Award model. He has labeled employee satisfaction instead of people satisfaction while customer satisfaction remained unchanged. The term "environment protection" has been used for the impact on society and environment. Other dimensions such as productivity, profitability, market position, and competitiveness may have been meant by Sun (2000) for business performance though he did not use the term "business performance".

Examination of studies on organizational performance showed that the term "organizational performance" involves almost all dimensions of performance except environmental impact/ environment protection. A comparison of the dimensions is shown Table 2.

Table 2 - Comparison of the Meaning of Organizational Performance

Garvin (1988)	Ahmed, Montagno and Firenze (1998)	Singels, Ruel and van de Water (2001)	Rahman (2001)
<ol style="list-style-type: none"> 1. Productivity 2. Profitability 3. Customer satisfaction 4. Employee relations 	<ol style="list-style-type: none"> 1. Market: market share and sales volume 2. Product: product quality, new and improved product introduction, productivity and ability to improve 3. Economies: annual earnings, profitability and return on investment 4. Employee: improvement in employee skills and employee flexibility 	<ol style="list-style-type: none"> 1. Production process 2. Company result 3. Customer satisfaction 4. Investment 5. Personal motivation 	<ol style="list-style-type: none"> 1. Profitable 2. Revenue 3. Number of Customers

It is clear from Table 2 that environment protection was not considered as a dimension of organizational performance, which is narrower than performance in the sense that the latter involves the former plus the environment protection dimension. It can also be observed that similar dimensions have been considered by each study. However, Singels *et al.* (2001) have considered an additional dimension labelled as "investment on means". In view of Singels *et al.* (2001), investment on means pointed out the efforts that have to be made to gain and maintain ISO 9000 quality management system certification due to high investment costs, increase of bureaucratisation and increase of paper workload. This additional dimension may be due to the fact that their study focused on ISO 9000 quality management system certification and performance.

Besides the conceptualisation of the term "performance", there are a number of performance measurement models available in the literature. Although performance measurement models are useful, they also attract much cynicism and scepticism over why, how and when they are used (Porter & Parker, 1993). Traditional business performance measures have been financial – measuring such ratios as rate of return, cash flow, and profit margin. These financial data have the advantage of being precise and objective. However, there are arguments over such measurement. First, the financial measurement tends to be insular or inward looking. Second, the financial measurement fails to include the less tangible factors such as product or service quality, customer satisfaction and employee morale. Third, they are lagging indicators that show what has happened in the past and poor performance predictors of tomorrow's performance.

Kaplan and Norton's (1996) approach for the development of the balanced scorecard was based around using interviews with members of the senior management team to surface differences in strategic priorities before resolving these differences through facilitated workshops. The balanced scorecard offers an alternative to the traditional financial indicators. This model translates a mission and strategy into a set of measures built around four or five perspectives. They are: 1) Financial, 2) Customers, 3) Internal processes, 4) Innovation and Improvement, and 5) Employees.

In general, the measurement of business performance consists of two aspects: 1) financial aspect, and 2) non-financial aspect (Otley, 1999). Based on studies by Li (2000) and Bontis *et al.* (2001) the term "*business performance*" seems to be the narrowest compared with the terms '*performance*' and "*organizational performance*". Ten dimensions or indicators were considered by Bontis *et al.* (2001), which were (1) industry leadership; (2) future outlook; (3) profit; (4) profit growth; (5) sales growth; (6) after-tax return on assets; (7) after-tax return on sales; (8) overall response to competition; (9) success rate in new product launch; and (10) overall business performance. Examination of these dimensions suggests that they are more towards finance and marketing successes.

Analysis of the meaning of performance also shows the development of the measurement trend of business performance. The era of the measurement of business performance began by using financial measures, followed by the non-financial aspects such as marketing, human resource, business success, and customer satisfaction. Also, several new performance measurement frameworks incorporating financial measures and business drives have emerged (Love & Holt, 2000) in the management literature.

Considering all the meanings of “*performance*”, “*organisational performance*”, and “*business performance*” in the available literature, this study conceptualises and defines the term “*business performance*” as how successful the company is in the past three years in certain relation to business success. This section, further, analyses the current practise of evaluation of contractors’ performance by the consultants and clients in government projects. In conventional procurement procedures prior to awarding a contract to contractor, the clients through their quantity surveyors evaluate the performance of the contractors based on the information provided in the tender documents. The performance criteria of the contractors are: 1) Financial standing, 2) Completion Period, 3) Quality of Experience, 4) Local Company, and 5) Company’s Workload.

Table 3 summarises the performance criteria of a contractor in tendering process. It seems clear that evaluation of performance of contractors is by tangible information provided in tender document, such as the information of financial standing and experiences. It seems clear also that subjective measurement of performance is neglected in current practise. Furthermore, it seems that previous reviews of trends in performance measurement generally focused on other industries than construction.

