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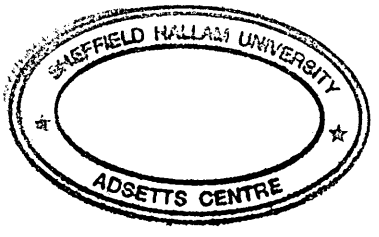
Impact of Environmental Conditions on Cost Management Information Systems in Egyptian Organisations

Ahlam Mohamed Mahfouz El-Gendy

A Thesis Submitted in Partial Fulfilment of the Requirement of Sheffield Hallam University For the Degree of Doctor of Philosophy

December 2004



Dedication

To the Memories of my Parents and my Sister: Amera

To my Family: Ahmed, Amro and Mai
For their continuous support

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Abstract

The Egyptian government pursued a privatisation policy that resulted in an increased role for the private sector in the national economy. Environment competition and unpredictability have affected the organisations and increased the requirement for them to work more effectively and creatively. Johnson and Kaplan (1987), Johnson (1992), Bromwich and Bhimani (1989), Ezzamel (1994), Dent (1990) and Scapens (1984) all recognised the gap between the theory and the practice of cost management practices, which has led to many of the approaches outlined in accounting literature not been widely used in practice according to many surveys (e.g. Drury et al., 1993; Ezzamel & Willmott, 1992). Scapens (1994), Kaplan (1998) and others encouraged researchers to focus on organisations' practices and this provided the motivation for this research.

The research explains the practices of cost management information system (CMIS) through three hypotheses: linear, non-linear and existence of intervening variables (managers' education level, location of authority, kinds of consultants, and size of organization) for the relationship between the practices of CMIS and managers' perceptions of competition intensity and unpredictability. Furthermore, the research considers four moderating variables (business sector, ownership category, transformation characteristic and strategic postures) in this relationship. The theoretical framework chosen is neo-contingency theory as it deals with the limitation of contingency theory.

In order to test the hypotheses, inquires based on cross sectional data were carried out. Data was collected from twenty nine organisations in Egypt using an interview guide, structured questionnaire and documentary evidence. A variety of statistical tests (using SPSS) were used to test the hypotheses and to explain the major relationships.

The thesis contributes to knowledge by providing empirical evidence of cost management information system, in terms of policies and practices, in twenty nine Egyptian organisations in different sectors. It also supports the relevance of neo-contingency theory as a theoretical framework for undertaking such studies. Through the testing hypotheses, it is one of the few studies to have considered moderating and intervening variables in the cost management area.

Chapter One

Introduction

1.1 Background

The Egyptian economy has been shifting since the mid 1970s from a centrally planned economy to a free market economy, then to a privatisation policy and an increasing role for the private sector in the national economy (As it will be illustrated in Chapter Five). The state has opened up the business environment in Egypt to local and international competition and these trends have affected companies and increased the need for working more effectively and creatively. Furthermore, establishing businesses in the new industrial zones (6 all over the country), which were built in the desert, is supported and encouraged by the government. Demirsar (1998) considers the development of free zones as a vital component of Egypt's effort to strengthen its private sector, attract foreign investment, create jobs and ease pressure on the Nile valley. Organisations which are investing in a free zone receive a lifetime exemption from customs duties, sales, corporate and other taxes. The implications of this for businesses are that they are encouraged to perform more effectively and creatively because of the increase in the intensity and unpredictability of the international and national competition which they face. These issues form the focus of this thesis, which studies links between organisations, their environment and the role of Cost Management Information Systems in achieving their aims.

Moreover, Bromwich and Bhimani (1989) claimed that many organisations have adopted innovative production systems and advanced manufacturing technology. Competition between organisations is intensifying with the ability to provide product diversity, price advantages, via lower costs, better delivery and service performance coupled with increased quality and an ability to respond quickly to changes in demand. Within the last twenty years, cost management practices have been criticised for not meeting the challenges of modern technologies and the economic environment (for example: Johnson & Kaplan, 1987; Johnson, 1992; Bromwich & Bhimani, 1989; Ezzamel, 1994; Dent, 1990; Scapens, 1984). Competition, deregulation of economies and changes in manufacturing technology create pressure on organisations to enhance their competitive positions. These changes have caused a major shift in the cost structures of many organisations. For example, in the manufacturing sector, direct

labour costs have given way to increased overhead costs. Those researchers have voiced calls for altering management accounting practices.

Bromwich and Bhimani (1989) considered empirical studies in the UK regarding organisations' reactions to rapidly changing product markets and manufacturing environments, with particular emphasis on the implications for cost management practitioners. The report found that management accountants need to alter what some managers perceive as their often self-assumed role as "watchdogs" rather than as "suppliers of information" and as parties to decision-making. The overwhelming influence of financial controls and the emphasis on short-term monetary returns by UK managers is seen as inhibiting the implementation of advanced manufacturing technology. Thus, it becomes essential to "manage" costs rather than just "reduce" them. For this reason, cost management has been a topic of considerable importance in the literature of accounting.

Furthermore, demanding markets and competitive capability have increased both the complexity and scope of organisations' products and services in every sector, with quality becoming a critical factor in business success. In this process of change, a feeling is growing among business practitioners that management accounting must be adapted. Therefore, a great deal of recent cost management literature has centred around activity-based costing (e.g. ABC: Johnson, 1988; Cooper, 1988; Jeans & Morrow, 1989; Noreen, 1991; Johnson, 1990; Innes & Mitchell, 1990; Christensen & Demski, 1995; Bjornenak & Olson, 1999; Bjornenak & Mitchell, 2000; Malmi, 1999; Innes, et al., 2000). Other modern cost management tools, however, such as target costing (e.g. Tani et al., 1994; Kato, 1993; Yoshikawa et al., 1993; Bromwich & Bhimani, 1994) and throughput accounting (Goldratt & Cox, 1984; 1993; Goldratt, 1994; Kaplan, 1994b; Dugdale & Jones, 1997b) have also been examined.

Thompson (1967) and Al-Hazmi (1995) claimed that cost management has three purposes, which are efficiency, optimisation and strategy. Some researchers concentrate on efficiency (Ezzamel, et al., 1994; Horngren, et al., 1999). Others focus on optimisation (Demski & Kreps, 1982; Gietzmann, 1991) and strategy (Macintosh, 1994; Guilding, et al., 2000; Simmonds, 1981; 1982; 1985; 1986; Shank and Govindarajan, 1992; Shank, 1989; Cooper and Slagmulder, 1998a; Bromwich, 1990; Simons, 1987; Dent, 1990).

There have been surveys of management accounting practice (for example, Drury et al., 1993; Ezzamel & Willmott, 1992) which reported that many of the approaches outlined in accounting literature are not widely used in practice. Furthermore, Scapens (1994), Kaplan (1998) and others encouraged research to focus on organisations' practices.

It was suggested by Ibbotson (1976) (in his study of capital investment as strategic innovation) and Al-Hazmi (1995) (a follow on study of cost management) that two characteristics of the environment that concern managers are Competition Intensity and Unpredictability. They considered the environment in terms of product market, factor market and legislation and found some evidence that Cost Management Information System (CMIS) adaptation does not take place in organisations unless there is some environmental stimulus. Here the managers' perceptions of the environment are a replacement for the particular environmental shock, but perhaps managers gain a wider understanding of environmental turbulence (shocks) and the need to respond to it.

1.2 Objectives and Research Hypotheses

The main objectives of this research are to understand, describe and explain the relationships between managers' perceptions of environmental conditions and the role of cost management information systems to achieve efficiency, optimisation and strategy in Egyptian organisations. Exploring the actual cost management policies and practices in a wide range of Egyptian organisations in different groups (chosen depending on a moderating variable) is a new research field in both the Middle East and Egypt. The research takes a wide view of the environment considering three divisions, Product Market, Factor Market and Legislation, rather one division only, as was the case in the previous research.

There are three hypotheses related to the relationships between managers' perceptions of environmental conditions and the role of cost management information systems to achieve efficiency, optimisation and strategy in Egyptian organisations;

> ***Hypothesis 1 (H_1):***
> ***There is a linear relationship between managers' perceptions of degree of competition intensity and unpredictability as elements of environmental conditions and practices of CMIS in relation to achieving efficiency, optimisation, and strategy purposes.***

The second hypothesis relates to both stimulus and constraint effects of managers' perceptions of environmental conditions where severe environmental conditions begin to preclude any rational response and, indeed, might lead to a lowering response; the shape of this hypothesis is non-linear.

> ***Hypothesis 2 (H_2): There is a non-linear (curvilinear) relationship between managers' perceptions of the degree of competition intensity and unpredictability as elements of environmental conditions and practices of CMIS in relation to achieving efficiency, optimisation, and strategy purposes.***

The third hypothesis is that there are some intervening variables, which might explain these relationships.

> ***Hypothesis 3 (H_3): Managers' education levels, location of authority, kinds of consultants and size of organisation are intervening variables which affect the relationship between managers' perceptions of the degree of competition intensity and unpredictability as elements of environmental conditions and the CMIS practices in relation to efficiency, optimisation, and strategy purposes.***

The research addresses weaknesses of Al-Hazmi's (1995) and other studies in this area in the following ways:

Theoretically: The theoretical framework adopted recognises and treats some of the limitations of contingency theory. Furthermore, the research addresses the importance of the decision-maker who serves as the link between the organisation and its environment, since; it considers strategic postures as a variable affected.

Empirically: The research chooses a bigger sample of organisations (29 organisations) adopted depending on the moderating variables (Al-Hazmi conducted 6 case studies and questionnaires). The reasons for using multiple cases in this research are: firstly, it allows replication of comparative logic among individual cases; secondly, it permits the development of rich description of cost management polices and practices in a wide range of circumstances, taking into account the differences that exist between cases.

Statistically: The data analyses undertaken employ a variety of tests to achieve the research aims. Factor Analysis and Reliability Tests are used to test the reliability and underlying structure of the data and facilitate efficient use of the questionnaire data efficiently. Cross Tabulation Tests are applied to study the relationships between the

dependent variables (the policies and practices of CMIS). Furthermore, Multiple Regression Tests are employed to study the multi effects of the independent variables on the dependent variables. The use of the Multi Regression tests addresses one of the limitations of the Contingency theory (as illustrated in Chapter Two). Furthermore, Cluster Analyses are used to test the existences of the moderating variables. These tests are used in addition to Means and Standard Deviation as measuring central tendency, Correlation Tests to study the relationships and Scatterplot Graphs to study the relationships, which Al-Hazmi (1995) used.

1.3 Motivation of the Research

The motivation to conduct this research arose from the problem of understanding the contribution of cost management accounting to the complex process of decision-making. In particular, the research attempts to explore and describe current cost management information systems with their three purposes: efficiency, optimisation and strategy when organisations face environmental conditions, in terms of a wide view of the environment: Factor Market, Product Market and Legislation.

The Egyptian economy is facing a very important period of time, with shifts to privatisation and open market strategies where competition intensity and unpredictability will become severe. Egyptian organisations will need to adopt and adapt their uses of CMIS successfully in order to face these environmental conditions.

1.4 Theoretical Framework

Neo-contingency theory is adopted as a framework for explaining the relationships between managers' perceptions of competition intensity and unpredictability for three divisions of the environment (Product Market, Factor Market and Legislation) and CMIS as policies and practices to achieve Efficiency, Optimisation and Strategy purposes. Since contingency theory has some limitations, Sorge (1991) and Donaldson (2001) suggested neo-contingency theory to deal with these limitations. The research addresses the limitations of contingency theory by adding moderating and intervening variables to the simple relationships between dependent and independent variables.

The justification for the choice of neo-contingency theory, which assumes a kind of contingency approach, is fully discussed later, in Chapter Two. The contingency approach offers better explanations for cost management information systems (Burns

and Stalker, 1961; Woodward, 1958;; Berry et al., 1991; Berry et al., 1995; Hoque & Hopper, 1994; Ezzamel & Hart, 1987; Bourgeois, 1984; Otley, 1980; 1991; Donaldson, 2001; 1996; Khandwalla, 1972; Al-Hazmi, 1995; Selto et al., 1995). The theoretical framework is based on sociological functionalism and takes account of the growing pluralism of views in the study of organisations, as discussed in Chapter Two.

1.5 Research Method

A survey of organisations using a structured questionnaire, which was administered during interviews, was used to collect the data. The justification for using interviews was to discover the interviewees' opinions about the intervening variables chosen from the literature that might affect the main relationship. Furthermore, administering the questionnaires during the interviews would increase the rate of responses for questionnaires (as the number of questionnaires would equal the number of interviews). The other reason for having the questionnaires filled during the interviews was to offer an opportunity for the interviews to clarify any difficult questions for respondents. The research benefited from the advantages of using the interviews and questionnaire methods together, as will discussed in Chapter Four.

This research is based on multiple case studies (29 cases). Eisenhardt (1989), Scapens (1990) and Yin (1994) claimed that collecting data by this method allows replicating and extending beyond individual cases, enabling a more thorough theoretical picture to be painted. Yin (1981) named this approach a "case-survey approach". The main advantage of an interview method is that it enables rich data to be collected. The disadvantage is that multiple cases produce exhaustive amounts of qualitative data. An Interview Guide, therefore, was used, which included a series set of open-ended questions to solve this problem. Furthermore, the structured questionnaire included a set of questions to measure each variable considered. The main aim of the questionnaire was to collect the data that could be subjected to quantitative analysis, using SPSS, to achieve the objectives and test the hypotheses.

The data were collected from multiple sources (triangulation) by using interviews and questionnaires and collecting documents from the organisations (e.g. Financial Statements and Annual Brochures). Yin (1994) claimed that case studies should not be viewed as a form of data collection, but instead, as whole studies. Yin (1994) and

Dubois and Gadde (2002) claimed that multiple sources of collected data develop converging lines of inquiry.

The research method adopted is consistent with the theoretical framework chosen (neo-contingency theory) in achieving the objectives. Many authors (for example, Otley, 1980; Donaldson, 2001) encouraged the use of the case study method when applying the contingency approach as a theoretical base. Also, Otley (1980) and Humphrey and Scapens (1996) claimed that there is a need to collect data from many organisations to study how each organisation's circumstances affect CMIS policies and practices. The data collected by the methods outlined are used for testing the research hypotheses.

1.6 Structure of the Thesis

This thesis has nine chapters. Chapters Two and Three develop the theoretical framework. The aim of Chapter Two is to outline the views of an organisation as a system, the contingency approach and the strategic postures, which were suggested by Miles and Snow (1978). The chapter argues that an organisation is a system that affects the environment in which it operates. It also argues that contingency theory has certain limitations, so the research recognises and deals with them. Therefore, it suggests that neo-contingency theory be used. The chapter also discusses the strengths and limitations of the theoretical basis. It includes the paradigm of structural neo-contingency theory. It discusses also the other appropriate approaches to the issue.

Chapter Three describes the Cost Management Information System (CMIS) and its three purposes (efficiency, optimisation and strategy) in greater depth. It also develops the three hypotheses: the linearity and the non-linearity hypotheses and the existence of intervening variables in the main relationship between managers' perception of competition intensity and unpredictability (as environmental conditions) on CMIS as policies and practices to achieve efficiency, optimisation and strategy purposes. The chapter clarifies how the structure of CMIS adopted leads back into the contingency framework.

Chapter Four discusses the research approach and presents a justification of the research design. The chosen research design includes interviews with managers, at the end of which each the interviewee was asked to fill in a questionnaire with closed questions. The main aim of the interviews was to discover interviewees' opinions about the intervening variables chosen from the literature, through open and open-ended

questions, that might have effects on the main relationship. The questionnaire that the interviewees filled in front of me gave him/her the chance to enquire about unclear questions so that I could clarify them. The 29 organisations, which were asked to participate in this study, were chosen depending on the moderating variables. The data would enable the hypotheses to be tested and investigated via the neo-contingency model using a comparative methodology. Furthermore, the Chapter focuses on the measurement of variables and the design of the questionnaire and the interview guide as instruments for collection of data. It discusses the issues related to the measurement of variables (e.g. differences between policies and practices, using managers' perceptions to measure the environment conditions). Consideration is given to reliability and factor analysis of the data collected and the statistical tests used to achieve the research aims are outlined. This chapter provides a link between the theoretical and empirical parts of this thesis, since it starts with the adopted research method, the measurement of the variables and the design of instruments, which helped to achieve the research aims identified in the theoretical part, then it reports on the reliability and factor analysis of the data, which are the basis of the empirical part, and it ends with an account of the statistical tests used.

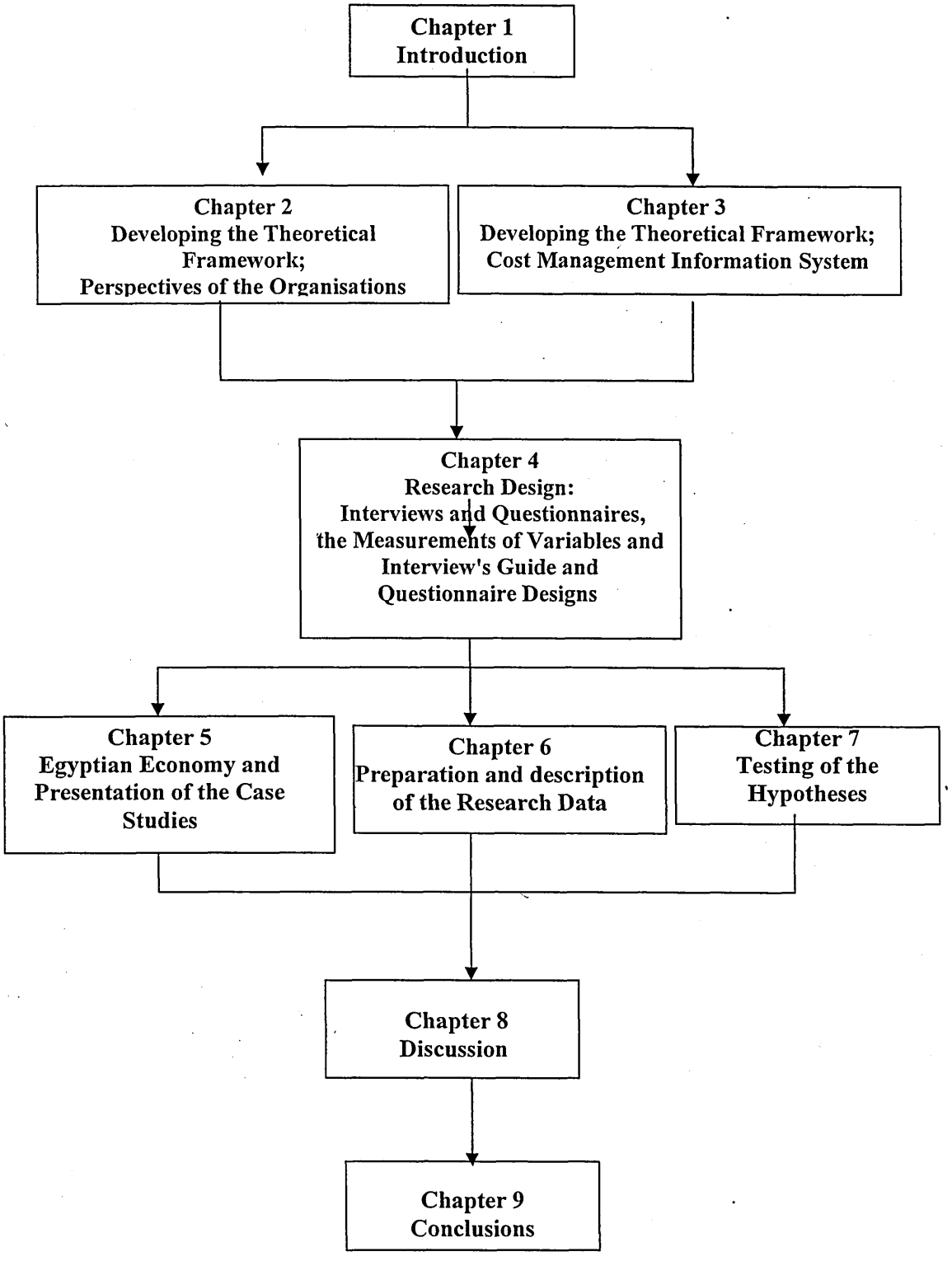
Chapters Five, Six and Seven contain an analysis of the data to achieve the aims of the research. Chapter Five contains information about the Case Studies and the Egyptian economic issues affecting the participating organisations. Chapter Six includes the preliminary steps that statisticians advise in order to enable analyses to be carried out efficiently. It aims to describe the data in terms of the dependent variables, namely CMIS as policies and practices to achieve efficiency, optimisation and strategic purposes, and the independent variables, which are managers' perceptions of competition intensity and unpredictability for the three divisions of the environment: factor market, product market and legislation, and their relationships to each other. Chapter Six also tests the existence of effects of moderating variables in the relationship between managers' perceptions of environmental conditions and their CMIS practices. Chapter Seven tests the three hypotheses.

Chapter Eight discusses the research findings, which are covered in Chapters Five, Six and Seven, within the context of the adopted theoretical framework. Chapter Eight draws on the relationship that exists between the findings and the literature review, and provides a critical discussion of the overall research.

The final chapter summarises the results of the research and identifies its contributions to knowledge. Some contributions relate to cost management information systems, while others relate to neo-contingency theory and multiple case studies. The chapter discusses the limitations of this research and offers suggestions for future research. It concludes with a reflection on the research process and the learning experience.

The structure of the thesis is shown in Figure 1.1 , below:

Figure 1.1 Flowchart for the Structure of the Thesis



Chapter Two

Developing the Theoretical Framework; Perspectives of the Organisations

2.0 Introduction

Chapters Two and Three contain the theoretical framework adopted in this research. Chapter Two includes the broad theoretical framework, related to perspectives of the organisation, its environment and the strategic postures that use to address this environment conditions. Chapter Three discusses the perspectives related to the Cost Management Information System (CMIS) and its three purposes; efficiency, optimisation and strategies. By the end of those two chapters, the main arguments and the three hypotheses will have been developed.

Chapter One identified that the main aims of the research are studying relationships between using CMIS - as policies and practices - and managers' perceptions of environmental conditions in organisations. There are three core issues in this relationship, from which the appropriate perspectives on this relationship are derived. The first core issue is 'organisation', which is the unit of analysis in this research. The second core issue is the relationship between organisation and environment, and the way the organisation perceives its environmental conditions. The third issue is managers' decisions and organisation strategies for responding to these environmental conditions.

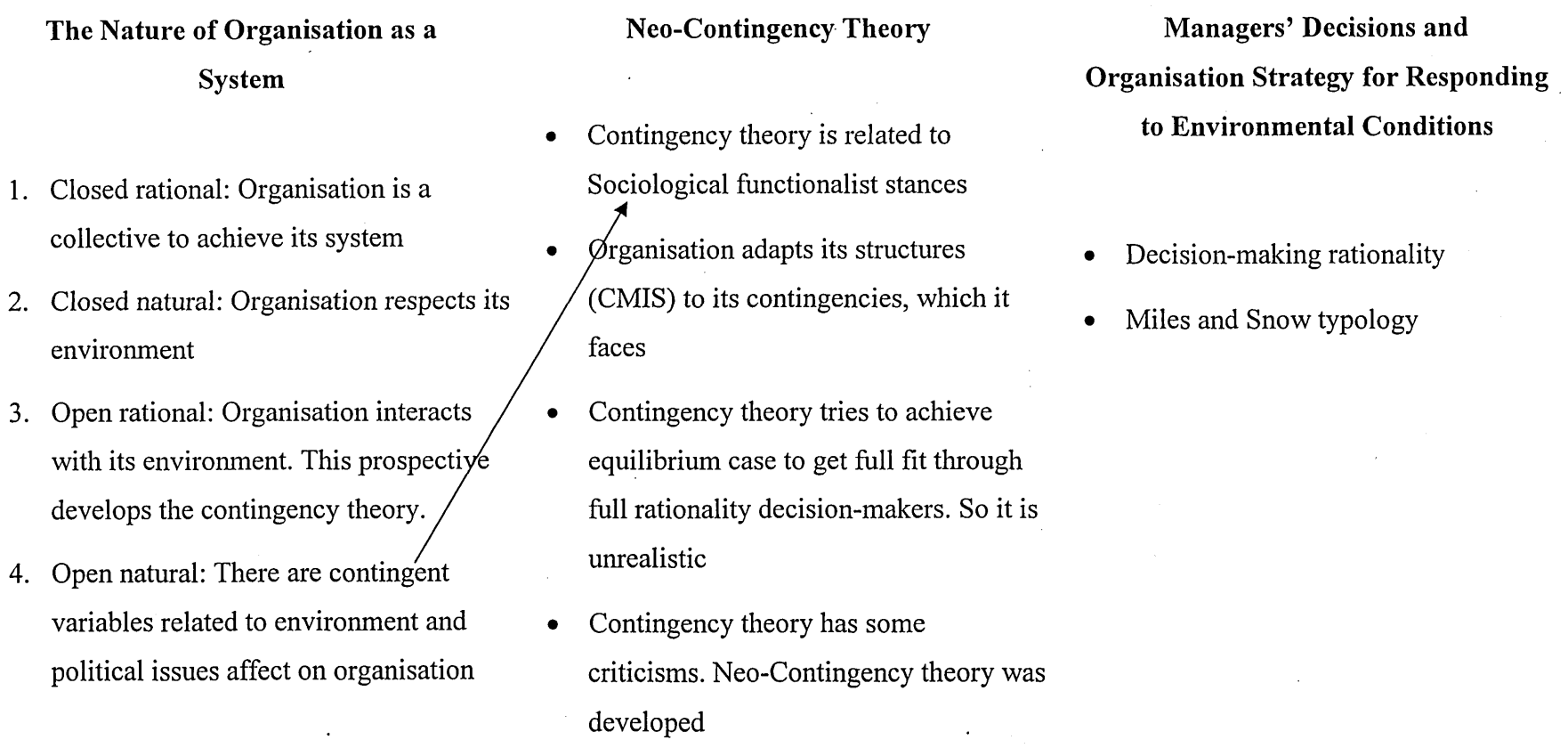
The focus in this research is to study how managers utilise or apply CMIS, as policy and practices, under varied external environmental conditions of the organisation. It is intended to investigate the organisation as a system, using contingency approach as a theoretical framework to test which variables most affect the main relationship between environmental conditions on CMIS as policies and practices.

Berry et al. (1991) argued that no observation could be free of a theoretical context. Therefore, it was important to look for the appropriate theoretical perspectives, which could support investigation and discussion of the empirical results. Furthermore, the use of multiple theoretical perspectives helps to highlight the limitations of each of the theoretical perspectives considered, thereby allowing for development and modification (Marginson, 1999). Therefore, the objectives of this chapter are to develop links

between the views about organisation, environment, managers and CMIS, and to justify the selected views along with the chosen theoretical frameworks.

This chapter reviews the literature related to three theoretical perspectives on organisation, the relationship between it and its environment and managers' decisions and organisation strategy: (1) organisation systems, (2) neo-contingency theory, and (3) managers' decisions and organisation strategy for responding to the environment. Figure 2.1 represents a flowchart for these three perspectives.

Figure 2.1 The Appropriate Theoretical Framework



2.1 Concepts of Organisation as a System

The organisation is the unit of analysis of this research. Furthermore,. organisation design has important implications for the design and use of CMIS. Therefore, there is a need to study different concepts of organisation to identify the appropriate concept. Since studying economics has an important role in management accounting research, this section briefly introduces concepts of organisation in the economic literature.

2.1.1 Organisations as Closed Rational Systems

There were four schools that advocated the rational system perspective in terms of classical organisation theory: Taylor's scientific management (1911); attempts by Fayol (1949) and others to formulate administrative principles; Weber's theory of bureaucracy (1947); and Simon's discussion of administrative behaviour (1976). Ezzamel and Hart (1987) argued that each of these four schools included a set of somewhat varied historically distinct characteristics. Moreover, there were important differences among the various schools considered in their approach to the normative structure. This section reviews important issues related to this research.

Scott (1987) concluded, after reviewing the appropriate literature in classical organisation theory that two structural features distinguish organisations from other types of collectives. The first feature is that organisations are collectives oriented to the pursuit of relatively specific goals. The second feature is that the structures of collectives that govern behaviour, in the form of organisational positions, are developed independently of individuals' personal attributes.

According to these two features, organisations - as rational systems - are collectives oriented to the pursuit of relatively specific goals and exhibiting relatively highly formalised social structures. Organisations are, therefore, instruments designed to attain specified goals with maximum efficiency. Otley (1984) argued that this view is characterised by being both universal in orientation and systematic in approach. For example, Taylor (1911) was concerned primarily with devising methods for the planning of work and working arrangements. Thus, proponents of scientific management believed that there exists "one best way" of performing every task. It is held that it is management's responsibility to provide specific guidelines for performance, to select best employees suited to the task and to engage in training them in the most efficient manner. Fayol (1949) developed a comprehensive list of principles

of management. Weber (1947) developed a description of the characteristics of the bureaucratic structure, which is a formal mechanistic way of organising similar to that of the scientific management school. Like Weber, Simon (1976) was also descriptive in his approach, examining the effect of structural features on individual decision-makers within the organisation.

The four types of theories also differ in the level of analysis at which they work. Taylor (1911) and Simon (1976) operate primarily at the social psychological level, focusing on individual participants as they perform tasks or make decisions; they treat structural features as contexts affecting these behaviours. By contrast, the administrative theory group and Weber work at the structural level, attempting to conceptualise and analyse the characteristics of organisational forms.

Ezzamel and Hart (1987, p: 16) summarised the common features shared by these schools of thought as follows:

1. "Rationality of behaviour is emphasised; it is assumed that it is desirable for the organisation to operate with maximum efficiency.
2. The organisation is perceived as a mechanistic system. The formal structure of the organisation is prescribed through the division of labour by specialisation; a chain of command; clear delineation of authority and responsibility; limited span of control and a clear distinction between the roles of line and staff personal. Efficiency is achieved primarily by structuring activities and directing people.
3. Human beings are assumed to be motivated primarily by economic rewards. Appropriate incentive schemes are considered sufficient to induce maximal performance from employees."

In this domain, the issues of decision-making rationality and bounded rationality emerge. Section 2.3.1 discusses these issues.

2.1.2 Organisations as Closed Natural Systems

The neo-classical theory was developed in response to the need for a theory which dealt with the human element in organisations. Scott (1987, p: 23) identified that "Organisations as natural systems are collectives whose participants share a common interest in the survival of the system and who engage in collective activities, informally structured, to secure this end." Organisations are viewed as organic systems. Their

structures grow out of the natural abilities and interests of participants. This approach is centred on increasing interest in the behavioural aspects of organisation.

In contrast, to rational system theorists, natural system theorists do not deny that organisations have distinctive features. However, they argued that other characteristics, which are shared with all social groups, are of greater significance, as follows:

1- Goal Complexity; The natural system perspective pays more attention to organisational goals and their relation to the behaviour of participants and their complex interconnections. Therefore, there is frequently a difference between the stated (official) and the real (operative) goals that can be observed to govern the activities of participants in organisations. Brunsson (1985) argued that rational system theorists stress the behavioural structure and are more interested in examining what is done rather than what is decided or planned. In this domain, differentiation between intention and realisation or between policies and practices is raised. Depending on this characteristic, a need was recognised in this research to differentiate between policies and practices, as will be illustrated in Chapter Four.

2- Informal Structure; Rational system theorists developed highly formalised structures to perform every task within organisations and held that workers are motivated to achieve maximal performance. In contrast, Scott (1987, p: 24) pointed out that "individual participants are never merely "hired hands" but bring along their heads and hearts: they enter the organisation with individually shaped ideas, expectations, and agendas, and they bring with them differing values, interests, and abilities". Burrell and Morgan (1979) observed that the social relationships developed within informal work groups had a stronger effect on production than did group piecework incentives. Ezzamel and Hart (1987) pointed out that this characteristic is an important contribution of neo-classical theory to modern organisation thought.

3- Functionalist Analysis: The functionalist model assumes that the organisation has certain needs or requirements that must be met if it is to persist in its present form. Ezzamel and Hart (1987) pointed out that neo-classical theory emphasises the importance of the human element in organisations and the broader motivational aspects of behaviour. It also emphasises the importance of the need for self-esteem and group belonging, and the role of supportive leadership. Ezzamel and Hart (1987) identified organisational climate as the strategic organisational variable affecting human

motivation. If the climate in organisation is supportive and friendly, it encourages the employees to achieve goal efficiency and optimisation.

4- Managers' Cognitive Processes: As illustrated in previous sub-section, Simon in 1940s and 1950s laid the groundwork for the treatment of cognitive simplification in his discussion of "bounded rationality" by suggesting that choice of action in the real world departs from the requirements of objective rationality because of human cognitive limitations. Coad (1995) claimed that the construct theory of Kelly (1955) and the "field expectations" of Tolman (1949) are both models of cognition, which suggested that individuals have a coded perception of their world to which they relate new experiences. Their models indicated that managers would process environmental and organisational events through pre-existing knowledge systems known as "schemata". Fiske and Taylor (1991) defined "schemata" as mental models, which represent beliefs, theories and propositions that have developed over time, based on individuals' personal experiences and which allow them to categorise events, assess consequences and consider appropriate actions. Coad (1995) concluded that when faced with new situations, managers seek to integrate the experience into an existing pattern. Taylor and Crocker (1983) viewed "schemata" as providing frames for problems. This makes it unnecessary for organisational decision makers to expend the mental effort necessary to diagnose completely each element of a new strategic problem. Schon (1983) added that "schemata" provide managers with a repertoire of images, examples and actions such that when a new situation arises it is perceived as something already present in the repertoire. Weick (1979) named "schemata" as "perceptual sets" which managers carry from situation to situation.

In the classical and neo-classical analysis - as illustrated in this section and the previous one - the organisation was typically treated as a closed system. Organisational issues tended to be investigated by the organisation independently of its environment. Selznick (1949) and his students considered the environment in their analysis of organisations. Their view was that the environment was perceived primarily as an enemy, as a source of pressures and problems.

Otley et al. (1995) pointed out that there was increased respect for the external environment in the literature of management control system in the early 1970s. In effect, research moved towards an open systems perspective and began to focus more closely on the importance of the organisation-environment relationship. This was a new

direction in management thought that connected the organisation with its external environment.

From the above literature, it could be argued that these theories see the organisation as a closed system with emphasis on rational solutions. However, Scott (1987) concluded that none of these rational system theories took much notice of the effect of the larger social, cultural, and technological context on the structure of the organisation. Ezzamel and Hart (1987) supported Scott's view and he added that the classical theory focuses on "organisations without people". In addition, as illustrated above, Simon (1976) claimed that it is impossible to get full rationality; it is only possible to achieve bounded rationality – as will be discussed in sub-section 2.3.1. These and related criticisms gave rise to alternative perspectives on organisations. The research sees the organisation as a collective formed to achieve specific goals. The following perspective, the natural system perspective, was developed specifically in opposition to the rational system model and was designed to correct its oversimplified conception of organisational structure and its naïve conception of individual participants.

2.1.3 Organisation as an Open Rational System

The previous two perspectives of organisation tend to view the organisation as a closed system, separate from its environment and comprising a set of stable and easily identified participants. However, organisations are not closed systems, sealed off from environments, but are open to and dependent on flows of persons and resources from outside. Ezzamel and Hart (1987) argued that an open system interacts constantly with its environment. The organisation, as an open system, *imports* energy and information from its environment. The system (organisation), then, *exports* some products into the environment, which, in turn, become inputs to other systems.

With the introduction of open systems analysis into organisation theory, it has become more common to talk about the interaction between organisations and their environments. Weick (1979) suggested that managers do not react (respond) to an environment, rather they enact (endorse) it. He added that managers create meaning from environmental stimuli based on attention to what has already occurred. Moreover, what they understand to be occurring currently affects their perception of past occurrences. Managers thereby continually amend their mental models through their ongoing experiences or enactment. In this sense, they invent their own environment.

The central feature of the open systems approach is that it seeks to study the activities of an organisation by reference to the context of the wider environment in which it is set.

Otley (1984) claimed that the basic premise for understanding organisation is that it is affected by and dependent upon its environment and that its survival is determined by the degree to which it is able to adapt itself to environmental conditions. Otley (1984) and other researchers (e.g. Emmanuel and Otley, 1985; 1990; Merchant, 1985; Johnson & Gill, 1993; Laughlin & Lowe, 1990) argued that the epistemological roots of this approach stem from general systems theory and sociological structural functionalism. They recognised that the behavioural aspects and contingency approach of management control systems tended to lie along the boundary of the closed natural category and the open rational approach. Figure 2.1 illustrated this location. Otley (1984) argued that the development of contingency theory was related to the perspective of organisation as an open rational system as illustrated in Figure 2.1. He added that initially the chain of causation was seen as running from the environment to the organisation, essentially determining what the most effective adaptive response should be.

Ezzamel and Hart (1987) argued that a closed systems approach treats irregularities in organisational performance, due to environmental influences such as error variances, which can safely be ignored, whilst an open systems approach treats them as forces indivisible from the functioning of the organisation, which should be studied and understood. They added that while a closed systems approach fails to understand and develop environmental feedback, an open systems approach succeeds in doing that.

Otley et al. (1995) and Laughlin and Lowe (1990) pointed out that the development of the contingency theory of management control systems resulted from this approach. As an example, Thompson (1967) viewed organisations as open systems, faced by unpredictability, that need to be clear and certain in order to function in a rational manner. In Thompson's view (1967), management's role is to try to reduce the existing unpredictability so that the organisation may operate efficiently to achieve its goals. Hence, in this approach, the emphasis is on the organisation and how it adapts with the environment. Therefore, the organisation is an open system because of its interaction with the environment. Furthermore, it is also a rational system because it retains its internal orientation. It could be argued that an organisation is both a closed and an open rational system because it must be a closed system in order to be rational, and it is an

open system because it exists in an unpredictable environment (Otley, 1984; Thompson, 1967).

2.1.4 Organisation as an Open Natural System

Otley et al. (1995), Ezzamel and Watson (1993) and Hogler and Hunt (1993) identified that the recognition of the political nature of organisational activity led to this perspective. It might be that this perspective is useful to widen the view and thinking beyond the themes of traditional contingent variables such as environment, technology, organisational structure, size, and corporate strategy. However, this research uses the contingency approach as its theoretical framework. It broadens the view of the contingency approach (using the concept of open natural system) concerning the effects of legislation issues (as one of the independent variables) on CMIS policies and practices.

The next section introduces literature and studies related to the contingency approach and its view about relationships between organisations' structures and their environments and other contingencies, which they may have.

2.2 Contingency Approach

Drury (2000) observed that in the 1970s, an information-economics approach emerged. Researchers extended the models developed in the 1960s to incorporate uncertainty and to take into account the costs of providing information and compare this cost with the value of the benefit derived from the information. The research sought to measure and compare the costs and benefits of implementing decision models and sophisticated control procedures. Accounting researchers developed economic models and asserted that using these models would achieve the best results or the most goals, as will be illustrated in Chapter Three. However, according to many surveys of management accounting practices (for example, Drury et al., 1993; Ezzamel & Willmott, 1992), there was little practical evidence to support these models. This implies that there is a gap between theory and practice in management accounting. It could be argued that universal explanation of CMIS as policies and practices failed. Therefore, some writers (e.g. Kaplan, 1986; 1998; Scapens, 1994) advocated that research should focus more closely on the study of management accounting practices. Therefore, the emphasis of management accounting research changed during the last ten years, from developing

theoretical models of what ought to be, to explaining observed practices or organisational behaviours.

Drury (2000) pointed out that research into the behavioural aspects of CMIS tended to concentrate on enhancing the economic performance arising from the use of existing techniques by promoting their motivational impact of avoiding dysfunctional behavioural consequences associated with their use. He added that behavioural research has not contributed to the development of new CMIS techniques, but it led to the consideration of how these techniques might be modified or which techniques would be most appropriate in specific organisational circumstances. Drury (2000) argued that in particular, behavioural research has shown that the economic models, which are advocated, may not work as expected when applied in practical situations, because of unintended behavioural responses in organisations.

The contingency approach is one of the major developments to emerge from behavioural organisational research. The contingency approach is based on the premise that there is no universally acceptable model of organisation and the form of organisation that will be most efficient is contingent upon conditions relevant to the situation (Otley, 1980; Alum, 1997). In particular, under a contingency approach, the type of CMIS, as a part of the control system, varies according to the specific circumstances or situations in which the organisation operates. The contingency approach attempted to relate the design of CMIS to such organisational factors as size, technology and management styles and to the type of environment in which organisations operate, for example, the level of unpredictability and competition intensity.

However, contingency theory faces some criticisms and problems. This section is divided into two sub-sections. The first sub-section introduces the traditional view of the contingency approach. The second sub-section contains criticisms and problems which the traditional view of contingency approach faced and the ways to resolve them in order to reach a neo-contingency theory concept, which better fits the theoretical framework of this study.

2.2.1 Traditional Explanation of Contingency Approach

The contingency approach provides a theoretical framework that might help to explain existing practice. Otley (1980) argued that the contingency approach is both descriptive

(in explaining why organisations adopted a particular CMIS) and prescriptive (in explaining the type of CIMS that ought to be operated in a particular set of circumstances). Therefore, the contingency approach is used as a theoretical framework to explain the practices of CMIS as a part of management control systems used by the organisations to face their environmental conditions. Selto et al. (1995) claimed that the contingency approach could allow variables such as types of business sectors, categories of ownership, characteristics of transformation, competition intensity, unpredictability, size, role of consultants and types of authorities to be addressed.

Contingency theory is a theory of equilibrium in that it describes organisational change as a process of regaining equilibrium. An organisation in misfit moves into fit. Burns and Stalker (1961) and Woodward (1965) explained this movement using contingency theory. They argued that there is a motivation for an organisation in misfit (that is in a dis-equilibrium state) to move into fit (in which the organisation is equilibrium state) to gain the higher performance that fit produces. However, when the organisation moves out of fit into misfit, it consequently loses performance, so that there is no incentive for it to move out of fit. This equilibrium aspect of contingency theory is consistent with a functionalist type of theory. Furthermore, Hage (1974) pointed out that it is consistent also with contingency theory being a cybernetic type of theory, which is focused on deficit reduction, or reducing misfit. Locke and Latham (1990), and Wood and Locke (1990) explained how deficits are created (using Goal-Setting theory which is a theory in organisational behaviour) by people setting new performance targets that exceed their present performance. Hence, this creates a gap or deficit, which tends to misfit. Donaldson (2001) argued that theories seeking to explain this deficit relate to individual or organisational proactively, in terms of creating a stress. He added that deficit-reducing theories, such as contingency theory, attribute to the individual or organisation as being reactive, seeking to remove an existing situation (the differences between reactivity and proactively, and the factors which lead to being proactive, will be discussed later, in section 2.2.2).

Donaldson (2001) argued that the contingency approach provides the theoretical explanation of two points; the association between contingent variables and practices of CMIS, as a part of management control system in organisations, and contingency change producing change in practices. An organisation that changes the level of its contingency tends to have been in fit when it made the change and hence to move into misfit so that its performance decreases. The organisation then changes its practices to

fit the new level of the contingency variable in order to avoid further performance loss. In this way, the contingency and the practices move into equilibrium and so raise the association between the contingency and the practices. Hence, it could be argued that practices of CMIS need to be matched to the circumstances in which the system operates. The match can be tested by using correlation analysis between each of the contingent variables and CMIS. This analysis will be shown in Chapter Seven.

It is still commonly agreed that employing contingency theory provides useful insights for understanding how environmental factors are related to CMISs (Berry et al., 1991; Hoque & Hopper, 1994). However, contingency theory has been criticised because it suffers from a fundamental problem related to methodological assumptions (Child, 1972; 1973; 1977; Otley, 1980; Doweny & Slcoum, 1975). The next sub-section introduces the literature related to criticisms of contingency theory.

2.2.1.1 Criticisms of Contingency Theory

There are two schools of thoughts related to contingency theory. The first advocates contingency theory and claims that organisational structures change and adapt, in response to unforeseen events in the external environment. Donaldson (1996) called this view as deterministic. According to this view, the model predicts that contingency variables account for most of the variation in structure and that the value preferences and choices of the managers make little independent contribution to an explanation.

The second school of thoughts rejects determinism by varying degrees. Whittington (1989) strongly rejected determinism and argued that managers exercise a free choice over the fate of their organisations. Other writers (e.g. Child, 1972; Bourgeois, 1984; Hopper & Powell, 1985) were less extreme and argued that managerial decisions and deterministic factors, such as unforeseen events in the external environment, work together in shaping the organisation. They emphasised the importance of the decision-makers who serve as the link between the organisation and its environment. The criticisms of the idea of the deterministic effect of contingencies on structure came from two main directions: sociologists (e.g. Child, 1972; Whittington, 1989; Schreyogg, 1980; Whitley, 1977), and management theorists (Anderson & Paine, 1975; Bourgeois, 1984; Weick, 1987). They asserted that there is more scope of choice by management, which exercises discretion over the choice of structure, with structural change being a more complex phenomenon than contingency theory allows. These choices arise in several ways. Management could regain fit by adjusting the contingency to the

structure. In addition, in conditions of environmentally induced slack, organisations may persist with sub-optimal structures for considerable periods of time. Thus, organisations need not in fact adjust their structures to their contingencies and this allows influence by managerial value preferences, beliefs, ideologies and power. In these ways, there is considerable scope for choice of structure (Bourgeois, 1984; Child, 1972; Bobbitt & Ford, 1980).

As a result of these strategic choices, contingency variables fail to explain much more than half of the variation in structure. However, Donaldson (1985) pointed out that structural contingency theory is not completely deterministic and that managers have played a long-standing role in selecting organisational structures that cope with or adapt to various contingencies. The present research uses this concept and considers that organisation strategy is a moderating variable that affects the main relationship (effects of managers' perceptions of environmental conditions on using CMIS to achieve efficiency, optimisation and strategy purposes), as will be illustrated in the next section (2.3) of this chapter.

From another point of view, Child (1972), Otley (1980), Bourgeois (1984), Ezzamel and Hart (1987), and others argued that the idea of the contingency model is empirically deficient because the application of contingency theory does not consider any moderating or intervening variables. They proposed that the model should be:

Subject to Moderating Variables:

If [X ——Intervening Variables——→ then Y]

The problems with the model are the number of moderating and intervening variables, the difficulty of collecting the amount of data required to measure these variables and also - as Ezzamel & Hart (1987) and Bourgeois (1984) stated - the impact of the interaction between those variables on the model. It was thought these complications could be remedied by simplifying the model and setting boundaries for any research. While simplification would help in keeping the model under control, greater simplification might hold the risk of over abstraction.[1]

[1] However, in this research –as will be illustrated in chapters Six and Seven- the data analysis revealed high correlation with the variables and the regression models had high R^2, in terms of high explanatory power in the contingency model.

Berry et al. (1995, p: 22) argued, "Contingency theory provides a picture for the organisation through its environment. The environment is crucial in shaping the organisation and the survival of an organisation depends on its 'fitness' for the changing environment". Otley (1991) argued that the external environment in which they operate affects designs of CMISs. Furthermore, Kaplan (1998) believed that competitive force would cause leading organisations to adapt to the new competitive environment by developing innovative cost management and control systems. For example, an organisation might begin to rely more heavily on CMIS for efficiency, optimisation and strategy purposes to fit its managers' perception of competition intensity and unpredictability. Furthermore, Donaldson (2001) argued that contingency theory explains organisational change as a functionalist process of adaptation. The organisation adopts a new structure that better fits its new level of the contingent variable, which is the main hypothesis of this study. Furthermore, Khandwalla (1972) observed a relationship between the degree of external competition, particularly product competition and the sophistication of the management controls used by an organisation. In such a way, the organisation replaces dysfunctional CMIS with functional CMIS. This is rational for the organisation in that it fulfils its goals. This change comes about through the decisions made by its managers. They are acting in a pro-organisational fashion.

Moreover, Al-Hazmi (1995) argued that managers have two primary perceptions of the external environment, that of competition intensity and unpredictability. He studied the effects of competition and unpredictability as the characteristics of the environment on cost policies and practices in absolute terms; he did not study the effects of any moderating and intervening variables on this relationship. Al-Hazmi (1995) focused on competition intensity and unpredictability as factors of external environmental conditions, which have an effect on organisational behaviour. He argued that as competition increased, there would be a stimulus to innovate until the constraint of severe competition increased the risk of failure. Similarly, as unpredictability increased, there would be a constraint on innovation arising from the inability to predict consequences.

The research follows Al-Hazmi and the above researchers in considering competition intensity and unpredictability as environmental conditions affecting on policies and practices of CMIS. In addition, it has aims to discover some of the circumstances which

might affect this relationship, as moderating and intervening variables. Therefore, the next step is to explore the variables, which explain those behaviours.

The contingency approach is used as a basis for explaining the case studies and the differences between them. The next sub-section adds other problems with contingency theory and suggests how to resolve some of them. This leads to a revised form of contingency theory that is named by some academic writers (e.g. Sorge, 1991; Donaldson, 2001) as *neo-contingency theory.*

2.2.2 Neo-Contingency Theory

Donaldson (2001) recognised two difficulties in traditional contingency theory, which have not been dealt with to date and which lead to revision to become neo-contingency theory. This new version of contingency theory is more realistic and more dynamic. This sub-section discusses these two difficulties and their relevance for this research as follows:

The first problem is analysing the way multiple causes interact to determine the overall effects on organisation. Foe example, within this research, there are a number of different contingent variables (managers' perceptions of competition intensity and unpredictability in relation to three factors: product market, factor market including five sub-factors "raw material, labour, management, finance and technology" and legislation), which could affect CMIS as policies and practices. Therefore, the question arises of how to combine the effects of more than one variable to assess their total effects on CMIS.

Donaldson (2001) argued that this issue could be explained by portfolio theory, which states that the risk of a portfolio is affected by the risk of each element, and by the correlation among the elements. If two variables display strong effect but are negatively correlated (or even are only weakly, positively correlated), then they produce lower effect (lower coefficient value) in the equation than in each of the elements (Brealey & Myers, 1996). However, Randolph and Dess (1984) did not agree with this view. They argued that these effects are additive. Therefore, the first effect is added to the second one to yield the overall effect on the dependent variable. Although this thought appears to be well developed, Van de Ven and Drazin (1985), however, argued that the overall effect of multiple effects is not the sum of their individual effects and so is not additive. They advanced a model in which the combination of multiple fits is seen as a system fit.

Drazin and Van de Ven (1985) argued that there is some holistic property that is not captured by analysing each variable separately then just adding them together. Thus, they argued that the effect of multiple contingent variables could not be calculated by simply adding up the effect of each variable.