Table 3: Contractors’ Performance Evaluation Criteria

Performance of Contractor	Performance Evaluation Criteria
1) Financial Standing	1. Overdraft Facility 2. Cash 3. Credit Facility 4. Expected Receivable Payments
2) Completion Period	5. The project’s completion period as compared to the Consultant’s estimate
3) Quality of Experience	6. Number of years in the industry 7. Number of projects awarded as compared to experiences in the industry 8. Average of awarded contract in one year 9. Value of projects in 3 years as compared to the proposed project 10. Executive Chairman 11. Project Manager
4) Local Contractor	12. The locality of the contractor
5) Company’s Workload	13. Number of current projects 14. Cost of current projects 15. Percentage of current projects

Source: CIDB (2002)

In summary, this section deduces that most of previous studies adopted primary data, whereby the data were obtained from formal records and documentation of the company’s profit, return on sales *etc.*, and secondary data that were based on the perceptions of the companies or managers, and a combination of both primary and secondary data. It is also clear that the performance measurements in previous studies involve objective and subjective performance measurement. Therefore, this study investigates the performance of contractors, using subjective measurement of performance of contractors that incorporates the quality performance, financial performance and non-financial performance.

3. RESEARCH METHOD

3.1 The sample

The population of this study comprised of construction firms operating in Malaysia. There are two sets of samples in the study. Those are: 1) companies with ISO 9000 certification, and 2) companies without ISO 9000 certification. The list of the contractors was obtained from CIDB Malaysia. There were in all, a total of 2,200 (G07) contractors, and 54 of them were ISO 9000 certified contractors. Both figures are accepted as the total population of the non-ISO 9000 certified companies and ISO 9000 certified companies respectively in the study. The representative of sample, i.e. the contractors, is critical in the study. Therefore, this study chose the probability sampling design (Sekaran, 2000). This study adopted a simple random sampling procedure and it could be generalized to the entire contractors (Sekaran, 2000). Therefore, following Krejcie and Morgan (1970) in Sekaran (2000), the recommended sample size to represent the companies without ISO 9000 is 327. On the other hand, a suitable sample size for the companies with the ISO 9000 certification is 44 but all 54 companies were selected to participate in this study due to the small population. Also, the sample size for this study is appropriate according to the rules of thumb as proposed by Roscoe (1975) in Sekaran (2000) that sample sizes larger than 30 and less 500 are appropriate, and the sample size should be several times (preferably 10 times or more) as large as the number of variables in a multivariate study (including multiple regression analyses).

3.2 Validation of Questionnaire

The research questionnaire was validated for comprehension and completeness in advance through personal interviews, some of which were conducted on site. In this study, the validation of the instruments was conducted using the following procedures: (1) content validity, and (2) face validity. The content validity establishes the representative sampling of a whole set of items that measures a concept, and reflects how well the dimension and elements of the concept have been delineated (Sekaran, 2000). This validation was done through a thorough literature review on the concepts of quality management principles, i.e. the ISO 9000 quality management principles and concepts of performance measurement of business performance of the contractors. These include the concepts introduced by quality gurus, quality management approaches, quality management systems and the concept of performance measurement that are related to the nature of the construction industry.

To meet the content validity requirement, the study adopted dimensions from the ISO 9000:2000 guidelines of ISO 9000. The face validity of the instrument was conducted by asking the experts in the field to validate and verify the questionnaires prepared. The researcher sought the opinions of construction professionals to determine the study objectives and theoretical framework. The experts involved in this procedure are five construction professionals. Suggestions put forward by the experts were taken on board for further development of the questionnaire. Later, a pilot study was conducted with 34 contractors. The respondents were encouraged to comment on the contents and wordings of the questions.

3.3 Measuring Management Responsibility and Business Performance

The dimensions of management responsibility are adopted from the ISO 9000:2000 guidelines. The guideline provides six dimensions of management responsibilities, namely: (1) management commitment, (2) customer focus, (3) quality policy, (4)

planning, (5) administration, and (6) management review. In ensuring the applicability of the dimensions to construction industry, i.e. the contractors, expert opinions were sought during the pilot test. The study employed a six-point scale to measure the perceptions of the respondents toward the level of management responsibility of the company in implementing a quality management system, where, 1 = never, 2 = almost never, 3 = seldom, 4 = sometimes, 5 = almost always, and 6 = always. The respondents are qualified personnel who understand the running of the business, thus, it seems appropriate that they can understand the questions asked in the questionnaires. The development of the questions was based on the ISO 9000:2000 guidelines, and the work done by Ahire *et al.* (1998), and Crosby (1979).

In the conceptualisation of the term business performance, it is measured using 17 dimension/indicators according to the respondent's perceptions. This study employed the perceptual evaluation in company performance measurement. Bontis, Keow and Richardson (2001) proved that research has shown that perceived measure of business performance can be a reasonable substitute for objective measures of financial performance (Pearce, Robbins and Robinson, 1987). Therefore, such measure is accurate enough to be incorporated as a valuable tool in the managerial decision processes.