This research recognises the above argument that Neo-Contingency theory evokes. It considers multiple effects of the multiple contingent variables on CMIS through using multiple regression analysis, rather than the sum of the effects of those variables individually. It studies these multiple effects to obtain a model, which explains the participation of each of these contingent variables as a coefficient and at the same time, their total effects.

The second problem is that it is unclear how managers know what exact organisational structures fit their contingencies. Contingency theory tends toward an implicit view that management knows what situation its organisation should be in. However, Donaldson (2001) argued that this view might be unrealistic. He claimed that management might know the direction in which fit lay and head in that direction. For example, managers from their experiences in the organisation to recognise the direction to adopt depending on their cognition and "schemata", as illustrated in the previous section 2.1.2. Therefore, Donaldson (2001) claimed that organisational adaptation is to move into quasi-fit rather than into full-fit. Managers try to move to fit but they attain only quasi-fit. The organisation will then adjust the level of its structure to narrow the gap between its actual level and that required to fit its contingencies, without completely eliminating the gap. However, by moving from misfit to quasi-fit, organisation performance will improve. This increase in performance is sufficient to feed back and commence growing again. In turn, such increase in the contingency increases the misfit and begins to reduce performance, so that eventually a further increase in the organisational structure is triggered. Hence, the organisation can go through the cycle of increasing the level of the contingent variable (e.g. managers' perceptions of environmental conditions) and structure (e.g. using CMIS), despite not attaining full fit. However, the organisation needs only to attain quasi-fit for the feedback effect of performance on the contingency to cause another round of the cycle of growth. Donaldson (2001) claims that an organisation needs only to enter quasi-fit recurrently to experience recurrent incremental increases in contingencies and structures.

It could be argued that the concept of the organisation moving into quasi-fit is more realistic than that of the organisation moving into full fit. The management of an organisation does not need to know exactly what full-fit is, but only has to know the correct direction. The correct direction can be discovered by extrapolating from past decisions, as illustrated in section 2.1.2. This model of managerial decision-making is consistent with bounded rationality. Lacking complete knowledge, managers tend to act only when there is a problem and to use a solution nearby that is not perfect but that satisfies, reducing the magnitude of the problem to an acceptable level.

Moreover, from the discussion of the assumptions of contingency theory (sub-section 2.2.1), it could be recognised that contingency theory is based on the concept of the state of equilibrium. This idea leads managers to be reactive towards environmental conditions and other contingent variables. However, Bateman and Crant (1999) claimed that the world has three kinds of people: those who make things happen, those who watch what happens and those who wonder what happened. Crant (1996) defined proactively as an action orientation toward organisational behaviours. Employees take an active role in their approach towards work. They initiate situations and create conditions. He claimed that this is in contrast to the passive and reactive patterns of behaviour. Proactive people actively seek information and opportunities for improving things. They do not passively wait for information and opportunities to come to them. Furthermore, Bateman and Crant (1999) argued that proactive individuals actively create environmental change, while less proactive individuals actively seek it. To be proactive is to take the initiative in improving business.

Buss (1987) and Diener et al. (1984) claimed that people are not always passive recipients of environmental constraints on their behaviour; rather they can change intentionally and direct their current circumstances. Bateman and Crant (1999) introduced the proactive disposition as a concept that identifies differences among people in the context in which they take action to influence their environments. They defined the characteristic proactive personality as someone who is relatively unconstrained by situational forces and who effects environment change. Proactive people identify opportunities and act on them, show initiative, take action, and persevere until meaningful change occurs. In contrast, people who are not proactive fail to identify opportunities to change things. Less proactive individuals are passive and reactive and they prefer to adapt to circumstances rather than change them. It could be argued that prospectors and analysers in organisations are proactive.

Crant (2000) argued that there are two factors which have an impact on proactive behavioural characteristics. The first factor is a personality characteristic of employees (this is outside the scope of this research, lying in the held of social studies). The second factor is contextual factors such as organisational culture, organisational rules, situational prompts, and public or private setting. Crant (2000) claimed that the proactive personality is associated with an array of organisational practices and innovations. He added that organisational interventions could have more effects for proactive individuals. Moreover, Kelley (1998) highlighted initiative and other proactive behaviours as the keys that distinguish star performers from average performers.

Bateman and Crant (1999) claimed that organisations could benefit from the proactive behaviour of their members. At the strategic level, this could be seen in the number and frequency of introductions of new products, services and processes, the amount of resources allocated to innovation, and how often the firm is a first or second mover. They added that a firm's level of proactive behaviour is reflected in its bold or cautious attitude, the extent to which it shapes the competitive landscape or merely reacts to the moves of others, how actively it creates demand and drives markets, and whether it is an industry leader or follower. It could be argued that this view supports Miles and Snow's (1978) typology of business strategies which will be discussed in section 2.3.2.1; Defender, Prospector or Proactive, Analyser, and Reactor or Reactive.

From the above discussions, contingency theory assumes that decisions should be rationally taken to obtain full fit with the contingencies in order to arrive at the equilibrium state that contingency theory aims to achieve. This leads to assume that managers should be reactive to get full fit. This assumption is an unrealistic approach.

From the above discussions, it could be argued that contingency theory supposes that managers should be reactive to achieve the equilibrium case. Neo-contingency theory supposes that managers could be at any point on a continuum between reaction and pro-action, which could lead to dis-equilibrium. Although managers try to make their decisions as proactive as possible, complete rationality in decision-making is not achievable. From a realistic standpoint, managers tend to seek a quasi-fit situation with the organisation's external environment. Managers, therefore, make decisions with a constricted view of rationality. This is a more pragmatic approach.

This is another area, in which neo-Contingency theory influenced this research. This research considers studying the organisation's behaviour as a scale between reaction and pro-action (depending on Miles and Snow's typology). It is supposed that managers might be at any point on the scale between being reactive and proactive decision makers. Therefore, four types of business strategies (Defender, Prospector or Proactive, Analyser, and Reactor) are considered as a moderating variable, which could impact on the relationships between managers' perceptions of environmental conditions and using CMIS in organisations. Section 2.3 contains discussion about the effects of managers' decisions and kinds of organisation strategies for responding to the environment in terms of using CMIS. Moreover, the following sub-section includes a summary of perspectives that discussed earlier.

2.2.2.1 Three Theories to Explain Adjustment

There are three theories to explain the notion of contingency adjustment to structure to attain a match. The first theory is contingency determinism; based on the idea that contingency leads to structure. Donaldson (1987) claimed that contingency determinism posits that a change in the contingency variable produces a change in the structural variable, directly and fairly immediately.

In contradiction to contingency determinism, the second theory postulated by structural-functionalism is of a more extended set of processes, which take longer to occur. Donaldson (1985) exemplified that a shift in the contingency variables leads to dis-equilibrium; this produces a decline in effectiveness that creates pressure for change, which causes structural adaptation producing a new structure and restoring effectiveness. Thus, the theoretical assumption of structural-functionalism is not contingency determinism but structural adjustment to regain fit (SARFIT). Both theories contain the notion that the structural reorganisation is driven by contingency. However, Donaldson (2001) claimed that under SARFIT the need for structural change arises from the reduction of performance, which comes from the mismatch of structure and contingency, rather than just from the change in the value of the contingency variable. Therefore, Hamilton and Shergill (1992) and Hill (1992) have empirically shown that fit positively affects performance and misfit negatively affects performance. Donaldson (2001) emphasised that SARFIT is a refinement of the contingency idea, which provides a more accurate model of the structural-functional logic.

In rejecting contingency determinism, Child (1972) offered the third theory: the strategic choice theory. Whittington (1989) strongly rejected determination and argued that managers exercise a free choice over the fate of their organisations. Other writers (e.g. Child, 1972; Bourgeois, 1984; Hopper & Powell, 1985; Bobbitt & Ford, 1980) were less extreme and argued that managerial decisions and deterministic factors, such as unforeseen events in the external environment, work together in shaping the organisation. They emphasised the importance of the decision-makers who serve as the link between the organisation and its environment. The criticisms of the idea of the determinism of structure by contingencies came from two main directions; sociologists (e.g. Child, 1972; Whittington, 1989; Schreyogg, 1980; Whitley, 1977), and management theorists (Anderson & Paine, 1975; Bourgeois, 1984; Weick, 1987). They asserted that there is more scope for choice by management, which exercises discretion over the choice of structure, and that structural change is a more complex phenomenon than contingency theory allows. These choices arise in several ways. Management could regain fit by adjusting the contingency to the structure. In addition, in conditions of environmentally induced slack, organisations may persist with sub-optimal structures for considerable periods of time. Thus, organisations need not in fact adjust their structures to their contingencies and this allows influence by managerial value preferences, beliefs, ideologies and power.

Grant (1988) claimed that contingency theory greatly expanded the scope of strategic and management control research. It emphasises the "fit" between external environmental factors and the internal resources of the organisation. It analyses the components of the organisation structure and the firm's ability to adapt to these changes (Child, 1970; Grant, 1988). Yasaiardekani and Nystrom (1996) used environmental scanning to test the effectiveness of contingency variables in strategic decisions.

Strategic choice, like SARFIT, contains the notion that misfit creates low performance, leading to a pressure for change to restore the match between structure and contingencies. However, in the strategic choice formulation, match can be restored by adjustment of structure to fit the new contingency (as in SARFIT), or by adjustment of the contingency to the structure. Therefore, Donaldson (1987, p: 4) asked, "Do organisations in disequilibria regain fit by structural adjustment, or do they with equal ease do so by adjustment of contingency to structure?". He answered this question by comparing the costs of the two routes. If the latter route is as open to choice as the

former, and can be chosen with roughly equal cost, then one would expect to see both routes being chosen with equal frequency.

The next section introduces literature and studies related to managers' decisions and types of organisation strategies for responding to environment.

2.3 Managers' Decisions and Organisation Strategy for Responding to the Environment

As illustrated in section 2.2, there are some writers who advocated that organisation strategy is the structural adaptation (e.g. CMIS) to various unforeseen environmental events. Chenhall (2003) claimed that strategy is somewhat different from other contingency variables. In a sense it is not an element of context; rather, it is the means whereby managers can influence the nature of the external environment, the technologies of the organisation, the structural arrangements and the control culture and the CMIS. Chenhall (2003) added that the role of strategy is important as it addresses the criticism that contingency research assumes that an organisation's CMIS is determined by context and that managers are trapped by their operating situation. Therefore, there was a need to test this assumption and its effects on CMIS. For this reason, organisation strategy was chosen as an intervening variable in the main relationship. The Kruskal- Wallis H test was used to test the intervening variables effects, as will be demonstrated in Chapter Seven.

Against this background, the next section incorporates two main elements. The first sub-section relates to bounded rationality in the decision-making process and explains how managers are unable to be fully rational in making decisions. As human cognitive limitations prevail, managers make their decisions with the aim of achieving bounded rationality, rather than full rationality. The second sub-section contains the typologies of organisation strategies; it describes what organisations could use in responding to the environmental conditions.

2.3.1 Decision-Making Rationality

Scapens (1984) argued that the neo-classical economic framework played a central role in structuring the decision models used by researchers who were instrumental in the development of management accounting's conventional wisdom. The neo-classical economic framework entails the following assumption: The decision-maker has

available at no cost and with no uncertainty all the information he requires to structure his decision problem completely and to arrive at a deterministic profit maximising solution, using the principles of marginal analysis.

Otley (1984) encouraged researchers to move away from economically rational models towards models that emphasise how individuals cope in situations characterised by ambiguity and uncertainty. Miles and Snow (1978) supported this view and argued that the process of organisational adaptation is neither an uncontrolled phenomenon nor a process involving perfectly rational and efficient choice. Instead, adaptation occurs through a series of managerial decisions, and is influenced by how consistently managers' choices are integrated, and how this integration relates to the managers' perceptions of uncertainty, adaptation and their roles in it. Furthermore, Hodgson (1988) argued that in a complex and uncertain world, it would be impossible for an individual to make sensible decisions in the manner assumed in rational economic models.

Simon (1976) argued that decision-makers could not choose the best possible solution because they do not know it. They do not know all the possible solutions and even supposing that there is a collection of solutions to be known, it could be very costly to go on searching. Therefore, he claimed that instead of maximising (much as the decision-maker would like to), he "satisfices". He described "satisficing" behaviour as a compound of satisfactory and sufficing. He compared between economic man and decision-maker, saying that as economic man is a maximiser, seeking the best solution whereas as a decision maker settles for solutions which are 'good enough'. He compared between intended rationality and the bounded rationality that underlies administrative behaviour.

In trying to describe the factors that affect decision-making, many authors (e.g. Simon, 1976; Stoner & Freeman, 1992; Beckert, 1996) have proposed a theory of bounded rationality. This theory points out that decision makers must cope with inadequate information about the nature of the problem and its possible solutions, a lack of time or money to get information that is more complete and distorted perceptions, an inability to remember large amounts of information and the limits of their own intelligence. Furthermore, time is crucial resource, but also, during the passage of times the suppositions on which decisions are based will be altered by changing circumstances. Therefore, decision-making occurs according to *bounded rationality* rather than *full rationality.*

Padgett (1980) argued that managers are rational economic beings who continually calculate what actions will lead to the greatest advantage. He added that this rationality is limited, however, by the information processing capabilities of the managers and the ambiguity and uncertainty of the environment surrounding them. Minkes (1987) argued that no management function can be performed without managers facing uncertainty and ambiguity, and they are far from an optimisation situation.

Minkes (1987) supported Simon's view about rationality. He discussed bounded rationality in terms of the "satisficing" concept, in which an individual ceases to search for a better solution once a "satisficing" rather than an optimal solution is found. Minkes (1987) arrived at a description of the decision-making process, according to which individuals paying sequential attention to multiple conflicting goals rather than being the rational decision-makers of economic models.

Berry et al. (1995) argued that bounded rationality accepts that human beings do not necessarily act to maximise the outcomes of a set of actions. Due to the complexity of decision-making, and limitations on people's knowledge and ability in processing information, individuals will seek satisfactory outcomes. Despite efforts to be idyllically rational in decision-making, an individual's rationality is constrained within the limits of his or her own ability to process complex information. Stoner and Freeman (1992) added that instead of searching for the perfect or ideal decision, managers frequently settle for one that will adequately serve their purposes in terms of finding the first satisfactory decision, rather than the optimal decision. Minkes (1987) showed that it is precisely the uncertainties, which require managers to make decisions. The future is unpredictable. If decision-makers knew what the future held, they would not need to make decisions. Nevertheless, their lack of knowledge, the partial ignorance in which they must necessarily operate, obliges them to make choices. One of the most challenging dilemmas that the manager faces is trying to operate simultaneously across several dimensions of time, namely the present, the future and even the past. Minkes (1987) argued that decision-making requires of managers certain kinds of sensitivity and flexibility, which lie outside the formal stages of the models.

Hayakawa (2000) recognised that various elements could affect bounded rationality. He identified them as follows: 1- Decision-makers' cognitive and computational capacities are significantly bounded. 2- The severity of this limitation is compounded by the fact that the available time fit making decision is fixed. 3- Decision-makers seldom have

perfect information about choice alternatives, since information gathering and processing, like any other activity, requires time, funds and other resources. 4- Many decision-making situations involve an element of risk, so that the anticipated consequences of decisions can only be assessed in probability terms, subjective or objective. 5- If decision-making situations are accompanied with uncertainty the consequences of an action could not be assessed even in probability terms.

2.3.2 Types of Organisation Strategies for Responding to Environmental Conditions

Quinn (1980) and Harrison (1987) assumed that strategy could be used as the intervening variable between the organisation and the external environment. It is evident that the core premise of research in the area of strategic cost management lies within a contingency framework (Govindarajan & Gupta, 1985; Simons, 1990) which runs through the contemporary work of industrial economists and a marketing view of products (e.g. Bromwich, 1990; Simmonds, 1981; 1986; Shank & Govindarajan, 1989). However, as Dent (1990) showed that control systems were partly contingent upon strategy, there is a contribution by CMIS to the complex processes of decision-making and to the way in which control systems can contribute to strategic change. Simons (1990) described how CMISs could focus the organisation's attention on strategic issues. The management accounting system plays a role not only as an instrument for implementation but also in the formulation of strategy.

Child (1972) argued that an organisation's strategy is the tool by which the organisation aligns itself with its environment. He discussed how organisations align themselves with their environments. He answered this question by introducing a range of the strategic choice approaches. He argued that organisation structure is only partially predetermined by environmental conditions and placed heavy emphasis on the role of the top decision-makers that serve as the primary link between the organisation and its environment. These managers are viewed as being in a position not only to adjust organisation structure and process when necessary, but also to attempt to manipulate the environment itself in order to bring it into conformity with what the organisation is already doing. In this domain, Hofer and Schendel (1978) claimed that strategy becomes the mediating force or "match" between the internal and external context. Furthermore, Glaister and Thwaites (1993) claimed that the organisation moves according to the strategy objective in response to changes in the environment. Coad (1995) argued that strategic control systems (such as CMIS) enable top management to respond to

unforeseen external and internal developments with changes in strategy. Ibbotson (1976) argued that environment influences strategy in the short run and strategy influences environment in the long run. Because of this role of the top decision-makers, they are in a position to adopt their CMISs. This strategic choice approach introduces an answer to the question why not all organisations in the same circumstances have the same CMISs? The answer is, it is a matter of managerial choice.

Van de Ven and Drazin (1985) used the word "selection" to describe the process whereby organisation structure comes to be correlated with the contingencies. They identified two kinds of selection: natural and managerial. In managerial selection, managers make the decisions about structure. Drazin and Van de Ven (1985) supported their conceptual argument with an empirical analysis. They showed that there were correlations between several structure variables and the contingency, which they saw as supporting the natural selection view. Further, they showed that the correlations were greater for aspects of structure and process under management control, thereby supporting the concept of management selection. Donaldson (2001) claimed that natural selection would explain fit among organisations by saying that mis-fitted organisations failed to survive. In a review of Drazin and Van de Ven (1985), he argued that the organisations in their study were units within public sector organisations, so that a mis-fitted unit would not go bankrupt and disband; hence misfit and low performance would not necessarily lead to lack of survival. Therefore, he claimed that the correlations between structure and contingency in their empirical analysis would not seem to be brought about by natural selection, though Drazin and Van de Ven's conceptual point may apply to freestanding organisations, such as in private sector organisations. Thus for some organisations, none of the correlations between their structure and contingency variables are caused by natural selection and all are brought about by managerial selection. Donaldson (2001) preferred to use the term managerial decision to distinguish it from natural selection. Hence, he argued that almost all organisations are shaped to some degree by the decisions their managers make, without natural selection having played a part. In the following sub-section, there is a brief discussion of the work of Miles and Snow, in which organisation strategies are classified.

2.3.2.1 Miles and Snow's Typology (1978)

From the above, strong implications rose that organisation strategy was an important variable, which could affect on organisational adoption of CMIS. Moreover, this might explain why organisations in the same category (that faced the same environmental

conditions) had different CMIS. Therefore, in this study, it was intended to test this effect through the data analysis. The Kruskal-Wallis test was used to test the effect of organisation strategy as one of the selected moderating variables.

Miles and Snow (1978) identified four basic types of organisation, the Defender, the Prospector or Proactive, the Analyser, and the Reactor or Reactive, in terms of their strategy for responding to the environment and theircombination of structure, culture, and processes consistent with that strategy. This perspective helps explain why organisations facing similar situations behave differently and continue to do so over long periods. These organisation types have the following general characteristics (Miles and Snow, 1978):

Defenders are organisations, which have narrow product-market domains. Top managers in this type of organisation are expert in their organisation's limited area of operation but do not tend to search outside of their domains for new opportunities. As a result of this narrow focus, these organisations seldom need to make major adjustments in their technology, structure, or methods of operation. Instead, they devote primary attention to improving the efficiency of their existing operations.

Prospectors are organisations, which almost continually search for market opportunities, and they regularly experiment with potential responses to emerging environmental trends. Thus, these organisations often are the creators of change and uncertainty to which their competitors must respond. However, because of their strong concern for product and market innovation, these organisations usually are not completely efficient.

Analysers are organisations, which operate in two types of product-market domains, one relatively stable, and the other changing. In their stable areas, these organisations operate routinely and efficiently through use of formalised structures and processes. In their more turbulent areas, top managers watch their competitors closely for new ideas, and then they rapidly adopt those which appear to be the most promising.

Reactors are organisations in which top managers frequently perceive change and uncertainty occurring in their organisational environments but are unable to respond effectively. Because this type of organisation lacks a consistent strategy-structure relationship, it seldom makes adjustment of any sort until forced to do so by environmental pressures. Managers in this kind of organisation are behaving reactively.

Snow & Herbiniak (1980) argued that the Miles and Snow's typology has important strengths, especially its strategic orientation and identification of patterns in the product market strategy. Management accounting researchers (e.g. Simons, 1987; 1990; Mia & Clarke, 1999) argued that Miles and Snow's typology formed the basis for a range of research concerning the best fit of strategy and CMIS design. This body of research emphasises the relationship between the organisation and changing market and focuses on how a management accounting system can be designed optimally in accordance with the specific strategy the organisation has decided to follow. This approach is criticised for being devoted to the idea of best fit; it tends to ignore the complex and dynamic nature of strategy implementation where the uses of accounting data and cost information may be very different in each case. This limitation is essentially the major focus of the recent strategic cost management literature, which is concerned primarily with the use of cost information in its broader strategic context: The focus of the literature is the way in which organisations are using their accounting system and cost information, which were, in turn, driven by their strategic behaviours.

Miller and Toulouse (1986) demonstrated that managers employing a differentiation strategy have different attributes from their counterparts using cost-leadership. For instance, managers employing a differentiation strategy appeared to have greater willingness to take risks, greater tolerance for ambiguity, and a greater tendency to internal locus of control, than those practising cost-leadership. Based on those findings, Jennings and Seaman (1994) pointed out that a manager practising a differentiation strategy will prefer superior product or service attributes. In contrast, a manager practising a cost-leadership strategy will try to become the lowest-cost provider of a product or service. In addition, managers practising the two different strategies will have different beliefs about what is important. Thus, researchers find that types of strategies and approaches to scanning are linked, because different strategies require different scanning approaches. Managers with certain scanning skills may choose strategies that maximise their skills.

Miles and Snow's view formed the basis for a range of research concerning the best fit of strategy and CMIS design (e.g. Simons, 1987; 1990). This body of research emphasised the relationship between the firm and the changing market and focused on how an optimal CMIS can be designed in accordance with a specific strategy that the firm had decided to follow towards achieving its business goals.

Simons (1987) extended Miles and Snow (1978) work. Simons' work was based on the premise that control systems should be modified in accordance with the business strategy of a firm. However, his result was inconsistent with Miles and Snow's (and also Ouchi, 1979; Hirst, 1983; Govindarajan, 1984) evidence that defenders tend to use more detailed cost analysis techniques and cost control oriented towards efficiency in task performance (Dent, 1990). Simons (1987) found that prospectors tend to use their financial control system more intensively than defenders with tighter budget goals and more frequent reporting on forecast and outputs than cost control. Simons (1990, p: 141) added the suggestion that defenders "need only focus on strategic uncertainties often related to product or technological changes that could undermine current low cost positions".

Depending on this perspective, it could be useful to consider this typology as a moderating variable, which might affect on the main relationship (managers' perceptions of environmental conditions on CMIS).

The next section contains a summary of the methodological issues related to the above theoretical framework. It encloses the ontology, epistemology and the research paradigm.

2.4 The Methodological Issues

Burrel and Morgan (1979) claimed that methodology refers to the methods and ways used to conduct research. A methodological position consists of three elements (ontology, epistemology and research paradigm)

2.4.1 The Ontology

Burrell and Morgan (1979) argue that ontology is concerned with the nature of social reality, the essence of the phenomenon under investigation. On the one hand, the social world can be regarded as having an empirical, external concrete existence, independent of and prior to the cognition of any research; this is the *realism* view. At the other extreme, the *nominalism* view assumes that the social world is external to the individual's cognition and is made up of nothing more than names, concepts and labels, which are used to structure reality. Furthermore, Gill and Johnson (2002) classified realism into ontological and epistemological realism. They argued that ontological realism considers that reality exists independently of the cognitive structures of

researchers, while epistemological realism considers that reality is cognitively accessible to researchers.

In this research, the phenomenon under investigation - which is using CMIS - has an empirical, external existence prior to and independent of the researcher. Therefore, the adopted ontological perspective of the research is realist. The collected data is real data, not social data. The data related to managers' perceptions are considered as epistemological realism and the data related to using CMIS to achieve efficiency, optimisation and strategy purposes and related to facts about organisations (Size, Ownership, Location of authority, Kinds of consultants and Kinds of transformation operations) and facts about the interviewees (Education level) are considered as ontological realism.

2.4.2 The Epistemology

Epistemology is concerned with the nature of knowledge and there are two streams as Burrell and Morgan (1979) introduced positivistic and anti- positivistic. The positivistic epistemology seeks to explain and predict what happens in the social world by searching for regularities and casual relationships between its elements. Gill and Johnson (2002) identified positivism as an approach that emphasises the use of the methods presumed to be used in the natural sciences in the social sciences. Donaldson (1996) claimed that the origins of positivist organisation theory lie in contingency theory. Burns and Stalker (1961), Chandler (1962), Woodward (1965), Lawrence and Lorsch (1967), Thompson (1967), Pugh et al. (1969), Blau (1970) and others, developed this during the 1960s in a series of works. In each study, they showed an empirical connection between some aspect of organisational structure and some aspect of the situation. However, each of these pioneering works emphasised their own contingency factor and their own aspects of organisational structure. Donaldson (1996) claimed that a commonality might be identified. He added that each of the specific relationships between a particular contingency and a particular aspect of structure could be subsumed under this more general theory.

Moreover, Burrell and Morgan (1979) identified six senses for the theory to be a positivist one in sociological terms. First sense is related to *nomothetic* which means that the phenomenon are analysed using a general framework with factors that apply to all organisations, both for the contingency factors and for the organisational structure. Thus, general casual relationships in the form of law (like regularities) are sought

between contingency and structural factors. The second sense is that the research associated with the theory is *methodologically positivist*, in terms of using comparative empirical research, often with the measurement of variables and statistical analysis of data. The third sense is that the theory explains organisational structure by material factors such as size, technology, control system, CMIS and so on, rather than by other factors such as idea, ideologies and the like. The fourth sense is determinist in that managers are seen as having to adopt the organisational structure that is required by the contingency factors in order to gain organisational effectiveness. The fifth sense is that the theory is closely informed by empirical research rather than extended theorising prior to empirical data collection. The last sense is that the theory is intentionally scientific in style with the aim being to produce scientific knowledge of the type achieved in the natural science. It could be argued here that the first and the second (determinism and SARFIT) dynamic casual theories, which are described in sub-section 2.2.2.1, are positivist types. These two theories have all the six senses which Burrell and Morgan (1979) identified. In essence, both of them deal with organisational structure as material factors rather than idea.

According to the anti-positivistic epistemology, social world is essentially relative and can only be understood from the point of view of individuals (researchers) who are directly involved in the activities. For the third dynamic casual, which described in sub-section 2.2.2.1 (strategic choice), the anti-positivists include those who suggest suspicions about the determinism of positivist organisation theory and would wish to assert in its place voluntarism which is a role for human choice. The extreme voluntarisms (e.g. Whittington, 1989) reject completely the proposition that the managers determine the strategies and structures that they choose for their organisations. Whittington (1989) argued that managers make free choices about the conduct of their organisations and that they should be responsible for those choices. Donaldson (1996) refused this extreme view, which has not been popular. He suggested – instead - that the partial voluntarism is more influential since there are both a degree of determinism of structure by contingencies and a greater degree of choice. (e.g. Child, 1972; Bourgeois, 1984). Those partial voluntarisms claimed that there is some tendency for structure to be associated with the contingency factors but the actual structure adopted depends on managerial decision and is therefore affected by managerial choices, values and interests.

This research focuses on the relationship between managers' perceptions of environmental disturbances and uses of CMIS as a deterministic view. The variables, which could affect, are realistic. Furthermore, it studies the strategic postures as a conditional variable to test its effects. Depending on contingency determinism view, the effectiveness of the organisation is affected by the fit between the organisational structure and the contingencies. This leads the organisation to adapt its organisational structure, then, it moves into fit with the contingency factors. Hence, the organisational structure is explained by its consequences for effectiveness. Therefore, this research has adopted positivism epistemology.

2.4.3 The Research paradigms

Burrell and Morgan (1979) and Burrell (1996) integrated the dimensions about the nature of reality, knowledge and human nature into two major dimensions: the subjectivity / objectivity dimension and stability (regulation) / change and developed their four research paradigms: functionalist sociology, interpretative sociology, radical humanism and radical structuralism. Hopper and Powell (1985) classified and analysed many research approaches in accounting under the previous paradigms. It is not the aim of this research to analyse or evaluate these paradigms, but to identify the standpoint of this piece of research. The following section reviews briefly these paradigms.

1. Functionalist Sociology

The functionalist approach is based upon a real ontology where the social world has an external existence distant from the researcher. This paradigm is rooted in positivism and aims to address regularities through devices borrowed from natural science and oriented -pragmatically- to solve problems.

2. Interpretative Sociology

The interpretative approach assumes that social reality is a network of assumptions and inter-subjectively shared meanings, which has existence outside any individual's awareness. This paradigm aims to understand the basis and sources of social realities. However, this paradigm perceives the world as it is and explains it within the individual's awareness and attempts to understand the subjectively oriented worlds.

3. Radical Humanist

The radical humanist shifts the concern from devices (in interpretative) to individuals. This paradigm is anti-functionalist, anti-organisation and concerned with the alienation problem. Developing the sociology of radical change from a subjectivist standpoint concerns the radical humanist paradigm. This paradigm overthrows limitations of existing social arrangement and argues that the awareness of man is dominated by ideological superstructures with which man interacts.

4. Radical Structuralism

Radical *structuralism* focuses on radical change, liberation and potentiality when analysing a social phenomenon and it addresses structural conflict, modes of domination, contradiction and deprivation in the phenomenon. This paradigm tends to be realist, positivist and determinist and assumes that contemporary society is characterised by conflicts, which generate radical change through political and economic crises.

In this research, as illustrated in the sub-section 2.1.3, organisations are assumed to operate as open rational systems, being concerned about their goals and responding to their environment. Contingency theory focuses on organisations as open social systems with unique characteristics. Sisaye (1998) argued that systems theory and its impact on the study of organisations as interdependent systems, the definition of functions and analysis of a structure in relation to its environment highlighted the importance of contingency theory in organisational sociological research.

Furthermore, Sisaye (1998) argued that classical organisation theory has its foundation in the functional approach developed in sociological research. He added that the functional theory of sociology and the traditional management accounting model are conceptually similar in their definition of organisations as rational purposive social systems. These arguments support the view that control systems achieve congruence between employees' behaviour and management goals. The contingency approach assumes that CMIS are adopted in order to assist managers in achieving some desired organisation outcomes or goals. Haldma and Laats (2002) argued that if a CMIS is found to be appropriate, then it is likely to provide enhanced information to the individuals who then can take improved decisions and thus achieve the organisational goals in a better way.

Moreover, the functional view of organisations provided the underlying principles for the traditional management accounting framework. Sisaye (1998) supported the idea that this approach assumed that organisational members are self-interested and motivated to work hard to achieve their personal goals. They claimed that the objective of control systems is to maximise organisation profitability by institutionalising economic rewards through contractual relationships. CMISs take on functional roles because they facilitate the flow of information in the organisation and guide employees' behaviours to be consistent with management goals.

Moreover, Burrell and Morgan (1979) claimed that contingency theory is sociological functionalism and it is similar to biological functionalism, which explains the way the organs of the human body are structured to contribute to human well-being. Sociological functionalism – in the same way - explains social structures by their functions, which are their contributions to the well-being of society. Pennings (1992) argued that the organisational sociological branch of functionalism assumes that organisational structures are shaped to provide for effective functioning by the organisation. Donaldson (1996) explained variations in organisational structures by functioning effectively in its situation. The structure fits the contingency, which in turn fits the environment. Thus fit is the underlying key. Organisations move into fit by adjusting their structure to their contingencies and this produces the observed association between contingency and structure. Donaldson (1996) added that the emphasis on the adaptation by the organisation to its environment makes structural contingency theory part of adaptive functionalism. Reference to interests brings in the way each manager and their group win or lose according to which decision option is taken up. This focus on the consequences for each individual differs from functionalism, where the focus is on the benefit to the organisation as a whole. Donaldson (1996) and Child (1972; 1984) claimed that the strategic choice formulation retains some degree of functionalism, modifying it to incorporate a recognition of human choices. Furthermore, Donaldson (1996) argued that in the case of Bourgeois (1984) there is a similarity with the idea of free choice for managers and the central assumption that top managers are free to choose among a wide range of alternatives.

Donaldson (1996) argued that organisational structure and its changes are seen as results of functional adaptation. Furthermore, the managers of the organisation are seen as making organisational structural decisions that are in the interests of the organisation to

increase its effectiveness. Thus, it is a theory of a functionalist in sociological terms and positivist type.

2.4 Conclusions from this Chapter

The organisation as a system operates in a legislatively controlled environment that includes inputs (such as raw material, labour, management and finance), and outputs (in terms of products). The research sought to identify an organisation as both a closed and an open system. It is a closed system to achieve its own goals efficiently and optimistically. In addition, it is an open system because of its links with the environment that imports its factors (raw material, labour, management, finance, and technology) and exports its products. Furthermore, the organisation works according to the laws and legislative structures in its environment. Every organisation adopts and adapts its structure (which is its CMIS, in this research) depending on the circumstances which it faces. Organisational adaptation occurs through a series of managerial decisions. Top decision-makers serve as the primary link between the organisation and its environment. Managers are sometimes in a position not only to adjust organisation structure and process when necessary but also to attempt to manipulate the environment itself in order to bring it into conformity with what the organisation is already doing.

In terms of the contingency approach, the research analyses the effects of environmental conditions, which are the contingent variables, on CMISs in the organisation. Each organisation – as an open system - adapts its CMIS depending on the managers' perceptions of competition intensity and unpredictability of environmental conditions. Therefore, it could be useful to use contingency theory to explain the existing differences between organisations. However, contingency theory has two main problems, which are related to summing the effects of variables in a research model and to the issue of reaching a state of equilibrium. Therefore, this research employs neo-contingency theory to deal with those two particular problems. Multiple regression analysis is employed to deal with the first problem. To deal with the second problem, a possible solution is to classify organisations depending on the degree of their reaction or pro-action using Miles and Snow's (1978) typology for strategic postures as a moderating variable. The assumption here is that organisations in the same category face the same environmental conditions. Managers serve as the link between the organisation and its environment. Therefore, perceptions of managers of environmental

conditions were considered as measure of environmental conditions, as will be illustrated in Chapter Four.

From managers' decisions and organisation strategy for responding to the perspectives of environmental conditions, it can be inferred that organisations that operate in the same environmental conditions have different responses. Due to the empirical needs of this research, a sample of numerous organisations, containing several sub-samples, was classified based on the (conditional) moderating variables. Business strategic posture is one of the moderating variables considered in this research. Miles and Snow's typology: Defender, Prospector, Analyser and Reactor Strategies, helps define behaviour according to which most existing forms of organisations can be categorised. The existence of these archetypes supports the choice of the framework of contingencies, which may be taken into account in CMISs (every organisation adapts its CMIS depending on the circumstances, which it faces).

This chapter discussed the methodological issues related to the research problem and using the neo-contingency as a theoretical framework. This included the ontology, the epistemology and the research paradigm adopted. The next chapter will study CMIS with its three purposes: Efficiency, Optimisation and Strategy as the other part of the theoretical framework chosen.

Chapter Three

Developing the Theoretical Framework; Cost Management Information System

3.0 Introduction

Chapter Two presented the appropriate theoretical framework related to perspectives of organisations. This framework contained three dimensions. The first dimension was related to system theory. An organisation is a system, which works in and deals with the environment. The second one was a contingency approach. The effects of environmental conditions on CMISs in organisations have to be studied as contingent variables. The third dimension was managers' decisions and organisation strategy for responding to environmental conditions. This chapter represents the other part of the theoretical framework in this research, which is related to cost management information systems. Furthermore, Chapter Two highlighted the justification of adopting neo-contingency theory as a theoretical framework by adding the methodological issues related to it.

Moreover, in today's highly competitive environment, cost management has become a critical survival skill for many organisations. It is not sufficient, though, simply to reduce costs; instead, costs must be managed. Cooper (1996) believed that the growing importance of cost management is changing significantly the practice of management accounting. He supported this claim by pointing out five cost management techniques, used to provide appropriate cost information to managers to face the new challenges in the environment conducting a normative approach. He identified these techniques as activity based costing, treatment protocols, target costing, kaizen costing and harnessing the entrepreneurial spirit. This study relates to cost management information systems as a part of management accounting systems in organisations. The discussion in management literature regarding the scope of cost management within organisations has been centred on three purposes: efficiency, optimisation and strategy (Al-Hazmi, 1995).

The purpose of this chapter is to review the literature related to CMIS, its role in management control systems in organisations and its three purposes. Accordingly, this chapter is divided into seven sections. The first section contains an answer to the question "what is a cost management information system?" and outlines its three purposes. Section two discusses the efficiency purpose and reviews some techniques

described in the literature. Section three reviews the optimisation purpose and the related issues. The fourth section includes issues related to strategic purpose in CMIS and the fifth highlights the limitations of the literature. Section six presents justification for studying the distinction between policies and practices of CMIS. The last section highlights two studies related to this research.

3.1 What is CMIS and what are its Three Purposes?

As it was illustrated in section 2.1, it could be concluded that the organisation is a coalition having goals. Chenhall (2003) argued that CMIS helps the participants of organisations to achieve these goals. Berry et al. (1995) argued that, while it would be too limiting to believe that any organisation had only one purpose or, indeed, that the only purposes of members of organisations were those of the dominant coalition, it is a helpful notion to regard organisations as purposive. In that sense, they suggested that control includes both problems of regulating the process of the formulation of purpose, and of regulating the processes of purpose achievement. They claimed that management accounting focuses mainly on the implementation of plans. Therefore, Berry et al. (1991), Marginson (1999) and Chenhall (2003) argued that a management control system is functionalist in nature, since it focuses on those activities or practices of management which are necessary for the organisation. Chenhall (2003) added that the appropriate design of CMIS will be influenced by the context within which they operate - as suggested by the contingency approach. Otley (1980), Dent (1990), Samson et al. (1991), Simons (1987, 1990), Kald et al. (2000) and Langfield-Smith (1997) suggested that a CMIS (as a part of control system) should be tailored explicitly to support the strategy of the business to lead to competitive advantage and superior performance.

The term Cost Management Information Systems (CMIS) is related to other terms like cost accounting system, management accounting system, and control system. This section is divided into two sub-sections. The first sub-section contains a description of the relationships between these terms to clarify the nature which of the CMIS. The second sub-section discusses the three purposes of CMIS.

3.1.1 Relationships between CMIS and other Terms

Shillinglaw (1982) argued that cost accounting developed in response to the need for precise measures which could be used in applying the principles of scientific management to control organisations costs. However, management accounting

developed as it became recognised that accounting information could be more widely used in managerial planning and control, which needed specific orientations for such uses. Hence, cost accounting systems, which are concerned with identifying the most accurate costs as possible, are a part of management accounting systems.

Horngren (1995) argued that the cost accountant's main mission might have been represented as the pursuit of absolute truth, where truth was defined in terms of getting as accurate or precise costs as possible. However, management accounting is concerned with 'different costs for different purposes', which highlights a preoccupation with finding conditional truth. Hence, cost accounting systems aim to estimate the most accurate cost figures possible and management accounting systems use these figures in different ways for different purposes.

It could be said that the appearance of management accounting came with the acceptance of the view that accounting information should be appropriate for the needs of users. In particular, it was recognised that a single concept of cost could not be appropriate for all purposes. The phrase 'different costs for different purposes' became fundamental for management accounting in general. Scapens (1984) argued that in developing management accounting's concepts and techniques, researchers had to identify the information needed by managers.

Chenhall (2003) claimed that the definition of CMIS has evolved over the years from one focusing on the provision of more formal, financially quantifiable information to assist managerial decision-making, to one that embraces a much broader scope of information. This includes external information related to markets, customers, competitors, non-financial information related to production process, predictive information and a broad array of decision support mechanisms, and informal personal and social controls. Management accounting systems use the information from both CMIS and other systems. Therefore, it could be argued that CMIS is only one source of information to management accounting systems. It could be concluded from the above that CMIS is a subsystem of management accounting systems in organisations. The debate –in this study- concentrates on CMIS as one source of information for management accounting system in organisations.

Otley (1984) claimed that management accounting could be understood only in the context of its organisational use. This approach has its roots in the work of Anthony (1965). This approach recognised that management accounting was related to the

practice of management. Furthermore, Chenhall (2003) argued that a control system is a broader term that encompasses management accounting systems and also includes other controls such as personal or clan controls. Ouchi (1979) and Flamholtz et al. (1985) claimed that, however, the essence of management control is about gaining the co-operation of individuals who may share only partially congruent objectives and channelling those efforts towards a specified set of organisational goals. Furthermore, Horngren (1995) claimed that the CMIS has two simultaneous missions: (1) transmission of information to help reach wise economic decisions, (2) motivation of users to aim and strive for organisational goals. Thus, CMIS is a part of the control system in organisations.

3.1.2 Three Purposes for CMIS

Cooper and Slagmulder (1998b and 1998d) claimed that two distinctive models lay at the heart of an organisation CMIS. The first one of these models deals with operational improvement; its aim is to help an organisation become more efficient and optimal. The other model is strategic management; its objective is to help identify the organisation's source of profitability. Furthermore, these two models demand very different types of cost information.

Johnson and Scholes (1997) argued that the tasks of achieving efficiency and optimisation are very important and they are what managers are involved in most of their time. They are vital to the optimal implementation of strategy, but this is not the same as strategic management. Langfield-Smith (1997) argued that operational management address how the various functions of the organisations contribute to the particular organisation strategy.

Mintzberg (1988), Anthony (1988), Pearce and Robinson (1991), and Stahl and Grigsby (1991) named operational tasks as tactics. They argued that strategy is related to the larger picture or the important things, whereas tactics are more concerned with the means to achieving the strategy. Tactics tend to be more concerned with matters pertaining to efficiency and optimisation. Porter (1996) argued that the tactics / strategy distinction is not always clear. He explained that one person's strategies could be another's tactics. Furthermore, Guilding, et al. (2000) claimed that when the time dimension is introduced, a tactical decision taken today turns out to be a source of strategic advantage tomorrow. He added that the arbitrariness associated with classifying a managerial decision as strategic becomes particularly apparent. Chandler

(1962), Zabriskie and Huellmantel (1991) and Cooper and Slagmulder (1999) described strategy as the determination of the basic long-term goals and objectives of an organisation and the adoption of courses of action and the allocation of resources necessary for carrying out these goals. However, they added that operational activities are concerned with managing resources already invested in today's markets.

Thompson (1967) suggested three major themes in this domain of CMIS: firstly, the establishment of purpose; secondly, the pursuit of optimisation; and thirdly, the struggle for efficiency. Horngren et al. (1999) defined efficiency as concerned with achieving a given level of result with a minimum use of resources. Thus, efficiency measures include that we have a means of determining the minimum resources necessary to produce a given effect or the maximum output that should be derived from a given level of resources. It is the relationship of outputs to given sets of inputs. In CMIS, efficiency gains might occur if either the value of the output rises per unit of input, or the cost of the inputs fall per unit of output. Horngren et al. (1999) argued that the efficiency variance is valid only for variable costs.

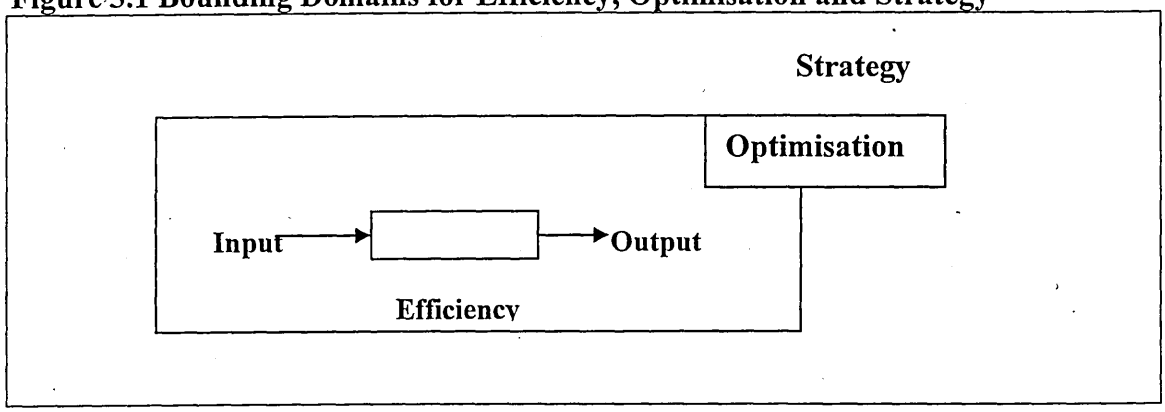
Drury (2000) argued that optimisation is concerned with the attainment of purposes; an action being optimal if it achieves what it was intended to achieve. It is related to the match between internal issues of organisations and their external environment. He added that efficiency is often confused with optimisation or effectiveness. An action may be effective, but inefficient in that the result could have been achieved with fewer resources. Conversely, actions can be efficient but not effective. He pointed out, as an example, that output may be produced efficiently at minimum cost, but this is ineffective if demand is depressed so that the output must be sold below cost.

The establishment of purposes is the core of strategic CMIS. It is related to the patterns of activity and resource allocation within the organisation. These purposes are not stable over long periods of time. They may be formulated in ways, which are contingent upon changes, both internal and external to an organisation. Therefore, Cooper and Slagumlder (1998a) pointed out that strategic cost information must be offered to individuals to help them identify the organisation's major sources of profitability in its wide meaning. The focus is "on the organisation's product markets and competitors' costs and cost structures and the monitoring of the organisation's strategies and those of its competitors in these markets over a number of periods" (Bromwich, 1990, p: 28). Accordingly, strategic CMIS is providing information to individuals to adopt a more

strategic perspective by reporting information relating to an organisation's markets and its competitors.

Berry et al (1995) suggested three boundaries as illustrated in Figure 3.1. The first one is related to achieving goals, which is optimisation. The second one is related to the relationship between outputs and inputs, which is efficiency and it is inside the first boundary. The third one is related to establishing strategy purpose and it is unbounded, because of being always changeable. It could be argued that efficiency is related to the internal domain in organisations, while optimisation is related to the domain between the internal issues of organisations and its external environment, and the major feature of strategic cost management is its external emphasis.

Figure 3.1 Bounding Domains for Efficiency, Optimisation and Strategy



Source: Berry, et al. (1995), p: 6

The next three sections develop the literature related to the three purposes and CMIS techniques to achieve them.

3.2 CMIS for Efficiency Purpose

Ezzamel, et al. (1994) stated that organisations are focusing on improving the technical capabilities of their CMIS in order to improve costing calculations and therefore improve their efficiency. Estimation models are used to account and control costing products including loop of budgeting, reporting process and standards costing. Al-Hazmi (1995) claimed that cost accounting research has been concentrated on two broad areas: (1) the study of the origin and development of cost accounting (e.g. Johnson and Kaplan, 1987; Ahmed, 1992) including the criticisms towards cost accounting techniques; (2) the study of modern cost methods and techniques such as ABC (Johnson, 1988; Cooper, 1988; Jeans & Morrow, 1989; Noreen, 1991; Johnson, 1990;

Innes & Mitchell, 1990; Christensen & Demski, 1995; Bjornenak & Olson, 1999; Bjornenak & Mitchell, 2000; Malmi, 1999; Innes, et al., 2000). Accordingly, this section reviews the literature relating to both areas through the following two sub-sections.

3.2.1 Criticisms towards Cost Accounting Techniques

Kaplan (1983; 1984) and Johnson and Kaplan (1987) claimed that within the last decade, cost accounting practices have been criticised for not meeting the challenges of modern technologies and the economic environment. Competition, deregulation of economies and changes in manufacturing technology create pressure on organisations to enhance their competitive positions. These changes have caused a major shift in the cost structures of many organisations. In the manufacturing sector, direct labour costs have given way to increasing overhead costs.

Moreover, Johnson and Kaplan (1987) argued that at least until about 1925, cost management rationally evolved in response to environmental changes. Since 1925, management accounting practice has stagnated and earlier concerns with providing information for managers have been replaced with the need to provide valuation of inventory and cost of sales for external reports. They criticised the literature of management accounting and revealed many drawbacks. One of these is an emphasis on managing results rather than process (Ezzamel, 1994; Ezzamel, et al., 1997). Dent (1990) provided an example that short-term budgetary pressure had discouraged investments in product quality, in manufacturing flexibility, and in productivity. More specifically, accounting "mistakes" are said to have led managers to make inappropriate product introduction and source decisions (Johnson and Kaplan, 1987). They added that the information reported by existing CMIS not only inhibited good decision-making by managers, it might actually have encouraged bad decisions. In addition, they accused traditional CMIS as having led to a loss of relevance of cost management to the decision-making that management must deal with.

Johnson (1992) claimed that improper use of accounting information to manage an organisation's activities is one of the criticisms towards cost accounting. Bromwich & Bhimani (1989) supported this point by indicating that the supposed subservience of management accounting to external financial accounting requirements. Accountants' time is spent following the requirements of the monthly reporting manual, generating reports that often obtain little attention at executive or board meetings, and the

requirements of budgeting and capital appraisal manuals. Therefore, with these regular burdens, many practising accountants have little time for working closely with managers, devising new systems, reforming existing systems or even thinking critically about accounting issues. However, Kaplan (1988) argued that management accounting considerations dominated integrated accounting systems, with financial accounting requirements being met by end of period adjustments. This hypothetical acceptance of management accounting in financial accounting includes a major shortcoming of management in its willingness to continue to use redundant systems for relatively trivial reasons. Johnson and Kaplan (1987) in their book, 'Relevance Lost; the Rise and Fall of Management Accounting' supported this argument. They claimed that the existing systems worked well for the financial accounting function. They allocated production costs to products, they provided inventory valuations and cost of goods sold, and all these procedures were correct in aggregating but they did not serve managerial purposes. They added that their main complaint was that managers were using the same figures to make important decisions for which the data were unsuitable. Johnson and Kaplan (1987, p: 1) said:

> *"Today's management accounting information, driven by the procedures and the cycle of the organisation's financial reporting system, is too late, too aggregated and too distorted to be relevant for managers' planning and control decisions."*

Management accounting was based on the realities of the 1920's, e.g. focused on labour costs, the cost of production and treated the factory as an isolated entity (Scapens, 1984). The reliance of management accounting on redundant assumptions concerned direct labour and components produced within the organisation, rather than overheads and bought in components. Johnson and Kaplan (1987) claimed that there are three areas that are addressed by traditional cost accounting. They are financial reporting, operational control and product costing. They argued that the traditional methods are fine for external financial reporting but have no relevance at all for operational control and product costing. Therefore, for product costing, they claimed that the distortions introduced by traditional costing systems mean that most organisations really do not know what their products cost to make. Therefore, Johnson and Kaplan (1987) and many other authors (e.g. Cooper, 1990a; 1990b; 1990c; 1991; Cooper & Kaplan, 1991a, 1991b; 1992; Johnson, 1992; Innes & Mitchell, 1990; 1991; 1997) have advocated Activity Based Costing (ABC) as a useful cost management tool with wide potential

both theoretically and practically. This has been supported by a huge number of conference activities, publications in professional and academic journals and by consultants advocating its use.