In this study, the dimensions for the measurement of business performance of the contractors are: (1) return on asset, (2) return on investment, (3) number of projects completed, (4) number of project completed ahead of time, (5) response to business competition, (6) success rate in securing new projects, (7) number of clients, (8) investment and contribution to society, (9) environmental awareness, (10) safety consciousness, (11) security consciousness, (12) reduced liquidated and ascertained damaged (LAD), (13) reduced activity during defect liability period (DLP), (14) reduced on-site accidents, (15) reduced wastage, (16) reduced absenteeism, and (17) low staff turnover. Thus, the measurement of the business performance of the contractors in Malaysia was based on the abovementioned dimensions. One question was prepared for each dimension. According to Zikmund (2000) one question for each dimension is sufficient to measure the perception of the respondents. Therefore, the instrument of measuring performance of the contractors in this study seems appropriate. The measurement of items was based on a six-point scale measurement, where 1 = strongly disagree and 6 = strongly agree. The respondents were asked to respond to such statements, like "*for the past 3 years, as a result of our quality management system being practised by our company, the performance has improved with respect to the following statements*".

3.4 Results

a) t-Test

The related hypothesis developed to determine the difference of management responsibility implementation is reproduced as follows:

H_A 1) The implementation of management responsibility of the ISO 9000 certified companies is better than the non-ISO 9000 companies.

In order to determine whether there is a statistically significant difference in management responsibility among the contractors, *t*-test was employed. The result showed that the value of $F = 25.21$ at $p < 0.0001$, which indicates that there is a statistically significant difference in the implementation of management responsibility between the ISO 9000 certified companies and non-ISO 9000 certified companies. The results revealed that the mean score for management responsibility

of companies, which are ISO 9000 certified, was significantly different from companies without ISO 9000. This result seems to suggest that companies with the ISO 9000 certification perceived that the implementations of management responsibility were better than the companies without the ISO 9000 certification.

Table 4: Result of the t-test on Management Responsibility

	t	Df	F	Sig.
Management Responsibility	9.244	322	25.21	0.0001

The hypothesis developed to determine the difference of business performance is as follows:

H_A 2 The perceived business performance of the ISO 9000 certified companies is better than the non-ISO 9000 certified companies.

In order to determine whether there is a statistically significant difference in business performance among the contractors, *t*-test was employed. The result showed that the value of $F = 37.24$ at $p < 0.0001$, which indicates that there is a statistically significant difference in business performance between the ISO 9000 certified companies and non-ISO 9000 certified companies. The results revealed that the mean score for business performance of companies, which are ISO 9000 certified, was significantly different from companies without ISO 9000. This result seems to suggest that companies with the ISO 9000 certification perceived that they perform better than the companies without the ISO 9000 certification.

Table 5: Result of the t-test on Business Performance

	t	Df	F	Sig.
Business Performance	23.21	322	37.24	0.0001

b) Pearson Correlation

The hypothesis tested in order to determine the relationship between management responsibility and business performance is as follows:

H_A 3: There is a positive relationship between the implementation of management responsibility and business performance of contractors.

To test this hypothesis, the Pearson product-moment linear correlation was applied. The correlation coefficient was $r = 0.66$, at $p < 0.01$. Thus, there was a significant positive association between the implementations of management responsibility and perceived business performance of contractors in Malaysia. This result seems to imply that the companies with high degree of the implementation of management responsibility practices will experience better business performance.

4. CONCLUSION AND RECOMMENDATION

This study investigated the implementation of management responsibility which is part of the elements of ISO 9000:2000 quality management system and business performance of Malaysian contractors.

In relation to the first objective to determine the differences between the ISO 9000 certified contractors and non-ISO 9000 certified contractors, this study found that the perceptions of contractors toward the implementation of management responsibility among companies with ISO 9000 quality management system were better than non-ISO 9000 companies. Therefore, it helps to explain that the ISO 9000 quality management system is to ensure continuous improvement that leads to better performance of the organisation. Although this result could be predicted, however, it provides evidence that the implementation of ISO 9000 quality management system helps to improve business performance of contractors. It further implies that the role of top management is of the utmost importance to ensure better performance of an organization.

This study also found that there was a positive association between the implementation of management responsibility and business performance of contractors in Malaysia. Also, it implies that the better implementation of management responsibility guided by the ISO 9000:2000 quality management system is, the better business performance of the contractors would be. It has to be emphasised here, despite the temptation to establish relationship between management responsibility with business performance, the study simply cannot establish such association because of the insufficient number of ISO 9000 certified companies in the population.

This study fundamentally contributes some implications for academia and practitioners. In terms of theoretical contribution, it strengthens previous findings as to how the role of management responsibility enhances business performance of companies. On the other hand, this study also contributes to practical aspects, i.e. providing insights to contractors in implementing better top management roles, and providing tools to measure their business performance. This study contributes to the available quality management and project management literature, as to how contractors as one of the players in Malaysian construction industry, implement the roles of top management in their organisation, by utilising the ISO 9000 quality management principles model. Specifically this study has successfully proven that contractors that are ISO 9000 certified perceived to have a better business performance than the contractors that are not ISO 9000 certified.

For further study, it is recommended that more in-depth study should be carried out to establish the cause and effect relationship of management responsibility and performance. By doing so, it is possible to identify some other moderating and intervening factors such as corporate culture, senior management focus of attention, and motivation. These factors could account for both the degree of management responsibility and also the business results achieved.

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