The next sub-section introduces techniques of product costing and control in organisations to attain efficiency with more focus on activity-based costing and its importance in accounting literature.

3.2.2 Techniques to Achieve Efficiency

Horngren (1995) claimed that Activity-Based Costing (ABC) has become the most popular way since late 1980s to achieve organisational goals. Furthermore, Johnson (1990) described ABC as one of the most important management accounting theories in the twentieth century. Therefore this sub-section will introduce the cost of product generally and ABC especially.

3.2.2.1 The Basis of Activity Based Costing (ABC)

The fundamental assumption on which ABC is based is the notion that activities cause costs. Therefore, ABC systems focus on the activities, which are performed to produce products, and on each product's consumption of the activities. The benefit from identifying or recognising the causality of cost is seen to be very important to managers. Controlling cost has been an important objective for cost accounting systems. It highlights to the managers the areas that they should focus their attention on. The main theme of ABC is to measure the costs of doing the activities; hence activities are the units of measuring. Cooper (1990 d) argued that this focus allows managers to ask if they can perform an activity more efficiently by changing the production process, by acquiring new technologies or by changing price strategy. In addition they can consider if they can perform an activity less frequently by changing product design or customer, or product mix.

Moreover the analysis by activity (some authors such as Osternga, 1990, name this analysis: Process Value Analysis (PVA)) allows management to assess the pattern of resource consumption in terms of how the resources have been used by the products. It focuses on meeting customer requirements, minimising cost and cycle time and improving the quality of output. Cooper and Slagmulder (1998c) claimed that it links activities to the events, circumstances or conditions that create or "drive" the need for the activity and the resources consumed. Accordingly, most support costs do not vary

directly with unit volume, e.g. direct labour or direct material. However, they vary in direct proportion with their cost driver (Ostrenga, 1990; Ahmed & Scapens, 1991). This analysis facilitates the segregation of activities (and their costs) into value added and non-value added components. These cost drivers are targeted for elimination/minimisation if they belong to non-value added activities and optimisation if they belong to value added activities. The non-value added activities are those activities, which do not contribute to the final product, or to the future economic benefit in the organisation.

Moreover, Turney (1992) argued that the ABC model has two dimensions: a costing dimension and a process dimension. The cost dimension contains cost information about resources, activities and cost objects. It identifies the significant activities of an organisation and attaches costs to them. It also assigns costs to cost objects that use the activities. Turney (1992) claimed that it supports economic evaluations of the strategy and operations of an organisation. He showed that knowing the cost of activities makes it easier to understand why resources are used: The process dimension contains performance information about the work done in the organisation. Turney (1992) defined a process, as a series of activities, which are linked to perform a specific goal. In other words, activities are all parts of a "customer chain". He claimed that this information supports judgements that how well a task is performed.

This line of analysis is valuable as a way of indicating the efficiencies and /or inefficiencies in operations. In this sense, it can be said that ABC is based upon economic rationality which decision-makers aim at (as illustrated in Chapter One). Its advocators claim that ABC, being based upon economic rationality, is a potentially helpful tool for decision-making.

Many authors have suggested that ABC systems can produce information in managing process control by dividing the activities into value added and non-value added (e.g., Johnson, 1988; Ostrenga, 1990; Turney, 1991; Kaplan, 1995). Process control managers are responsible for costs and their generation within their process area. Setting cost plan for a process centre from a corporate /plant level will not help the process manager correct a problem or know more about his process area. However, Full Absorption Costing (FAC) systems allocate costs which are non-controllable to the department that produces them. At the process level, managers should only be informed about and be held responsible for controllable costs.

Managers should have a CMIS which provides them with "timely" and "accurate" cost information to plan, control and monitor the cost of that process centre. Cooper and Slagmulder (1998d) added another important property of cost information, which is "specific in focus". The actual consumption of resources by the responsible individual should be captured. Information should also be timely, Cooper and Slagmulder (1998d) explained the term of "*timeliness*" as meaning that the information is received after the activity has been performed. Timeliness is important because if the cost information is too early or too late, then improvement will not occur optimally. Feedback that is too early leads to cost information that does not enable an individual easily to detect the outcomes of any actions that have been performed. Similarly, if the feedback is too late, then the individual will have to be careful about making only a single change per feedback period, or the effects of multiple changes will be compounded.

Additionally, Cooper and Slagmulder (1998d) argued that a high level of accuracy is required because any significant level of measurement error will make it impossible for individuals to identify their contribution to overall organisation performance. If the measurements are not sufficiently accurate, it will be difficult to motivate performance improvements, in terms of more efficiency and optimisation; because there is no way that individuals can differentiate between a real change in performance and an error in the measurement process.

Consequently, a specific focus to the feedback is required if individual contributions to changes in performance are to be identified. If the focus is not sufficiently specific, only combined improvements will be measured.

The next sub-section discusses the main differences between the estimation model in Full Absorption Costing (FAC), which most organisations use, and ABC.

3.2.2.2 The Main Differences between the Nature of the Model in the FAC and ABC Systems

FACs focuses on the product in the costing process. Costs are traced to the product because each product is assumed to consume specific resources (Cooper 1988). Therefore these systems classify the costs according to their relationship to the final product into fixed and variable costs, direct and indirect cost. These systems are interested in describing this relationship, without any explanation of the causes of these costs. Hence, it is argued that the FAC model is a descriptive model of what occurred in the last period of time.

In contrast to FAC systems, ABC systems focus on the activities in the costing process. Costs are traced from activities to products based on the product's demand for these activities during the production process. The allocation bases used in ABC are the measures of the activities performed. These bases are defined by cost drivers and might be expressed in terms of hours of set-up time or number of times handled. The cost driver is considered the root cause of a cost. Therefore, the cost driver provides the explanation of why costs in an activity cost pool change overtime (Cooper & Kaplan, 1992).

For cost accounting and control, ABC differs from FAC in its treatment of non-volume related overhead costs. Many significant overheads are related to specific activities, which are relatively independent of production volumes on such activities (not the volume of production) which consume resources.

Moreover, two major points were made by Scapens (1991): (1) ABC and FAC move away from the notions of short-term fixed and variable costs, which are an important feature of management accounting's conventional wisdom, and focus on the variability of cost in the longer term. (2) ABC and FAC propose hierarchical resource consumption-costing models, which are shared at one level, will be variable at a higher level.

The following are potential benefits of allocating this type of overheads according to the cost driver (Innes & Mitchell, 1990):

1. It provides a set of activity volume based on non-financial measures of performance, which can provide useful routine feedback on process efficiency.
2. It helps in the identification of activities, which are non-value added or waste resources.
3. It provides indications to operational level management of how non-volume related overhead costs behave and can therefore be influenced and reduced.
4. It provides a basis for constructing flexible budgets and more meaningful variance analysis. Through Activity Based Budgets (ABB), the overhead budget is oriented towards resource use and in this way it facilitates and emphasises the need to justify resource acquisition and consumption. In terms of control information feedback, the ABB approach also contrasts with the input-based cost reports, which are involvedin more conventional budgetary control systems. Variance information will be

produced for each activity and so responsibility and cause should be identifiable. (Cooper & Kaplan 1992).

Moreover, Johnson and Kaplan (1987) argued that when attempting to provide quick feedback to responsibility centre managers, the process control information should be reported upon the activities which are directly under the control of managers, outputs produced and resources consumed within the responsibility centres. FAC cannot identify the cost of each activity; instead it uses standard costing, budgets, variance reporting and other tools to perform the process control.

In theory, it is possible to trace all overheads, but in practice, it is quite difficult to trace some overhead costs such as head office administrative costs or joint cost to individual products, and hence there is still some room for arbitrary cost allocation. For example, Scapens (1991) described an allocation problem where there might be a temptation to terminate production of individual products when their joint production is still worthwhile. In addition, the ABC model has been criticised for being based on the simple economic analysis which underlies management accounting's conventional wisdom, and on the assumption that there is a sense of harmony and co-operation among operating units and between operating units and service functions. It does not acknowledge the possibility of conflict over the allocation process (Ahmed & Scapens, 1991; Gietzmann, 1991; Brignall et al., 1991; Bhimani & Pigott, 1992).

In practice, Innes and Mitchell (1991) stated that there is a need to follow up the respondents' claims on the beneficial impact of ABC on their organisations through case studies which permit a more direct and detailed investigation of the full (positive and negative) effects of ABC. Therefore, they conducted research on this issue, as reported in the next sub-section.

3.2.2.3 Organisations that Rejected ABC after Implementation

ABC was introduced as a useful management accounting tool with wide potential both theoretically and practically. Furthermore, this has been supported by huge body of conference activity, bypublications in professional and academic journals and by consultants advocating its use. In spite of this promising appeal, surveys record that its adoption has proceeded at a fairly slow rate not only in the UK, but also in overseas organisations. Several surveys have examined the adoption of ABC in organisations in the US and report a range of results. For example, Green and Amenkhienan (1992)

stated that 45% of responding manufacturing firms using advanced technologies had implemented ABC to some degree in their firms. Shim and Sudit (1995) stated that 27% of the manufacturing firms surveyed had fully or partially implemented ABC. Drury et al. (1993) found that 36% of responding US firms had implemented ABC and a 1995 survey by the same group (Cost Management Group of the Institute of Management Accountants, 1996) showed that the percentage of ABC adopters had increased to 41%.

In the UK, Innes and Mitchell's (1991) research on the implementation and use of ABC systems reveals that only 6% of surveyed UK firms had begun to implement ABC by 1990. Furthermore, Drury and Tayles (1995; 2000) reported that 13% of UK manufacturing firms had adopted ABC by 1991 and so they found somewhat higher rates of adoption.

Moreover, Cobb et al. (1992) undertook thirty telephone interviews with organisations which had been considering the use of ABC one year previously (the organisations being identified from a CIMA survey in 1990). Moreover, they visited two organisations which had rejected ABC after implementing it and ten who were continuing to use it. This study concentrated on the problems the organisations had experienced in assessing or implementing ABC both for product costing and increasingly for cost management. The results of this study were as follows:

Of the thirty organisations involved in telephone interviews, twenty were still considering using ABC. Cobb, Innes and Mitchell (1992) showed that consultants were involved with twelve of the seventeen organisations implementing ABC (seven telephone interviews and ten visits). They added that during the first year of implementing ABC, the most common problem was the amount of time spent on it by both the accountants and the computer staff. During this implementation of ABC, technical problems were experienced including the choice of activities; the selection of cost drivers, the linking of cost drivers with individual product lines and the uncertainty and effects of using ABC for stock valuation.

Cobb, Innes and Mitchell (1992) argued that although the ABC systems were relatively simple (with usually fewer than thirty cost drivers), after the initial implementation stage several organisational and re-sourcing problems hindered effective operation of the system. They identified five significant problems as follows:

1. The amount of work involved.

2. Accurate data collection.
3. Activities crossing departmental boundaries (making cost management difficult).
4. ABC being neglected as other changes within the organisation were given a higher priority.
5. A great deal of accountants' time required not simply in gathering or processing data but also in interpreting the results.[1]

The next sub-section discusses other ways of using CMIS to increase efficiency which are discussed in the literature.

3.2.2.4 Other Techniques of CMIS to Increase Efficiency

The control of efficiency using budgeting and reporting process, and standard costing leads to the emphasis given to the calculation and analysis of variances. However, managers are more interested in interpretation and meaning of these variance reports rather than the raw data of these reports. This emphasis on managing the output of activities and the control of results leads to the importance of standard costing in describing only what was/is within the organisation. Standard costing systems are widely used because they provide cost data for many different purposes, such as assisting in setting budgets, simplifying the task of inventory valuation, predicting future costs for use in decision-making, and providing data for cost control and performance appraisal.

However, the problem with ignoring external environments is that organisations, costs have to be compared with the cost structures of competitors. Consequently, some revisions have to be made, for example, price increase or decrease, product and process re-designing and volume assumptions. Al-Hazmi and Berry (1994) discussed the two ways of pursuing efficiency (internal and external views) in relation to CMIS. This discussion refocuses attention on deriving criteria for making decision regarding standard setting and establishing the cost of any product or process which is a reflection of the market place.

One of the techniques which have been discussed in the literature to increase efficiency and take account of external market factors is Target Costing, which is widely used by Japanese organisations (Tani et al., 1994; Kato, 1993; Yoshikawa et al., 1993). Target costing is driven by external market factors. A target market price is determined by

[1] Piper and Walley (1992) discussed some of these difficulties.

marketing management prior to designing and introducing a new product. This target price is set at a level that will permit the organisation to achieve a desired market share and sales volume. A desired profit margin is then deducted to determine the target maximum allowable product cost.

Bromwich and Bhimani (1994) identified two major difficulties associated with target costing. The first one is to decide on the tightness of the targets in terms of the effort required to obtain the target. The second problem is that of deciding at which level of the product hierarchy target costing should be applied in an environment of high product variety.

Yoshikawa et al. (1993) claimed that Japanese organisations use functional analysis as a tool for target costing. Their aim is to determine the functions of the product and indicate how far the design of these functions will satisfy the consumer (according to market research) and at what cost relative to that part of the target cost allocated to that function. This allows the variance between the target cost per function and its current cost to be calculated.

To determine the target profit according to Kato (1993), in Japan total target profit is based on the medium-term profit plans which reflect management and business strategies over profit for each product which will be on the market during the period. The target cost can then be determined by deducting the target profit from the target-selling price. Thus, target cost is determined primarily from market data. Product costs are computed based on design specifications and compared with target cost. If the projected product cost is above the target cost, then product designers focus on modifying the design of the product so that the target cost can be achieved over a period of roughly 12 - 14 months. A team of designers, engineers, marketing and production personnel, together with the management accountant, concentrate on producing a product that meets the target cost requirement. Drury (2000) claimed that target costing has its greatest impact at the design stage because a large percentage of a product's life cycle costs are determined by decisions made early in its life cycle. However, target costing can be also applied to cost reduction exercises for all products throughout their entire life cycle. Hence, over the life of the product the target cost should be continuously reviewed and reduced as part of a continuous improvement process.

In target costing, cost tables provide cost data for new products, or for evaluating changes to existing products. Cost tables are simply databases of all the costs of

producing a product, either for product functions or product components, based on a large variety of assumptions. They provide information on the impact of product costs from using different input resources, manufacturing processes and design specifications. Thus, they enable answers to be quickly provided to "what if?" questions relating to decisions to change any aspect of the product. Such tables may well include simple mathematical versions of cost functions, which, for example, show how changes in the material components of products will alter cost. Thus, Bromwich and Bhimani (1994) claimed that a cost table would show a variety of cost performances when using different types of materials for a given component. According to Yoshikowa et al. (1993) there is a cost table for each part of the product's life cycle.

Hence, from the stated techniques and other techniques, it could be said that there are many techniques, which professionals and consultants are advocating as tools for achieving efficiency in organisations. The next section introduces literature and studies related to the optimisation purpose concentrating on ABC, theory of constraints and throughput accounting.

3.3 CMIS; Optimisation Purpose

The neo-classical economic framework has been widely used, in the academic literature, by accounting researchers to analyse management accounting problems (Scapens, 1991; Ahmed, 1992). In this economic framework, the decision-makers were assumed to have available, at no cost and with no uncertainty, all information needed to completely structure any decision and to arrive at a profit maximising solution. In addition, decision-makers in the neo-classical economic framework were presumed to act rationally and possess the knowledge required to use any of the economic mathematical techniques. Most of the current management accounting textbooks describe these as a set of quantitative mathematical techniques modelling an identified decision-maker's problem (see for example, Drury, 2000). Such techniques include: cost-volume- profit analysis, optimal product mixes using linear programming, statistical regression techniques for classifying costs into their fixed and variable elements, the use of shadow prices from the output of a linear programming model to compute variances in term of opportunity losses and statistical variances investigation models.

In the literature, some academics (for example, Demski & Kreps, 1982; Gietzmann, 1991; Williams et al., 1995) have supported particular models for optimisation of

activity and product mix using, for example, Linear Programming (LP). The LP model was developed in the early 1960s on the basis of marginal economic analysis (marginal revenue and marginal costs) and on the assumption that decision-makers are profit maximers. Assuming that technology, logistic system, raw material, production and distribution arrangements, organisational and market arrangements are given over the relevant time period, then, marginal economic analysis is seen as an optimal feature of management accounting wisdom for the evaluation of short and medium-term decisions. Gietzmann (1991) claimed that the LP model is only utilised in a limited number of industries, for example, in divergent process such as oil refining.

A sizeable literature concerning the use of the LP model suggested a number of reasons why the LP model is not widely used. For example, Gietzmann (1991) provided three reasons: sketchy and unstructured information, uncertainty of the variable, and using simulation analysis rather than optimisation analysis.

In the next two sub-sections, there are reviews of two examples of models, which are found in the literature in relation to the optimisation purpose.

3.3.1 ABC and Optimisation Purpose

A review of the literature shows that some authors classified the ABC system as a "transaction cost approach" (e.g. Ahmed, 1992; Kain & Rosenzweig, 1992; Kaplan, 1994a; Johnson & Kaplan, 1987). A transaction cost approach assumes that all individuals are opportunistic in their behaviour. Nevertheless, it assumes that individuals do not have unlimited ability in considering decisions (have full rationality). Rather, while all individuals seek to maximise their expected utility, their ability to do so is limited by their capacity to acquire and process information (bounded rationality) (Ahmed, 1992). Therefore, the relevance of cost information to decision-making is a key element in the profit-maximisation debate in the classical economic theory of the organisation. It can be monitored to assist decision-makers in identifying short-run and long-run profit maximising equilibrium. This use of cost information assumes, firstly, the practicability of accurately tracing resource consumption to the final product and secondly, the incorporation of the opportunity cost incurred by the commitment of these resources.

Cooper (1988), Cooper and Kaplan (1988) and Cooper and Kaplan (1991a) introduced ABC as a useful guide to achieving higher profit by revealing links between activities

and resource consumption. They showed that managers should separate the expenses incurred to produce individual units of a particular product from the other expenses needed to produce different products or to serve customers. Then managers should explore ways to reduce the resources required to perform various activities. Thereafter, they can transform those reductions into profits; by either reducing spending on those resources or increasing the output those resources produce. Then, they should achieve efficiency, which leads in turn to optimisation. The actions allow the insights from ABC to be translated into increased profits. In this domain, there is another technique similar to ABC which is Activity Based Management (ABM). Trussel and Beyer (1998) argued that ABM is a system that incorporates many of the concepts of strategic management and applies them to cost management.

Cooper and Kaplan (1991a) argued also that managers can use ABC to analyse many other aspects of their organisation's operations, such as brand and customer profitability, as a basis for reducing resource consumption and to recognise that costs are not continuously fixed rather variable. Managers can compare the profits that various customers, product lines, brands, or regions generate. Cooper and Kaplan (1991a) added that managers should take two types of action after an ABC analysis. First, they should attempt to re-price products: raise prices for products that make heavy demands on support resources and lower prices to more competitive levels for the high-volume products that had been subsidising the others. Secondly and more importantly, managers should search for ways to reduce resource consumption. This requires either decreasing the number of times activities are performed for the same output, such as by changing product and customer mix, or reducing the resources consumed to produce and serve the existing mix of products and customers. This might require designing products with fewer and more common parts or customising products at the last possible production stage. It could also seek implementing continuous improvement programmes to enhance quality, reduce set-up times, and improve factory layouts, or adopting information technology to facilitate the processing of batches, products, and customer orders.

Mitchell (1994) argued that using any of the costing systems (including ABC) generates output costs based on the application of the prices of achievement of the estimated resources. Opportunity costs are not usually explicitly captured in output costing systems. However, Zimmerman (1979) suggested that the somewhat arbitrary practices adopted by accountants in allocating fixed costs to products are a means of providing an alternative measure of the opportunity cost of consuming shared resources.

ABC is based on a more realistic model of resource consumption than that present in FAC systems. Its central focus is on the identification of quantities of resource used by activities in order to produce outputs. Mitchell (1994) stated that ABC might therefore better satisfy one of the fundamental motivations hypothesised as a rationale of cost allocation.

3.3.2 Theory of Constraints (TOC) and Throughput Accounting (TA)

TOC ideas were originated in production scheduling. Goldratt and Cox (1984) emphasised the importance of managing 'bottlenecks'. It is related to theOptimised Production Technology (OPT) approach in production management. The OPT approach is based on the principle that profits are expanded by increasing the throughput of the organisation. Consequently, the throughput increases by managing bottlenecks. In later work, Goldratt (1994) expanded this concern from bottlenecks to 'constraints', which are anything that prevent a system from achieving its goal[1]. These constraints might be in markets or organisation policy. The idea is to find the constraints and to relieve them, enabling the organisation to increase the rate at which throughput is produced.

Goldratt and Cox (1993) specified that the goal of organisation is to make money now and in the future. Later, Goldratt (1994) added two goals to this: security and satisfaction for employees and customer satisfaction. He argued that an organisation's ability to achieve its goals depends on the level of throughput that is achieved. Therefore, non-bottleneck sources should be scheduled and operated based on constraints within the system, and should not be used to produce more than the bottlenecks can absorb. Otherwise, this production will increase the inventory. Goldratt (1994) advocated that the performance of the whole organisation is determined by the throughput at its constraints and thus management attention must be focused on this area; improvements elsewhere are illusory, since they will not increase the organisation's overall throughput. Goldratt and Cox (1993) identified five steps to improve throughput through removing the constraints that restrict output. These steps (Goldratt & Cox, 1993, p: 299) are as follows:

Step 1: Identify the system's bottlenecks.

[1] My M.Phil. thesis at the University of Cairo in 1994 was in this domain. Its aim was planning and controlling the costs of maintenance of the equipment using Mont-Carlo simulation model in Naser Organisation for manufacturing cars in Egypt.

Step 2: Decide how to exploit the bottlenecks.

Step 3: Subordinate everything else to the above decision.

Step 4: Elevate the system's bottlenecks.

Step 5: If, in a previous step, a bottleneck has broken go to step1.

Kaplan (1994b) described the TOC approach as a short-run, powerful optimisation procedure based on the assumption that almost all parameters, other than throughput, are fixed. Prices, product mix, customer orders, technology, product designs and even the amount paid to workers are fixed. Therefore, if everything is assumed fixed, maximising throughput (sales less material costs) is the only item left to manage. Dugdale and Jones (1997b) claimed that the reason behind the treatment of labour as a fixed cost in throughput thinking is that, in practice, decisions rarely lead to labour actually being laid off. Efficiency savings usually mean that labour is simply re-deployed.

The TOC approach recognises three critical measurements for organisations. One is throughput, defined as sales price less purchases of materials. It is the rate which the system generates profit through sales. The second measurement is investments (inventory). It is the sum of inventories, research and development costs and the costs of equipment and buildings. These are items that have been purchased, but have not yet been converted to throughput. The third is operating expenses, defined as all organisational expenses, which exist to convert inventory into throughput. To increase profitability, Goldratt and Cox (1993) advocated that managers should aim to increase throughput while simultaneously reducing inventory and operational expenses.

Galloway and Waldron, have a series of articles in *Management Accounting* in 1988 and 1989, advocated throughput accounting to apply the TOC philosophy. They rank the products according to throughput accounting ratio to ascertain the optimum use of the bottleneck activity. Goldratt (1994), however, rejected the use of throughput accounting. He did not advocate any specific accounting practices. Instead, accountants are encouraged to learn TOC ideas and apply them to accounting in a way that suits their own circumstances.

However, Drury (2000) claimed that traditional techniques that have been described in management accounting textbooks, such as linear programming for allocating the

optimum use of bottleneck resources and the use of shadow prices for decision-making and variance analysis, can be viewed as an attempt to apply TOC ideas. He added that applying TOC ideas to accounting does not represent a radical innovation in accounting, but a move towards the widespread adoption of short-run variable costing techniques, which exists in management accounting text books for many years. Hence, the same criticism that has been applied to variable costing can also be made to the application of TOC ideas. That is, all expenses other than direct materials are assumed to be fixed and unavoidable.

From the above stated techniques and ideas, there are many techniques and models, which are advocated by many consultants, and academics who promise organisations that they can achieve optimisation purposes by using them.

3.4 CMIS; Strategy Purpose

Simmonds (1981; 1982; 1985; 1986) saw profits stemming not from internal efficiencies but from the firm's competitive positioning in its market. Simmond's approach saw the strategic CMIS function as providing an assessment of competitor costs, prices and cash flows and the reduction of this information to price-cost-volume figures. Therefore, he argued that management accounting should help the organisation evaluate its competitive position relative to the rest of the industry by collecting data on costs and prices, sales volumes, market share, cash flow and resource availability for its main competitors. Managers require information to protect an organisation's strategic position and determine strategies to improve its future competitiveness. This information could provide advance warning of the need for a change in competitive strategy. Simmonds (1986) pointed out also that by monitoring movements in market share for its major products, an organisation could see whether it is gaining or losing position and an examination of relative market shares will indicate the strength of different competitors. Shank and Govindarajan (1992) and Shank (1989) supported this view. They advocated the adoption of the broader approach of strategic cost management.

Making decisions is closely aligned to strategy. Minkes (1987) argued that a decision involves making a choice where at least addressed two possible courses of action are available. All decisions can be looked at in terms of costs, since the choice of any one option involves sacrificing the next best option.

Moreover, Staubus (1971) argued that decisions must be made on the basis of comparisons of the effects of alternative courses of action on organisations' goals. Most of these decisions involve alternatives that differ with respect to their effects on operating costs only, and others involve both revenue and cost effects. Minkes (1987) identified five steps to make a decision as follows:

- Recognition of the problem.
- Collecting information.
- Developing alternatives.
- Evaluating alternatives.
- Choice.

Every decision has a final purpose. This purpose is to choose an alternative in order to solve the problem. The decision can be achieved by the above five steps. Minkes (1987) argued that this view is very naive but, in reality, managers work in a more limited, practical and pragmatic way, which takes into account the lack of knowledge and an uncertainty about the future. However, decisions may involve many people and departments and optimal action would depend on the ability to bring together the different interests and objectives of these separate individuals and units. Thus, within a decision, there will be a multiple objectives. These objectives may be in harmony or in contrast. Macintosh (1994) suggested that organisations must use a less satisfactory but more appropriate measure of assessment, which is the social test. The basic idea of social tests is that accomplishment and fitness are judged by the collection of opinions and beliefs of one or more relevant group. The problem becomes more difficult when the information is ambiguous and open to different interpretations. Furthermore, making decisions is related to the dilemma of full and bounded rationality, which was discussed before in Chapter Two.

The importance of making decisions increases according to their effects on organisations. As illustrated in sub-section 3.1.2 in this chapter, strategic decisions have long term, wide scope and outside the organisation effects. The next sub-section will concentrate on this kind of decisions.

3.4.1 Characteristics of Strategic Decisions

Johnson and Scholes (1997 p.10) defined a strategy as "The direction and scope of an organisation over the long term: which achieves advantage for the organisation through its configuration of resources within a changing environment, to meet the needs of markets and to fulfil stockholder expectations".

From this definition, there are three main characteristics associated with the words 'strategy' and 'strategic decisions':

1. Strategic decisions are to be concerned with, or affect the long-term direction of an organisation.
2. Strategic decisions are likely to be concerned with a wide scope of activities in the organisation.
3. Strategy should fit the environment in which it operates.

The discussion above is related to strategies and strategic decisions generally. Guilding, et al. (2000) claimed that strategic management accounting has mainly three characteristics: environmental or marketing orientation, focus on competition and a long-term, forward-looking orientation. Furthermore, it could be argued that customer satisfaction could be added as a fourth characteristic.

Simmonds (1986) also stressed the importance of the learning curve as a means of obtaining strategic advantage by forecasting cost reductions and consequently selling price reductions of competitors. He also drew attention to the importance of early experience with a new product as a means of conferring an unbeatable lead over competitors. The leading competitors should be able to reduce their selling price for the product (through the learning curve effect) which should further increase its volume and market share and eventually force some lagging competitors out of the industry.

To gain strategic advantage via its pricing policy, an organisation attempts, using its CMIS to achieve its strategic purpose, to assess each major competitor's cost structure and relate this to their prices. Simmonds (1982) suggested that it might be possible to assess the cost-volume-profit relationship of competitors in order to predict their pricing responses.

One of the main objectives of management is to reduce costs and improve the quality of output. It is important for management to understand that costs are not merely incurred,

they are caused. When action is taken to reduce activities, which consume resources, consequently, a decision of terminating the cost might be reached. In other words, if the cause is removed, the savings are long term. Management's ability to manage resources and reduce the reliance on support costs is improved by using the analysis by activities. There is an argument in the ABC literature about the reduction of cost for the long term through activity management or through cost drivers within process improvement. Ostrenga (1990) claimed that the activity management and resultant cost reduction could be facilitated only by reduction in the drivers or cause of resource commitment and not by the direct reduction in activities. Wong (1996) used a case study to illustrate how an activity- based approach can give management a 'richer' and 'robust' understanding of cost dynamics. Cooper and Slagmulder (1998a) found that strategic cost management is to be the application of cost management techniques, which improves the strategic position of the firm thereby reducing costs.

Govindarajan and Shank (1992) considered the role that CMIS information plays in four stages of strategic management: strategy formulation, strategy communication, strategy implementation and strategic control. To this they apply three themes: Value Chain Analysis, Strategic Positioning Analysis and Cost Driver Analysis to formulate a framework concerned with the relationship between strategy and management accounting. They referred to this framework as Strategic Cost Management which Shank (1989, p: 50) defined as "the managerial use of cost information explicitly directed at one or more of the four stages of the strategic management cycle".

Moreover, everyone in the business world today realises that the key to long-run competitiveness is total customer satisfaction. In a global economy, organisations shift their interest to the customers from the products. This shift belongs to the effects of competition, which organisations face and an organisation compares its own customer profitability with that of a target competitors. Organisations have a responsibility to their employees and shareholders not only to understand the profitability of customers, but also to develop a sensible, mutually, advantageous dialogue with their present and future customers. Johnson (1990) argued that in this global economy, nothing is more important than knowledge of customers' wants and of how to satisfy those wants profitably.

Johnson (1992) argued that organisations must adopt new ways of thinking about business, not merely new tools and solutions designed to improve old practices.

Organisations need information that triggers actions aimed at building strong customer relationships and removing constraints that cause variation, delay, and excess in processes. He added that to stimulate competitiveness, management information must follow a "bottom-up empowerment cycle". He argued that this information must come from customers and from processes, and it must be gathered and used primarily by people in the work force who face the customers and who run the process.

Bromwich (1990) and Lord (1996) supported this concentration on customer satisfaction. They sought to compare the relative cost of product attributes or characteristics with what the customer is willing to pay for them. Products are seen as comprising a package of attributes, which they offer to customers. It is these attributes that actually constitute commodities, and which appeal to customers so that they buy the product. The attributes might include a range of quality elements (such as operating performance variables, reliability and warranty arrangements, physical features - including the degree of finish and trim, and service factors, such as the assurance of supply and after-sales service). An organisation's market share depends on the match between the attributes provided by its products and consumers' tastes and on the supply of attributes by competitors. Bromwich (1990) argued that the purposes of the analysis of product attributes should be to attribute those costs which are normally treated as product costs to the benefits they provided to the consumer for each of those benefits which are believed to be of strategic importance. Bromwich and Bhimani (1994) argued that CMIS should provide information -in this domain- about the cost of any package of attributes, which is being considered for introduction to the market.

Both Govindarajan and Gupta (1985) and Simons (1987) suggested how control systems (and CMIS as a part of control system) could be best suited to a strategic business that follows a specific strategy. The major focus of Simons' work was on the link between business strategy and management control systems. He explicitly used the contingency framework as a dominant logic for research on control systems design (Simons 1987, p: 358). Under contingency theory, the type of CMIS varies according to the specific circumstances or situations in which the organisation operates.

From the above literature in the last three sections and others, it can seen that there are a huge number of techniques, ideas and models promising to achieve efficiency, optimisation and strategic purposes for organisations which use them. The next section introduces limitations of the literature and studies related to the CMIS.

3.5 Limitations of the Literature

Through the above literature review, it could be observed that researchers developed models that were very complex and that failed to recognise that information is a costly resource. Consequently, no limits were placed on the complexity of the information system. Therefore, it is not surprising that the complex models developed by academics had little practical relevance. Drury (2000) suggested three reasons to explain why the approaches advocated in textbooks are not widely used in practice:

1. A delay in theoretical developments being applied in practice.
2. A lack of understanding of theory by practitioners.
3. Theory fails to address the reality faced by practitioners.

Moreover, Scapens (1991) suggested that there is a considerable difference between the techniques described in management accounting textbooks and management accounting practices. Furthermore, Otley (1991) and other writers drew attention to the fact that management accounting research had very little impact on practice.

Moreover, surveys of management accounting practice (for example, Drury et al., 1993; Ezzamel & Willmott, 1992) reported that many of the approaches outlined in textbooks are not widely used in practice. Also many of the techniques that are rejected by textbooks are widely used. For example, the surveys reported, in this domain:

- the widespread use of full product costs, derived from traditional product costing systems, for decision-making;
- the extensive use of absorption costing for preparing monthly profit statements;
- the widespread use of cost allocations for cost control and managerial performance evaluation purposes;
- insignificant use of the quantitative techniques, for example linear programming, statistical variance investigation models and regression techniques for estimating cost functions.

Moreover, Scapens (1991) and Horngren (1995) suggested that simple techniques be used in practice. They added that, nevertheless, the use of simple techniques in practice may be quite rational and not an irrational rejection of techniques suggested in the academic literature.

Therefore, it could be argued that there is a gap between theory and practice that has resulted in a change of emphasis from normative (developing theoretical models of what ought to be) to positive research (explaining what is - that is explaining observed practices). Therefore, greater emphasis is placed on understanding and explaining observed practices, whereas previous research was more concerned with developing normative economic decision-making models. Scapens (1994) argued that accounting academics should not be unduly concerned that a gap exists between actual practices and the theoretical ideals which are derived from neo-classical economic theory and are themselves questionable. He concluded that practitioners should continue to review textbook material and other new techniques, seeking to find ways to improve and adapt their practices.

Kaplan (1998) supported the existing of a gap between theory and practices. However he went further to deal with it. He advocated that after studying and analysing management accounting and recognising a potential gap, academics should create new knowledge to face this gap in theory. For example, Kaplan and Cooper developed concepts and practices for activity-based costing, and Kaplan and Norton formulated and applied the balanced scorecard. They used innovative action research methods (Kaplan, 1998). They started with practices in organisations and recognised the gap between the needs of managers in these organisations and the practices then being taught and studied to reach new ideas. Hence, they continued to complete the innovation action research programme until these ideas became familiar to other academics and organisations.

Kaplan (1998) argued that academics have a big advantage over full-time consultants in the creation and dissemination of new knowledge. Academics are skilled in abstracting from day-to-day appearances and practices into generalisable concepts and theories. Furthermore, Kaplan (1986) encouraged researchers to undertake just such a programme of field-based research to locate and document the practices taken by innovative organisations to remedy the identified performance gap.

Drury (2000) pointed out that research into the behavioural aspects of CMIS tended to concentrate on enhancing the economic performance arising from the use of existing techniques by promoting their motivational impact of avoiding dysfunctional behavioural consequences associated with their use. He added that behavioural research has not contributed to the development of new CMIS techniques, but it led to the

consideration of how these techniques might be modified or which techniques would be most appropriate in specific organisational circumstances. He argued that in particular, behavioural research has shown that the economic models which are advocated may not work as expected when applied in practical situations, because of unintended behavioural responses.

Neo-contingency theory is one of the major developments to emerge from behavioural organisational research. As illustrated in Chapter Two, the contingency approach is based on the premise that there is no universally acceptable model of organisation, and that the form of organisation that will be most efficient is contingent upon conditions relevant to the situations. Neo-contingency theory tried to relate the design of CMIS to such organisational factors as size, technology and management styles and to the type of environment in which they operate, for example, the level of uncertainty and competition intensity. The attraction of contingency theory is that it provides a theoretical framework that might help to explain existing practice. Otley (1980) argued that the contingency approach is both descriptive (in explaining why organisations adopted a particular CMIS) and prescriptive (in explaining the type of CIMS that ought to be operated in a particular set of circumstances). Therefore, this research uses contingency theory as a theoretical framework to explain the practices of CMIS in the organisations, as explained in Chapter Two.

Contingency theory arose in response to the universalistic approach that argues that optimal control design applies in all circumstances and organisations. Fisher (1998) claimed that the universalistic control approach was a natural extension of scientific management theory. Scientific management principles implied that there is one best way to design operational processes in order to maximise efficiency. However, Burns and Stalker (1961) argued that the beginning of administrative wisdom is the awareness that there is no one optimum type of management system. The contingency approach is to be distinguished from universalistic theories, which assert that there is "one best model" for all organisations to achieve their objectives. The contingency approach sees maximum achieved purposes resulting from managers' adopting, not the maximum, but rather the appropriate use of information provided by CMIS that fits the contingencies, which an organisation faces in a particular case. Optimal practices are seldom universal ones. This is the core of the contingency approach.

Fisher (1998) added that there is a further extreme approach, which is the situation-specific approach. This situation-specific approach argues that the factors affecting each CMIS are unique so that general rules and models can not be applied. Thus, a researcher is forced to study each organisation and CMIS individually. The contingency approach is situated between these two extremes. According to the contingency approach, the appropriateness of different CMIS depends on the circumstances of the organisation. However, in contrast to the situation-specific model, CMIS generalisations can be made for major classes of organisation circumstances.

3.5.1 The Plural View of Organisation

If an organisation is to survive, it must induce participants to contribute resources, energy, and time to it. Individuals have different interests and value various inducements; they join and leave the organisation depending on the bargains they can strike (the relative advantage to be had from staying or going). Scott (1987) argued that the open systems view of organisational structure stresses the complexity and variability of the individual parts – individual participants and subgroups - as well as the looseness of connections among them. Scott (1987) described an organisation as a system which is "multi-cephalous": many heads are present to receive information, make decisions, direct performance. Therefore, co-ordination and control become problematic. Ezzamel and Hart (1987) argued that the behaviour of a participant in isolation is usually different from his/her behaviour within the organisation. The above discussion raises the issue of how total organisation perception relates to individual perceptions of environmental conditions. Downey and Slocum (1975) suggested that all factors, which influence individual perceptions directly or indirectly, influence the organisation's perceptions. Furthermore, Donaldson (1985) offered a defence of organisational level constructs. He argued that the individuals in organisations are logical and essential in organisation theory. Donaldson (1990) claimed that key phenomena such as organisational structure cannot even be discussed unless the organisation is viewed as an entire system. Therefore, the unit of analysis in this research is an organisation itself, which is studied through its managers' perceptions.

The organisation is studied in this research as a whole system. It has input (Factor Market including Raw Material, Labour, Management, Finance and Technology) and output (Product Market). In addition, this system should work following the legislation regulations. Therefore, there are three independent variables: Factor Market (including the five sub-variables), Product Market and Legislation. In this way, the research

considers the organisation as a whole. Furthermore, it considers all the purposes of CMIS; Efficiency, Optimisation and Strategy as the three dependent variables, since the theoretical base – the contingency approach – is functionalist.

Gordon and Miller (1976) pointed out that accounting information systems should be designed employing a total conception of the organisation and its administrative tasks. Macintosh (1994) argued that the system must adapt to environmental conditions in order to survive. It must, as the law of nature instructs, change and evolve.

It could be argued that there are many variables, which affect the adoption of CMISs. Management's task is concerned with both the internal and the external environment. Otley (1991) argues that the nature of CMISs will be affected by the external environment in which they operate, as the purpose of a CMIS is to assist an organisation to adapt to the environment that it faces. Thus, it can be argued that these two dimensions (internal and external environment) may tend to change CMISs, policies and practice. The next section introduces literature and studies related to the previous contingency based-studies related to CMIS.

3.6 Previous Contingency based-Studies Related to CMIS

Otley (1984) and Langfield-Smith (1997) claimed that before the 1980s there were no published research studies that examined explicitly the relationship between strategy and control systems. However, Khandwalla (1972) studied the relationship between using management control systems and competition as an aspect of environmental conditions. He distinguished between three forms of competition –product, process and marketing- and found the more intense the level of competition, the greater was the reliance on formal control systems. In particular, he argued that intense product competition might require complex organisational forms, with departments of research and development, new product testing and scanning for new markets. In this situation, sophisticated control systems may play an integrative role. Khandwalla's study (1972) was notable in providing the first empirical evidence of the relationship between control systems and the level of competition.

There are two problems with Khandwalla's (1972) results. First, Khandwalla only considered the relationships between price, product, and marketing channel competition and the organisation's profitability. However, an organisation's competition may be triggered not only by price, product, and marketing channel competition, but also by

factors, such as the number of competitors in the market, technological change in the industry, changes in government regulations or policy, and package deals for customers offered by competitors. Furthermore, these factors are likely to apply simultaneously and in combination to affect competition. Porter (1979), for example, suggested that the intensity or degree of competition in an industry depends on the collective strength of different factors in action within the industry.

The second problem with Khandwalla's results was that he considered only the direct (bi-variate) relationship between the three types of competition and the organisation's profitability. As illustrated above, organisations facing a high level of market competition adopt multiple strategies to combat the competition. Kohli and Jaworski (1990) argued that the greater the competition, the more an organisation must be market orientated, in the sense that it must discover customer desires and create superior customer value to satisfy them. They added that an organisation must carefully assess the expected costs and benefits of pursuing its strategy of increased market orientation. The CMIS could assist organisations in the identification, evaluating and implementation of appropriate strategies.

Table 3.1 contains a summary of contingency-based studies related to cost management information systems and contingent variables.

Table 3.1 Contingency- Based Studies Related to CMIS and Contingent Variables.

Study	Variables	Comments
- Burns and Stalker (1961) - Lawrence and Lorsch (1967) - Perrow (1970)	Unpredictability as an environment aspect	Early contingency research on organisational structure
- Chapman (1997) - Hartmann (2000)	Unpredictability as a fundamental variable in CMIS contingency-based research	They interpreted aspects of CMIS research by examining the impact of environmental unpredictability
Chenhall and Morris (1986) Chong and Chong (1997) Gordon and Narayanan (1984) Gul and Chia (1994) Mia (1993) Mia and Clarke (1999) Cunningham (1992)	Unpredictability was related to the usefulness of broad scope CMIS	Their findings were the more unpredictability the more open and externally focused the CMIS
Khandwalla (1972)	Size of organisations and	He found that large size is

Study	Variables	Comments
	CMIS as a control system	associated with an emphasis on and participation in budgets and sophisticated controls.
Bouwens and Abernethy (2000)	Market and customer requirements	Their study focused on importance for operational decisions
Abernethy and Brownell (1999)	Strategic Postures, They considered budgets – as a kind of control system as CMIS	They studied how management accounting control systems can be used to facilitate strategic change (a more prospector type of strategy) in 63 public hospitals.
Abernethy and Brownell (1997)	Uncertainty	They used Perrow (1970)'s model of technology and structure in research and development organisations to investigate the design of control systems.
Selto et al. (1995)	Interaction and Systems Models of Contingency Theory	Assessing the Organizational Fit of a Just-In-Time manufacturing System
Hoque and Hopper (1994)	Management control system	A case study of management control in a Bangladeshi
Shields et al. (2000)	The design and effects of control systems	Tests of direct and indirect-effects models

3.7 Development of Hypotheses

It was suggested by Ibbotson (1976) in his study of capital investment as a strategic response that two characteristics of the environment that concern managers were competition intensity and unpredictability, as follows:

Managers' Perceptions (Environmental Conditions) ---------→Strategic Posture

Al-Hazmi (1995) followed Ibbotson (1976) in his argument about the impact of environmental disturbance on cost management systems, which was structured as follows:

Managers' Perceptions (Environmental Conditions) ------→ CMIS (Polices and Practices

Al-Hazmi (1995) attempted to examine the effects of managers' perceptions of competition intensity and unpredictability on CMIS of policies and practices. Al-Hazmi (1995) concluded from his survey with a small sample that:

1. The use of cost information for efficiency in companies was universal.
2. The use of cost information for effectiveness and optimisation was very limited in companies.
3. The use of cost information for strategic purposes was common in companies
4. There was the strength of the relationship between environmental perceptions and uses of cost information. However, he observed also that the change of sign in correlation indicates that the correlation is sensitive to small sample size. He showed that his research must be extended to incorporate empirical tests in a large sample.
5. There was a small effect absorbed due to organisational size and a further small effect due to production process.

Al-Hazmi suggested linear contingent relationships and further empirical examination of three propositions as follows:

1. Predictable uncompetitive market was expected to be simple since full cost Accounting to hold. When competition increased, it was expected to find efficiency pressure leading to the adoption of cost management policies, of which Activity Based Costing is an example.
2. For uncompetitive environments, when unpredictability was perceived to increase, it is expected to observe the use of short-term optimisation model to aid decision-making.
3. When competition and unpredictability increased, it is expected to find that the use of strategic cost management policies and practices increase.

Moreover, Al-Hazmi found from four case studies in the Milk industry that there was strong but not conclusive evidence of a contingent relationship between the use of cost accounting practices and managers' perceptions of the environment to their firms. He also found that traditional full absorption costing policy and practice was used and seen as useful in pursuit of efficiency. He also found a very limited existence of economic

optimisation cost policy. The practice here was even more limited. Only one (1/6) company had an optimisation cost policy in use. There were no formal strategic cost policies, but some evidence of cost information being used in managerial thinking on meeting competitive pressures.

When reviewing Al-Hazmi's study, a critical point regarding his research variables emerges. The objective of this research was to study the relationship between the dependent variable, CMIS; policies and practices (Efficiency, Optimisation and Strategy) and independent variables, Environmental Conditions. Al-Hazmi assumed that there are no moderating (conditional) variables. Furthermore, due to the limited data in Al-Hazmi's study, the selected variables were not tested appropriately. Therefore, he introduced intervening variables (Company Size and Production Processing) in the middle of the inquiry, which were not targeted in the beginning. Al-Hazmi did not start from a normative view regarding the likely influence of those variables developed in the middle of the research.

By reviewing the results of previous research in contingency theory (e.g. Chenhall and Morris, 1986; Scapens, 1984; Otley, 1980), it could be found that three contingent classes have been identified to be influential on management accounting system and its appropriate development: (a) The firm's environment, (b) Organisational structure and (c) Technology. Environmental factors that have been considered to be important include the level of uncertainty, as indicated in Table 3.1 (e.g. Otley, 1980; Ezzamel, 1990; Gordon, 1984; Evans et al., 1986; Innes & Mitchell, 1990), and competition intensity (e.g. Otley, 1980; Ezzamel, 1996; 1992; Macintosh, 1994). Technology factors include the production techniques, production system demands, and complexity (scope and variety) (e.g. Gordon, 1984; Macintosh, 1994). Organisational structure factors include size of company (e.g. Ezzamel, 1990), ownership (e.g. Innes & Mitchell, 1990), and role of consultants (e.g. Miles & Snow, 1978). The attraction of contingency theory is that it provides a theoretical framework that might help to explain existing practice.

However, some previous studies (e.g. Gul, 1991; Mia, 1993; Mia & Chenhall, 1994; Gul & Chia, 1994) examined the effects of environmental variables on management accounting system design. These studies defined management accounting system design in terms of certain information characteristics, such as breadth of scope[1], levels of

[1] They argued that the scope of management accounting system information refers to the dimension of focus, quantification and time horizon (Chenhall & Morris, 1986). Such information has been identified

aggregation, its integrative nature and timeliness (Chenhall and Morris, 1986; Shields, 1995). Implicit in all these studies is that there must be an appropriate fit between environment variables and management accounting system information characteristics to enhance managerial performance. In this research, the links between CMIS and its purposes (efficiency, optimisation and strategy) are considered. The justification for this concern depends on Horngren's (1995) definition of CMIS as a system which provides information to managers to help them to make their decisions.

3.7.1 The Hypotheses

The initial hypothesis is that both competition intensity and unpredictability are positively associated with using CMIS because using CMIS does not take place unless there is some stimulus (a shock). Hence, managers' perceptions of environmental conditions are surrogate for the particular shock (Bromwich, 1990; Bromwich & Bhimani, 1994; Gordon & Narayanan, 1984; Chenhall & Morris, 1986; Mia, 1993; Mia & Clarke, 1999; Cunningham, 1992). However this effect might be a constraint effect where severe environmental conditions begin to prevent any rational response and, indeed, might lead to a lowering response. Al-Hazmi (1995) observed a relationship between the degree of external competition, particularly product competition and the sophistication of the management controls used by an organisation.

> ***The Hypothesis 1: There is a linear relationship between managers' perceptions of degree of competition intensity and unpredictability as elements of environmental conditions and practices of CMIS in relation to achieving; efficiency, optimisation, and strategy purposes.***

Furthermore, Cooper (1996) argued that as global competition becomes more intense, organisations are forced to learn to be more proactive in the way they manage costs. He added that for many of these organisations, survival is dependent upon their ability to develop sophisticated CMIS that create intense pressures across the entire value chain to reduce costs.

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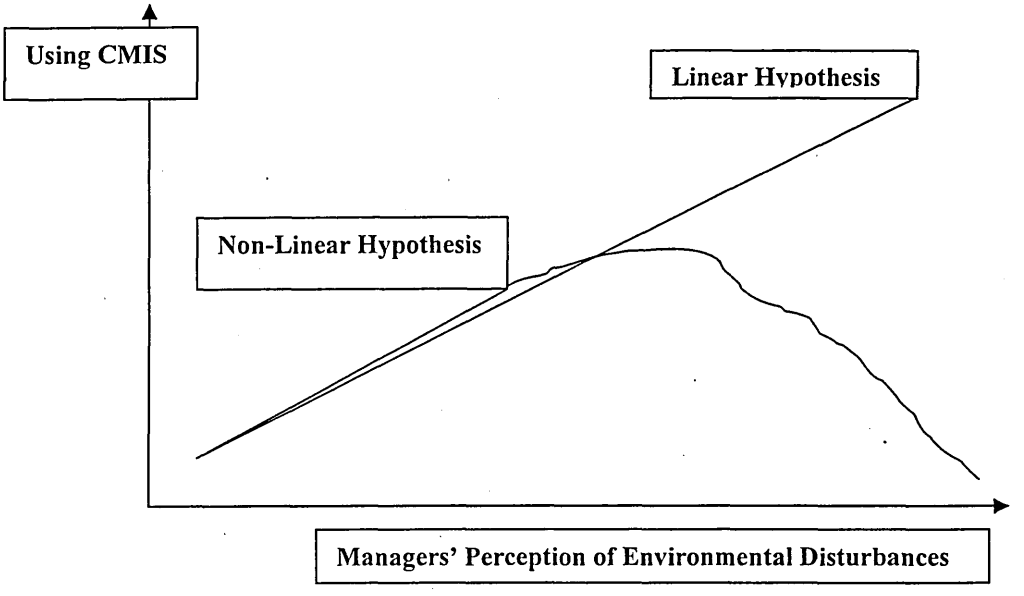
by accounting researchers (e.g. Hayes, 1977; Gordon & Narayanan, 1984; Chenhall & Morris, 1986; Mia & Chenhall, 1994; Gul & Chia, 1994) as a characteristic of management accounting systems having particular significance in assisting managerial decisions. The broad scope of management accounting system information includes external, non-financial and future-oriented information while the narrow scope of management accounting system information includes internal, financial and historical information (Chenhall & Morris, 1986).

Al-Hazmi (1995) supposed linear relationships in his research. However, Luft and Shields (2003) claimed that researchers often intentionally induce linearity by limiting the range of evidence collected (e.g. choosing typical cases rather than extreme cases for qualitative studies) or transforming quantitative data to meet the assumptions of linear statistical models. Luft and Shields (2003) added that these studies represented only a portion of what many theories can, in principle, explain. Therefore, they encouraged researchers to consider non-linearity relationships. In this research, both linear and non linear relationships are hypothesised.

> ***The Hypothesis 2: There is a non-linear (curvilinear) relationship between managers' perceptions of the degree of competition intensity and unpredictability as elements of environmental conditions and practices of CMIS in relation to achieving; efficiency, optimisation, and strategy purposes.***

Figure 3.2 Linear and Non-Linear Hypotheses

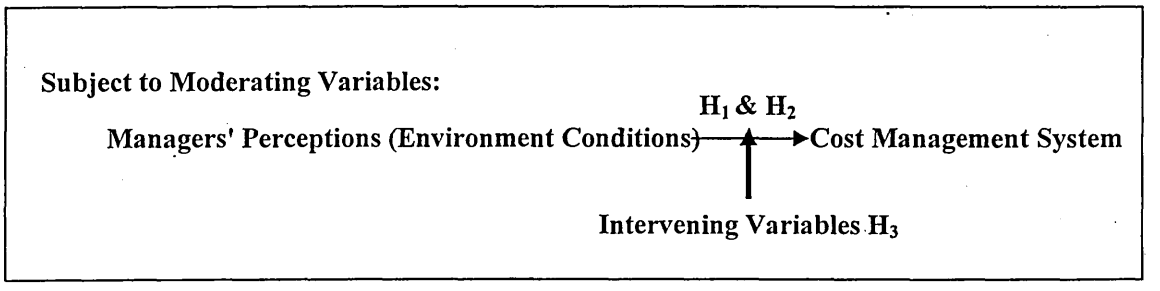


It was intended to overcome the defects of the previous research by carefully selecting the research variables and methodology from the beginning.

The Hypothesis 3: Managers' education levels, location of authority, kinds of consultants and size of organisation are intervening variables which affect the relationship between managers' perceptions of the degree of competition intensity and unpredictability as elements of environmental conditions and the CMIS practices in relation to efficiency, optimisation, and strategy purposes.

These intervening variables are discovered from the interview data. Moreover, any of these three hypotheses could be subject to moderating (conditional) variables which are Types of Business Sectors, Ownership Categories, Business Strategies Postures, and Transformation Operations Categories. These variables and justifications for their measurement will be discussed in Chapter Four.

Thus, these hypotheses lead to extend Al-Hazmi study (1995) as follows:



Furthermore, in order to remedy the drawbacks of Al-Hazmi's study and because almost all data-collection methods have some bias associated with them, collecting data through multi-methods and from multi-sources may provide better results. Therefore, an integrated strategy of interview and questionnaire methods has been chosen. The instruments used to collect data were "Interviews' Guide" and "Questionnaire". In this way, I avoided the disadvantages of questionnaires and interviews used individually and gained some of their advantages by combining them, as will be illustrated in Chapter Four.

3.8 Conclusions from this Chapter

This chapter represents the second part of the literature review in this research, which is related to cost management information system. Chapter Two contained the first part which was related to the perspectives of organisation. From literature reviewed in this chapter, it becomes evident that there are three purposes to cost management information systems: Efficiency, Optimisation, and Strategy. However, there is a huge number of techniques and models with potential to improve efficiency, optimisation and

strategy. Many surveys showed that organisations use simple techniques rather than these complex techniques.

There appears to be increasing support for studying the organisational behaviour aspects of CMIS. The contingency approach is one of the major developments to emerge from behavioural organisational research. Otley and Wilkinson (1988) suggested that the structure of an organisation could be affected by the characteristics of its external environment and by the features of its internal technology, allowing for a limited scope of managerial choice. The contingency approach was suggested, as a framework of variables which affect organisational structure including CMIS as one of its components. Otley (1991) also argued that the fundamental basis of the contingency approach is that there is no universally best design for organisational structure. Rather, the CMIS needs to be tailored to the specific circumstances of the organisation. Hence, the choice of CMIS design is adapted to these conditions.

Ibbotson (1976) and Al-Hazmi (1995) in a pervious study in CMIS argued that Competition Intensity and Unpredictability concerned managers. They classified environment divisions into product market, factor market and legislation. Al-Hazmi (1995) found, from four case studies in the Milk industry in UK, that there was: strong but not conclusive evidence of a contingent relationship of the use of CMIS and managers' perceptions of their firms' environment.

The research intends to extend Al-Hazmi's study (1995) by adding moderating and intervening variables to his simple model. Therefore, there are three hypotheses. There are stimulus effects for managers' perceptions of degree of competition intensity and unpredictability as elements of environmental conditions on practices of CMIS in relation to achieve efficiency, optimisation, and strategy purposes. This is a linear hypothesis. However, the non-linear hypothesis is that there is an overlapping between stimulus and constraint effects. Moreover, there is a third hypothesis which explains that these relationships could be affected by intervening variables that be discovered from the literature. All of these hypotheses will be tested in relation to the existence of the moderating variables.

Having considered the literature in Chapters Two and Three, the hypotheses have been developed. The next chapter contains the research design used to collect data to test these hypotheses.

Chapter Four

The Research Design

4.0 Introduction

Chapter Two contained a discussion of the issues related to the proposed theoretical framework, which included viewing organisations as systems, the contingency approach and related critiques, neo-contingency theory and managers' decisions and organisation strategy for responding to the environment. Chapter Three contained a literature review related to CMIS, its three purposes and its relationships to managers' perceptions of environmental conditions. The basic model proposed for this study included CMIS as policies and practices as dependent variables, environmental conditions as independent variables, and business sectors, ownership categories and transformation characteristics as moderating variables. Furthermore, the research was intended to discover intervening variables, which could affect the main relationship, namely the effects of environmental conditions on CMIS as policies and practices. Furthermore, Chapter Three presented the three hypotheses developed: linearity, non-linearity and the existence of intervening variables might affect the relationship between use of CMIS and managers' perceptions of environmental disturbances.

This chapter describes the research design and how it links to the research objectives and the theoretical framework reviewed in Chapters Two and Three. This includes a review of the different stances and justifications of the adopted stances, and the choice of research method, population and sample, based on the research objectives and nature of the investigation. Furthermore, it discusses the adopted measures of dependent, independent, moderating and expected intervening variables and the design of the research instruments.

This chapter is divided into eight sections. The first section discusses the alternative research methods considered and the choice of the appropriate one. It also discusses the theoretical reasons for choosing the sample. The second section discusses issues related to the implementation of the fieldwork. It justifies the choice of the Egyptian organisations as the population of the research. The third section describes how the empirical work was carried out in Egypt. The fourth section contains discussion about the adopted measures of each kind of variable. The fifth section discusses the design of the interview guide and questionnaire. The sixth section deals with issues related to

reliability and factor analysis of the data. The seventh section summarises the data analysis techniques used to achieve the aims of this research. The final section provides concluding comments from the chapter.

4.1 The Research Method

This section discusses the issues related to the research method and the most appropriate method in this research. Furthermore, it discusses choices between two kinds of case studies; one longitudinal case study or multiple cross-sectional case studies, and identifies the most appropriate type of case study in relation to the research aims and data. Furthermore, theoretical reasons for selecting the cases are discussed. In light of these points, at the end of this section, a description is given of the method adopted for data collection in this research.

4.1.1 Case Studies as Research Methods

Over the past decade there have been a number of calls for management accounting researchers to adopt case studies (Yin, 1981; Kaplan, 1986; Eisenhardt, 1989; 1991; Scapens, 1990; Spicer, 1992; Otley & Berry 1994). For example, Kaplan (1984, p: 415) encouraged researchers to "leave their offices and study the practices of innovating organisations". Furthermore, Johnson and Kaplan (1987) pointed out that it could be possible to learn from the practices of successful organisations. Yin (1981) identified a case study as a research strategy that attempts to examine a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident, and argued that multiple sources of evidence could be used. Yin (1994) added that studying phenomena that take place in rich contexts means that there will always be too many variables to consider. Consequently, the application of standard experimental survey designs may not be appropriate. Since the basic proposition - as illustrated in Chapter Two - included four moderating, six independent (and ten sub-main independent variables) and four intervening variables, which might affect CMIS as policies and practices, the, case study method was the most appropriate method for the research problem.

Brown (1995) argued that while the survey and historical analysis answer "who" "what" or "where" questions, the experiment and the case study will answer "how" and "why" questions. A case study has many advantages. It can sustain the potential contribution of the research, fit in with the research objectives and framework, and enable the points of

view of managers to be explored. It can also provide an opportunity for identifying intervening variables, which might be influential on the main relationship. Nevertheless, a case study might have some disadvantages, such as the difficulty in collecting the amount of data required to provide convincing evidence for such studies.

Eisenhardt (1991) argued that the difference between case study research and "storytelling" lies in the methodological rigor and multiple-case comparative logic. Llewellyn (1999) claimed that, within case study research, there is a need to identify research questions, develop well-designed instruments such as interview guide and questionnaires and to consider theoretical sampling and controls and so forth. Section 4.5 will explain the development of the research instruments (interview guide and questionnaire). Sub-section 4.2.6 in this chapter considers the sampling rationale.

Otley and Berry (1994) distinguished between deductive and inductive modes of inqury. They argued that deductive work generates hypotheses from theoretical assumptions and tests them against empirical observation (data). Blaikie (1995) claimed that this mode contains the possibilities of falsification and truth of these hypotheses against real world observations. Otley and Berry (1994) and De Vaus (1996) added that inductive work consists of making generalisations from observations, resulting in theoretical statement, which attempt to explain the observed phenomena. Depending on this classification, the research is considered a deductive work, where hypotheses are formulated and the empirical work aims to test them.

Otley (1980) claimed that contingency theory deals with a highly connected structure of control devices (e.g. CMIS) in organisations. Therefore, he encouraged researchers to develop hypotheses and explore organisations to test them, using a case study method. Furthermore, Kaplan (1984) argued that it is difficult to collect data without anecdotes to support them, explain the relationships or test the hypotheses. Furthermore, in this research, the anecdotes from case studies are used to explore the interviewees' views about the supposed intervening variables, which might explain the relationship between managers' perceptions of competition intensity and unpredictability and polices and practices of CMIS, as proposed in the third hypothesis.

It can be argued that case study is the most appropriate method of data collection in this particular research study (Yin, 1981; Kaplan, 1986; Eisenhardt, 1989; 1991; Spicer, 1992; Otley & Berry, 1994; Sekaran, 2000; Berry et al. 1995; Donaldson, 2001) for the following reasons:

- Since the theoretical base of the research is contingency theory. Furthermore, the research considers the developments of policies and practices to identify the managers' rationales. Many authors (e.g. Otley, 1980; Donaldson, 2001) encouraged researchers to use the case study method in this situation.
- Many of the variables, which have been hypothesised to affect CMISs design, relate to the highly connected structure of organisations (Otley, 1980; Yin, 1994).
- The ontological perspective of the research is realist (Scapens, 1990; Tsoukas, 1989).
- Case study, as a strategy, allows data to be collected by both interview and questionnaire methods to build up a case study or a picture about each organisation. Personal interviews provide an opportunity for obtaining anecdotal information to support/explain the empirical results. Furthermore, they give an opportunity for the researcher to explain and discuss the research problem verbally with interviewees. (Llewellyn, 1999; Kaplan, 1984).
- Case studies make it possible to highlight the distinction between the formal (policies) CMIS which managers believed were used, and the way in which they were actually used (practices) (Yin, 1981; Scapens, 1990; Yin, 1994). .

According to these above points, the next sub-section compares between longitudinal and multiple cross-sectional case studies, in order to explain which was the most appropriate for this study.

4.1.2 The Data Collection Method

Dent (1991) traced the way in which new accounting practices were implicated in a reconstruction of the culture in a railway organisation using longitudinal case study. His main argument was that accounting practices do not have similar implications as in the case of organisational activities. He pointed that in some organisations, however, accounting is centrally involved in the work issue, while in others, accounting is incidental, perhaps existing as a practice, but with no particular significance. The Dent study examined the relationship between accounting practices and cultures in organisations. Therefore, he chose a longitudinal case study as the research method to obtain a rich description of accounting practices provided by participants in the organisation together with practices he discovered. Furthermore, Dent's observations on activities and interactions were another source of data to used to enhance validity. Dent

in his study did not seek to test a prior hypothesis; rather, he sought to theorise through the data in an inductive manner. His study was exploratory. His aim, from the empirical work, was to obtain rich data in order to explore relationships between accounting practices and cultures in the organisation. The study was conducted over a period of two years with follow up visits two years later.

If it was intended to collect data by this method (longitudinal case study) rich data would be collected from one organisation. In that case, it would not be possible to compare between organisations' policies and practices when facing different levels of environmental conditions. Furthermore, it would not be possible to address the moderating variables through choosing the organisations from different sectors. Moreover, the adopted theoretical base, which is neo-contingency theory, requires data to be collection from many organisations in order to study how each organisation's circumstances affect CMIS policies and practices. Otley (1980) and Humphrey and Scapens (1996) claimed that research in the domain of contingency theory should involve a number of organisations, carefully selected so as to give a range of values on chosen contingent variables whilst controlling for other variables as far as possible. This argument was considered by choosing the organisations according to the moderating (conditional) variables. Therefore, using the longitudinal case study method to collect data was not appropriate to achieve the research aims.

The alternative was to conduct multiple cross-sectional case studies. Eisenhardt (1989) and Yin (1994) argued that multiple cases are a powerful means to provide better explanations than single cases, because they permit replication and extension beyond individual cases. Replication simply means that individual cases can be used for independent corroboration of specific propositions. This corroboration helps researchers to perceive patterns more easily and to eliminate chance associations. Extension refers to the use of multiple cases to develop more elaborate theory. Furthermore, Yin (1981) argued that where cross-case analysis is the major goal of the research, there might be no need for any single-case report. He added that such a study might consist of brief summaries of individual cases (as in the Chapter Five), followed by the cross-case analysis (as in the Chapters Six and Seven). Yin (1981) named this approach the "case-survey approach".

As illustrated in the Chapter Three, Al-Hazmi's (1995) study was closely related to the research problem. However, a critical point regarding Al-Hazmi's research method was

the lack of suitable data. He was unlucky because he started with six case studies. However, most of the organisations in his sample were going through a significant period of change. They were unwilling to release any information. These changes, coupled with strategic repositioning and difficulties with confidentiality, resulted in highly restricted access. In an attempt to overcome this problem, Al-Hazmi planned to complete the data collecting by a postal questionnaire, but unfortunately he again obtained a very low response rate (8.33%, n = 22 organisations). This low response might have occurred because of the inconsistency in the design of his research questions and methods in the early stages. Consequently, he could not inquire deeply behind the variables. He used two different methods to investigate his selected variables, without drawing proper linkage between them.

In order to remedy the drawbacks of Al-Hazmi's study and because almost all data-collection methods have some bias associated with them, collecting data through multi-methods and from multi-sources would provide better results. However, I faced a dilemma at this stage in the research. To achieve the aims of the research, it was necessary to collect "rich" data from many organisations at the same time. However, the questionnaire method has a major disadvantage, which is low response rate (for example, the response rate was 8% in Al-Hazmi's study,). A low response rate may lead to inconclusive results.

Johnston et al. (1999) claimed that when developing the research design, it is important to decide on what data to collect and how to collect it. In the early stage of this study, the interview guide was developed containing all the data, which needed to be collected. However, it contained some closed questions and two long tables of scaled questions about degrees of different uses of cost information and degrees of competition and unpredictability, which an organisation faced in three divisions: Product Market, Factor Market and Legislation. In order to prevent the scope for spontaneous responses during interviews and to enable the interviews to be conducted in a systematic and comprehensive fashion, it was preferable to separate these two long tables and put them in the questionnaire, to be filled in at the end of each interview. As a result, the interview guide contained open-ended questions to use as a basic guideline during the interviews to make sure that all relevant topics were covered. Then, the interviews could be conducted in a systematic and comprehensive fashion. Therefore, both the structured questionnaire and the interview guide (Appendix 1) were used in each interview situation. Using this method, the main disadvantages of the questionnaire

(misunderstanding of questions and low response rate) were overcome. In this way the interviews were conducted smoothly without interruptions and all the needed data, collected with a better response rate than could have been expected from a mailed questionnaire. Johnston et al. (1999) claimed that the questions presented in the case study, as a strategy, are not survey or interview questions, but questions that need to be addressed by the case to support the research hypotheses. Each question would be accompanied by a set of probable source of evidence and sample strategies for acquiring that evidence. For each question, in every case, evidence from multiple sources was collected in order to allow for triangulation which, Yin (1994) defines as the convergence of evidence on one meaning. Furthermore, the interviews gave a chance to explain and discuss any issues or questions raised in the questionnaire.

Case studies can be done by using either qualitative or quantitative evidence or by using a combination of these (Yin, 1994). Qualitative data was assembled by taking notes. Quantitative data was based on tabulations of different organisational events using the questionnaire. Such data has the benefit of providing researchers from being carried away by clear impressions in qualitative data, and it supports findings from qualitative evidence when it confirms those findings. Qualitative data is useful for understanding the rationale or theory underlying relationships revealed in the quantitative data, which can then be strengthened by quantitative support. The questionnaires were completed from published data, archival documents and by interviewees. The qualitative data was assembled from interviews in the organisations. This qualitative data was used as a source of explanations of the results of quantitative data (from questionnaires). Furthermore, it was used to explore the interviewees' views about the supposed intervening variables, although further statistical tests (Kruskal H.) were needed to test their effects on the main relationship.

Young and Selto (1993), Shields and Young (1993, Kalagnanam and Lindsay (1999) and Davila (2000) chose their own research design which included both interviews and questionnaire methods as case studies. This kind of research design encourages a higher the response rate. Furthermore, Yin (1981) suggested that a case study narrative might be replaced by a series of answers to a set of open-ended questions. This is easier to produce and the reader can usually find the desired information or skim the entire text without difficulty. Thus, by conducting a systematic case study approach, the investigation could be designed to incorporate evidence from interviews and questionnaires to study the main relationship of interest in the research.

4.1.3 The Fieldwork Techniques Adopted

Johnston et al. (1999) claimed that one advantage of case study research is that it can make extensive use of other sources of data within the organisation. The main objective of using case study techniques was to build, in some details, many case studies containing account of managers' explanations of policies and practices of CMIS, how they were developed, and how the managers perceived the environment of the organisation. From this building, it became possible to test the research hypotheses regarding the main relationship. Therefore, the fieldwork technique adopted was as follows:

- Interviews were carried out with the production, marketing, general and engineering managers at the organisations. Sekaran (2000) argued that a researcher who uses interviews can clarify doubts and ensure that the responses are properly understood by repeating or rephrasing the questions. She added that these methods might provide rich data Moreover, Johnston et al. (1999) argued that these methods offer the opportunity to establish rapport with the interviewees. They claimed that these methods are the most appropriate in studies which deal with groups and individuals within an organisation. They added that these methods help to explore and understand complex issues. Many ideas can also be brought to the surface and discussed during such interviews.

- The questionnaire technique was employed at the end of each interview to provide a wider variety of managers' explanations of policies and practices of CMIS. There are some advantages of using the questionnaire method in this study:

    - It was an inexpensive method (given that the context ensured a good response rate).
    - The researcher received organised answers because the questions were organised.
    - It took a shorter time for a participant to fill in the questionnaire than attend an interview to give the same data in interview.
    - It was an efficient way to collect quantitative data.

- Any available documents of participant organisations: annual reports, financial plans and budgets, progress reports, description of and instruction for cost management systems, and 5 years financial statements were collected.

Furthermore, various documentary materials and literature relating to the industry data and government rules were collected from relevant regulators. Analysis of these documents helped to evaluate strategies in each organisation as a whole unit in the data analysis and interpretation stages of the research.

By using several sources of data e.g. structured questionnaire, personal interview, and documentary analysis, data from one type of source can be checked against data from another. In some cases, cross checking of the same point was carried out with different interviewees.

4.1.4 Theoretical Reasons for Sample Selecting

Sample means a subset of the population that is used to gain information about the entire population. The sample serves as a model of the population. However, in order to extend study findings to the population, the model must be an accurate representation of the population.

The ability of a researcher of a study to extend findings or generalise findings to the population is referred to as "external validity". Therefore, selection of cases (organisations) is an important aspect of testing theory from case studies. The external validity problem has been a major barrier in doing case studies. Eisenhardt (1989) argued that however, the sampling of cases from the chosen population is unusual when testing theory from case studies. Such research relies on theoretical sampling (i.e., cases are chosen for theoretical, not statistical, reasons, Glaser and Strauss 1967).

Eisenhardt (1989) claimed that while the cases may be chosen randomly, random selection is neither necessary, nor even preferable. She added that the goal of theoretical sampling is to choose cases, which are likely to replicate or extend the emergent theory. Harris and Sutton (1986), for example, were interested in the parting ceremonies of dying organisations. In order to build a model applicable across organisation types, these researchers purposefully selected diverse organisations from a population of dying organisations. They chose eight organisations, fitting each of four categories: private, dependent; private, public; dependent, independent. The sample was not chosen randomly, but reflected the selection of specific cases to extend the theory to a broad replicated within categories. However, in order to overcome their lack of statistical sampling representatives, careful selection and replication of cases was imperative.

Johnston et al. (1999) claimed that using statistical generalisability and conceptualising case studies, as "sampling units" would be inappropriate and unrealistic. Generalisability theory would require establishing an appropriate sampling frame and conducting a large number of case studies selected from this frame. However, the number would be unmanageable. Johnston et al. (1999) argued that conceptualising a case as an individual study, rather than a sampling unit, changes what case or cases it is appropriate to investigate. They added that if cases are thought to be sampling units, then the objective is to randomly choose a sample of cases from a population of cases. For various reasons, this is often inappropriate or impossible, as in this research. It was inappropriate and difficult to know the number of organisations in Egypt classified according to the adopted moderating variables. By treating each case as a study, the focus shifts to choosing the case or cases that are best suited to investigate the theory. Therefore, Yin (1994) claimed that the selection of the case study, or the set of case studies is similar to decisions made by a research conducting multiple experiments. Each experiment should complement the others by replicating the findings under various conditions, or by addressing different aspects of the overall theory. Therefore, his view is that multiple-case studies should follow a replication, not sampling logic. This means that two or more cases should be included within the same study precisely because the investigator predicts that similar results (replications) will be found. The goal is that together the set of studies will provide rich support for the theory.

Johnston et al. (1999) claimed that case selection decisions stem from the research hypotheses. Specifically, every case should serve a unique purpose within the overall scope of inquiry. In this research, there were four moderating variables in the basic propositions. In order to test the effects of these moderating variables, there was a need to choose the sample of organisations to contain sub-samples, each representing a category of the moderating variables. Therefore, a sample of organisations was chosen depending on the moderating variables by selecting randomly (from the organisations available and willing to participate) to represent each of four industrial sectors:

- Manufacturing.
- Assembly..
- Retail.
- Construction.

Moreover, the organisations were chosen, at the same time, to reflect the moderating variables: ownership categories (Private and Public) and transformation characteristics (divergent, convergent, and multiple). Johnston et al. (1999) argued that if case study methodology is to depend on replication logic, then there should be an attempt to fully investigate a phenomenon fully, using multiple cases. The data was collected from multiple cases inside each sector (a list of these organisations is in Chapter Six). Hence, the research sample was divided into four sub-samples according to industrial sectors, two sub-samples according to ownership categories and three sub-samples according to transformation characteristics. In this way, the selected organisations covered a great variety of industrial organisations thus offering the potential for a wide range for each of the experimental variables.

The question which I faced in this stage of the research was how many organisations should be in each sub-sample? Many authors (e.g. Eisenhardt (1989) and Yin (1981)) argued that while there is no ideal number of cases, a number between 4 and 10 cases usually works well. With fewer than 4 cases, it is often difficult to generate theory and its empirical grounding is likely to be unconvincing, unless the case has several mini-cases within it. With more than 10 cases, it becomes difficult to cope with the complexity and volume of the data. However, there were sub-samples to support the basic proposition, which included the moderating variables. Furthermore, each sub-sample contained multiple organisations to fulfil the research objectives, which enabled the applicability of contingency approach in the CMIS context to be tested. Thus, choosing multiple sub-samples and multiple case studies was reasonable to support the theory. Thus, it could be argued that the appropriate number of cases depends upon how much is known and how much new information is likely to be learned from additional cases.

An issue facing any researcher is when to stop adding cases. Eisenhardt (1989) suggested that researchers should stop adding cases when theoretical saturation is reached. (Theoretical saturation is simply the point, at which incremental learning is minimal because the researchers are observing phenomena seen before, Glaser & Strauss, 1967). Moreover, Ezzamel and Willmott (1998) developed six intensive case studies and reported two of them in their paper about accounting, remuneration and employee motivation in the new organisation. They focused on two cases because they obtained intensive data from these organisations, which were also fairly large with enough sub-units to exhibit variation. They argued that by this choice, they sought to

explore fully the details and dynamics of remuneration schemes or relate them to specific contexts.

In this research, the plan was to choose 6 organisations as an initial sample for each of the four industrial sectors or alternatively I could say 12 organisations for each of the two ownership categories. Thus, the total initial sample was 24 organisations. This number was decided upon because access to more than that number of organisations was expected to be difficult. However, when going to Egypt to collect data, I was able to gain access to 29 organisations! Therefore, the volume of data collected was large and needed careful management. The starting point was the creation of a separate file for each organisation, including all the collected documents from it and two or three pages about any comments related to it. Then, these organisations were listed and classified according to the moderating variables. Descriptive tests were then carried out at different levels to interpret the data. The next step was to build an overview about each organisation as a separate case study and to write up each one on two pages only. Then, quantitative data analysis steps were followed in order to test the hypotheses. In this way, I was able to manage the collection of data from this large number of organisations.

4.2 Implementing the Field Work

This section discusses the implementation of the fieldwork. It includes the reasons for choosing Egypt as the population. Furthermore, it explains the reasons of selecting this group of organisations as the sample of the research. Moreover, it reports the difficulties which I faced when accessing these organisations.

4.2.1 The Research Population

Egypt was chosen as the research field due to many reasons:

1. There have been few studies in Management Accounting in the Middle East.
2. It is my country so I was able to gain access and because it is the environment to which I belong, I was familiar with its accounting practices and culture and had an understanding of the political and economic background of the organisations. Therefore, although it was intended to get access to 24 organisations, I got access to 29 organisations.

3. Privatisation is the core of the economic transformation process in Egypt from public to private sector. This change increases the importance of organisations adapting to face both local and global competition.

4. Most of the participant organisations were established in new cities in Egypt and are only approximately 5 years old. Therefore, this is a new research field in Egyptian Universities such as the one where I am working.

The Egyptian Government has encouraged investment in industries with the aim of solving many serious economic, political and social problems, which they face. In order to achieve this aim, the government has established new cities in the Egyptian deserts for the following reasons:

- To develop residential areas to deal with the increasing population. Therefore the government has built many flats and housing complexes including shops which they have sold at cheaper prices than would be paid in the major cities. This has encouraged people to relocate from the main cities (e.g. Cairo and Alexandria) to these new cities. In this way, many problems will be solved (transportation, crowded in the main cities and raising of flat rents).
- To encourage investment in industries and agriculture in the Egyptian deserts. With this investment has come employment, so avoiding the need to travel to the other main cities for work.

Since the end of the 1970's, the Egyptian government has encouraged organisations into these cities by creating the appropriate legal and political climate. These laws and rules offer many economic facilities, (such as, exemptions from some kinds of taxes for periods of time), and the lifting of import restrictions on raw materials. There are many facilities for construction organisations plus low interest loans for these organisations to help them in developing their business and give them the best climate for success. It is a new venture for the Egyptian Government. Most of the participating organisations were in this group.

4.2.2 Reasons for Choosing This Group of Organisations

This group of organisations was chosen for the following reasons:

- All of these organisations were established and worked under the same political and legal considerations. It is important for the purposes of the research that all the participating organisations should be in the same climate.

- All of these organisations started in the same period of time. Therefore their equipment is approximately same age. They do not have serious problems of replacement and development of equipment / technology, as their equipment is the most up to date.
- This group of organisations has a chance to work under a beneficial statutory, political, and legal climate for investment. It has a chance obtain numerous benefits from many facilities which the government provides. However, for these organisations to continue to receive these facilities continually they should achieve a standard of improvement and success, in terms of improvements in their production systems, cost management systems and their products, which would lead to increased exports.

4.2.3 Access

In 1974 Egypt started with an 'Open door' policy as a new economic measure as explained in Chapter Five. The aim was to liberalise the economic organisation of the country, reactivate the private sector and encourage growth through the incentive of competition. Furthermore, this policy aimed to encourage trade with the west and to promote both Western and Arab investment in Egypt, and to increase productive activities, such as the production of goods (DTI-Egypt Desk (1996)).

Access to these organisations was difficult in nature. This is because (1) most of them were currently going through a very significant period of changes, so it was difficult for them to devote any time to this study; (2) these changes were coupled with strategic repositioning and difficulties leading to concerns about confidentiality, therefore they provided restricted access. Attempts were made to overcome difficulties by (a) seeking support of my Embassy which provided confirmation that I would use the information for the research purposes only and this encouraged the organisations to co-operate; (b) using personal networks and contacts.

4.3 The Fieldwork undertaken in Egypt

In order to test the hypotheses, inquiries based on cross sectional data were carried out. Data was collected from the 29 organisations using the Interview Guide, the Structured Questionnaire, and by studying the archival and documentary materials. The data was collected over 10 months during 1998. I started to contact the organisations in January

1998. I set about gaining acceptance in June 1998. I was able to conduct a total of twenty-nine case studies during June to October 1998 in all the sectors as follows:

In the Manufacturing Sector: 10 organisations

In the Assembly Sector: 5 organisations

In the Retail Sector: 6 organisations

In the Construction Sector: 8 organisations

(A list of names of these organisations, their activities, number of interviews in each organisation, the interviewees in each organisation, the spent time in each interview, number of completed questionnaires in each organisation, and any other documents collected from each organisation are in Chapter Five. A map of Egypt to identify the locations of these organisations is in Appendix 2).

Data from one type of source could be checked against data from another. In addition, cross checking of the same point was carried out with different interviewees. Thus, several techniques were used to validate field data, as follows:

1- Personal interviews were conducted during an on site-visit with managers at various levels of management (financial directors / controllers, accounting staff, and general marketing managers). The time to complete an interview varied in length between 1-2 hours. Eighty-eight meetings were conducted during summer 1998. The interview guide was translated into Arabic under supervision of Dr. Marghani Ahmed (He was working at Sheffield Hallam University as a member of academic staff in the School of Financial Studies and Law). The interview techniques involved the following:

> ***a- The Interview Guide:*** It was used as a basic guideline during the interview to make sure that all relevant topics were covered and to help the researcher conduct the interviews in a systematic and comprehensive fashion. In addition, the interview guide served to introduce the concepts of cost management, policies and practices and to stress the confidentiality of information provided. It also emphasised the importance placed on the views of the respondents regarding their perception and attitudes towards cost management systems, policies and practices, and the strategic responses of their organisation. Details of design of the interview guide and variable measurements are contained in sections 4.5 and 4.4 respectively.

b- ***Tape-recording and note taking:*** Interviewing was supported by tape-recording which captured much more than my memory. I used tape-recording if this was acceptable to the interviewee. Some interviewees refused to allow tape-recording during an interview and other interviewees only allowed tapes recording for part of the interview. It is commonly accepted that tape-recording interviews has advantages and disadvantages. It allows what is said to be recorded and permits the interviewer to be more attentive to the interviewee. It may also increase rapport between interviewer and interviewee. But there may be certain drawbacks in using tape-recording during the interview. In particular, it may lead to biased responses when interviewees comment on confidential or sensitive issues.

When it was possible to use tape-recording, reliance on field notes was decreased and I was free to concentrate on the responses. However, I found it useful to take notes of selected key issues for several reasons. Firstly, it helped me to help formulate new questions if a subject showed special interest. Secondly, it was a useful aid where reviewing the discussion when replaying the tape and the writing up of the manuscript text, Finally, it made me aware of the documentary evidence deemed relevant during the interview and served as a reminder for him to collect it. Therefore, I took notes in both cases.

2- Questionnaires: At the end of each interview, I asked the interviewee to fill in a questionnaire in Arabic. However after starting to fill in the questionnaire, some of them asked if, to save time, I would leave the questionnaire for them to fill in and come back to collect it. However, I persuaded them politely to let me wait until they finished. I think that this was wise, because I obtained some important and interesting explanations about some answers, which were unexpected at the time the questionnaire was designed.

3- Reading and analysing available documents of participant organisations: Some documents were made available to me. These included: annual reports, financial plans and budgets, progress reports, description of and instruction for cost accounting systems, industry data, government rules, 5 years' financial statements and any other suitable available documents.

4.4 Measurements of the Variables

This section will discuss the adopted measures of dependent, independent, moderating and intervening variables respectively through the following four sub-sections.

4.4.1 Measurement of CMIS as Policies and Practices

This section aims to justify the differentiation of policies and practices and to discuss the adopted measures of CMIS as policies and practices.

4.4.1.1 Justification of the Differentiation of Policies and Practices

Langfield-Smith (1997) categorised controls as formal and informal controls. She claimed that formal controls include rules and standard operating procedures. These are more visible and thus the easiest to research. However, informal controls are not consciously designed. They include the unwritten roles of the organisation and often derive from, or are an artefact of the organisational culture.

Mintzberg (1978) and Langfield-Smith (1997) pointed out a distinction between intended strategy and realised strategy. Intended strategy is a statement of intent or a plan, sometimes formalised in a statement of mission, objectives and intended actions. Intended strategy is proactive, consciously formulated prior to decisions and action. Organisations are encouraged to scan their environments, analyse their strengths and weaknesses and position themselves so as to minimise threats and maximise their ability to take advantage of opportunities. Normative literature on strategy (e.g. Porter, 1980; 1985; Hofer & Schendel, 1978) typically supported this view.

Mintzberg (1978) discussed that realised strategies emerge through events and environmental interactions as they unfold over time. Realised strategies are inferred through history as organisational activities accumulate to exhibit a consistency or trend. Thus, intended strategies may not be realised or only part of what is intended may come about. They may be premised on incomplete or imperfect information, environmental circumstances may change, or they may simply not be enacted. Similarly, realised strategies may emerge unintentionally. Minor decisions and actions may have far reaching consequences, culminating in unintended strategies.

Johnson and Scholes (1997) argued that the idea that intended strategy can be managed through neat logical and sequential planning mechanisms is unrealistic. Given the complexity of organisations and the environments in which they operate, managers

cannot consider all possible intended strategies. In this domain, it could be argued that CMIS policies are related to the intended strategies and CMIS practices are related to realised strategies. Practices emerge from the solution of day to day problems and the deliberate moves by business to reposition itself. Rather, it has been argued that choice among cost management practices takes place by comparing options against each other and considering what would give the best outcome and be possible to implement. Therefore, cost management practices are affected by all the components of the environment around the organisation. It is very important to distinguish between cost management policies – as planned or intended - and practices which are affected by the current circumstances. Anthony (1989) argued that there is a need for survey information relating to the use of cost management practices.

When Dugdale and Jones (1997a) followed Innes and Mitchell's study (1995), Dugdale and Jones (1997a) found that most of the organisations in Innes and Mitchell's study (1995) did not use ABC. However, these respondents had previously reported in Innes and Mitchell's study (1995) that they had it. Therefore, in this research, respondents' uses of cost information to achieve each purpose: efficiency, optimisation and strategy, were used as measures of their CMIS practices. Moreover, CMIS policies were measured by the respondents' reporting their existence or that they intended to use them, as can be seen in the questionnaire in Appendix 1.

4.4.1.2 The Adopted Measures of CMIS as Policies and Practices

CMIS as policies were measured as facts. Therefore, respondents were asked to report the existence of CMIS as policies to achieve those objectives; efficiency, optimisation and strategy in their organisations as discussed in Chapter Three.

CMIS as practices were measured as the extent of using cost information to achieve those three purposes: efficiency, optimisation and strategy. Five-point scales were used as follows: Extremely Important, Very Important, Important, Not So Important, and Not Important.

4.4.2 Measurement of Environmental Conditions

This section aims to highlight the measures of environmental conditions as independent variables. It is divided into two sub-sections. The first one includes divisions of environment and the level of competition intensity and unpredictability perceived. The

second one discusses the justification for using managers' perceptions of environmental conditions for measurement of environmental conditions.

4.4.2.1 Dimensions of the Environment

In order to identify divisions of the environment, a very long list of these divisions might be presented, including general socio-economic influences, such as government attitudes to private industry, fiscal and tax measures, legislation relating to the conduct of business, the climate of industrial relations, the general state of the economy and social and demographic trends, ...etc. However, this research considers an organisation as a system, as explained in Chapter Two. This system works and deals with the environment. It has input factors including raw material, labour, management, finance, and technology and outputs, which include products and working according to the legislative environment. Thus, the divisions of environmental conditions adopted are Product markets, Factor markets (including five sub-divisions; Raw material, Labour, Management, Finance, and Technology) and Legislation.

As illustrated in Chapter Two, competition intensity and unpredictability as environmental conditions have been considered. Fisher (1995) claimed that competition and environmental unpredictability are related. He defined unpredictability as: (1) lack of information regarding the environmental factors affecting a given decision- making situation, (2) not knowing how much the organisation will lose if a specific decision is incorrect, and (3) the difficulty in assigning probabilities with any degree of certainty as to how environmental factors are going to affect the success or failure of a decision. This research follows Ibbotson (1976) and Al-Hazmi (1995) in their definitions of competition intensity and unpredictability as follows:

Competition intensity: is the general level of competition, opposition or indifference that makes profitability difficult.

Unpredictability: is the overall degree of variability from period to period that makes forecasting and planning difficult.

The definitions of competition intensity and unpredictability for all divisions of the environment are given in Table 4.1

Table 4.1 Definitions of Competition Intensity and Unpredictability for All Divisions of the Environment

	Competition Intensity	Unpredictability
Product Market	Difficulty in selling products at prices which give an acceptable contribution to profit	Difficulty in predicating company sales given price levels or vice-versa
Raw material	Difficulty in obtaining materials and supplies in the required quantities and qualities and at an acceptable price and time	Difficulty in forecasting the availability and prices of materials and supplies
labour	Difficulty in obtaining managers with the required skills in sufficient numbers, at acceptable terms and conditions	Difficulty in forecasting labour shortages, wage increases and labour disputes
Management	Difficulty in obtaining managers with the necessary qualifications, experience and ability on acceptable terms	Difficulties in predicating managerial vacancies and the terms that have to be offered to fill them
Finance	Difficulty in obtaining the volume and types of funds at acceptable cost	Difficulty in predicating the availability and the cost of different types of funds
Technology	Frequent difficult technical problems have to be solved	Difficulty in foreseeing technological developments both internal and external

Source: Adopted from Ibbotson (1976).

Five-point scales were used for each of the two dimensions as follows:

- Low to High Competition Intensity with five points scales measured on a scale of 1-5, where 1= lowest and 5=highest
- Very Predictable, Predictable, Average, Unpredictable, and Very Unpredictable

In addition, summaries of conditions typical of the extreme points on the scales of competition intensity and unpredictability were developed for each sub-division in the questionnaire. These were not definitive but indicative, because of the complexity of the factors contributing to the overall conditions of competition intensity and unpredictability. The summaries for the Product Market are given in Table 4.2 and all are included in the questionnaire in Appendix 1.

Table 4.2 Summary of Product Market Conditions

For Competition Intensity:

Low Competition Intensity	High Competition Intensity
• Expanding market	• Static or declining market
• Competition negligible	• Intensive competition
• Large number and variety of customers	• Dependent on one major customer
• High profit margins	• Low profit margins
• Well established products and established customers	• New competitors and new products always appearing
• Stable prices of products	• Fluctuating prices of products

For Unpredictability

Very Predictable	Very Unpredictable
• The market follows a steady pattern from period to period	• The market fluctuates widely from period to period
• Prices are stable	• Major competitors are likely to change prices without warning
• New Competitors and new products to upset the market unlikely	• New competitors and new products are always likely to appear. It is difficult to foresee how well a new product will sell

Source: Adopted from Ibbotson (1976).

4.4.2.2 Justification for Using Managers' Perceptions

This sub-section argues the importance of the role of managers' perceptions and cognition in actions in response to environmental conditions. Therefore, this sub-section is related to the domains of human cognition and bounded rationality, which were discussed in sub-sections 2.1.2 and 2.3.1.

Miles and Snow (1978) argued that the effectiveness of organisational adaptation hinges on the dominant coalition's perceptions of environmental conditions. As reported in chapter two, several studies found that managers' beliefs and expectations were based on their definitions of which variables were relevant, important, and desirable in the environmental scanning process. Duncan (1972, p: 325) suggested that environmental conditions are "dependent on the perceptions of organisational members and thus can vary in their incidence to the extent that individuals differ in their perceptions". It could be argued that managers' perceptions of the environment are the links between the environment and the organisation. Duncan (1972) emphasised that environmental conditions should not be considered as constant conditions in organisation. Duncan (1972) stated that future research should emphasise perceptions of environmental

conditions rather than environmental conditions themselves. It could be argued that two organisations might face the same kind of environmental conditions but the responses, or the managers' perceptions in each one would be different. Miles and Snow concluded that each of their four strategies could be observed in any industry. Al-Hazmi (1995) showed that the four milk organisations of his case studies, subject to the same environmental conditions and product market changes, had different responses.

Stacey (1993) and Coad (1995) argued that emphasis on studying perceptions is important because different people might apply different responses. They could focus on different attributes of the unfolding action. Coad (1995, p: 123) defined strategic control as "concerned with the decisions and actions undertaken by organisational actions, past or yet to come". Therefore, it could be argued also that a major source of changes of CMIS is managers' perceptions. This is an internal source of changes in organisations. The only external source is legislation. Whatever the source of conditions (internal or external except for legislation), there will no effect on an organisation unless managers' perceptions are first affected. Furthermore, Macintosh (1994) summarised that although the environment may be the same, the perception of each organisation is different.

Hopwood (1972, 1974) identified the different styles that managers could adopt in their use of accounting information and studied their impact on individual behaviour and organisational performance. However, Otley (1978) obtained different results from those of Hopwood (1972) because the research site had significant differences. The conflicting findings could be reconciled only by adopting a contingent approach, which could allow decision-making and organisation strategy to be considered as a contingent variable. However, Miles and Snow (1978) argued that studies based on contingency theory tend to ignore the important variable of managerial choice. Rahman and McCosh (1976) sought to explain why different uses of accounting control information were observed, and concluded that both individual characteristics and organisational climate were significant factors. Therefore, the choice of studying managers' perceptions of environmental conditions rather than environmental conditions themselves was justified.

Moreover, Boyd et al. (1993) identified two alternative approaches for environmental measurements: archival and perceptual measures. They claimed that objective environmental measures rely on archival sources and include indicators such as growth

in industry sales and concentration ratios. They added that perceptual environmental measures entail the subjective judgements of the environment by organisation members. They pointed out that, although archival measures would be shaped by broad industry factors, perceptual measures would be affected by both industry factors and the more focused task environment or microenvironment. Information from both the micro- and macro-environment would be processed through the mediating filter. They identified this filter as composed of individual cognitive factors, variables at the workgroup and organisational levels, and the strategic focus of the firm. Furthermore, Tymond et al. (1998), based on a review of CMIS research investigating the role of environmental conditions, recommended that the measures should involve top managers' perceptions of the external environment.

Downy and Slocum (1975, p: 567) suggested that " behaviour can best be understood by reference to the behavioural environment (the environment as perceived and reacted to by individuals) rather than by reference to the physical environment (objective physical environment)". This view presents the environment as a set of stimuli, which lack meaning or information value until perceived by individuals. Downey and Slocum (1975) added that perception refers to the process by which managers organise and evaluate stimuli. They supported Duncan's view (1972). He claimed that environmental conditions should be considered as perceptually based. Therefore, many studies came out during the last decade studying managers' perceptions rather than the objective physical conditions. For example, Carpenter and Golden (1997) studied managers' perceptions of discretion, Zhang and Doll (2001) studied managers' perceptions of environmental uncertainties, and King and Zeithaml (2001) related managers' perceptions of causal ambiguity to the firm's performance.

Some researchers (e.g. Mia and Clarke, 1999; Duncan, 1972; Chenhall & Morris, 1986; Govindarajan, 1984; Gul & Chia, 1994) adopted perceptions of environmental conditions rather than the actual environmental conditions. This research supported these researchers' view. In justifying the choice of this tool of measurement, Lawrence and Lorsch (1967) and Downey and Slocum (1975) argued that the environment is enacted or created by the members of the organisation by a process of attention to selected stimuli. If the environment is defined as a set of stimuli, therefore, it lacks meaning or information value until perceived by the individual. This means that the conditions of the environment facing the organisation are determined perceptually. It could be argued that if managers' perceptions towards, strong effects of environmental

conditions are *none,* the scanning or responses of this organisation will be *nothing at all.* Therefore, measuring managers' perceptions of environmental conditions was more important than the measurement of the environmental conditions themselves.

Furthermore, Weick (1979) argued that managers of the world in which they live enact environments. He added that their reality in terms of perceptions about the interactions of people inside and outside an organisation is not to be understood as an empirical reality but rather as a function of management cognition. Weick (1983) claimed that when managers act, their thinking occurs concurrently. Moreover, there is a presumption of logic in meeting a situation. Therefore, action is natural and thinking - in action - in turn provides the action itself with greater meaning. Coad (1995) claimed that it might only possible for managers to make sense of what they are doing after they have done it. Therefore, he argued that explanation of strategic change needs to take account of the view that environments are invented or created in managers' minds and that they can often only make sense of what they are doing with hindsight. It could be argued here that managers actions might be triggered not only by environmental disturbances, but also by other factors, such as changes in government regulations or policy. Moreover, these factors are likely to apply simultaneously and in combination to affect environmental conditions. Porter (1979), for example, suggested that the intensity or degree of competition in an industry depends on the collective strength of different factors in action within the industry. Therefore, this research asked managers directly about their perceptions of environmental disturbances in relation to three dimensions, which were, product market, factor market, and legislation.

Moreover, there are different views of the reasons for the differences in managers' perceptions. Downey and Slocum (1975) argued that individual psychological characteristics, such as their tolerance for ambiguity and cognitive complexity, might influence their managerial perceptions. Sutcliffe (1994) discussed demographic characteristics, such as functional diversity and executive team tenure. Elsbach and Elofson (2000) claimed that secondary effects related to decision explanations' packaging- its language and labelling of the decision process- may play an important role in improving perceptions of a decision maker's competency- based trustworthiness.

4.4.3 Measurement of the Moderating Variables

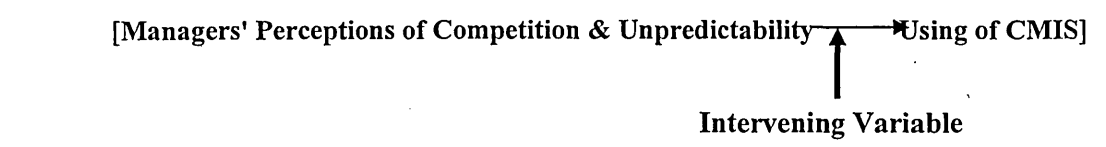
The choice of the organisations involved some degree of control for certain features of the environment such as business sectors, ownership categories, transformation

characteristics and business strategies postures. In order to study how and why perceptions of environmental conditions are different, there was a need to choose a sample containing several sectors with many organisations in each one. Therefore, a sample of organisations was chosen considering the moderating variables, which are related to the kind of sector. Data was collected from four industry sectors (Retail, Assembly, Manufacturing, and Construction). It was assumed that every organisation in a sector faces the same environmental conditions.

Moreover, in order to study the effects of these managers' perceptions of environmental conditions only, the appropriate procedure was to seek to control for such possibly confounding effects of other causes of performance. This would be achieved by holding constant other factors, by studying only organisations that were in the same category, for example, the same business sector (Dess et al., 1990), the same ownership category, the same transformation characteristic and the same business strategy posture. It was assumed that organisations within the same group would face the same environmental conditions. Therefore, by controlling the characteristics of these groups, it would be possible to study the effects on managers' perceptions when they face the same conditions. Business sectors and ownership categories were chosen as control variables because they seem to be external characteristics of organisations. Furthermore, the transformation characteristic was chosen because it seems to be an internal characteristic. Business strategic posture was chosen because it seems to be a link between the organisation and its environment. The interviewees were asked to identify their strategic postures during the interviews.

4.4.4 Measurement of expected Intervening Variables

In order to explain the differences between organisations in the same business sector, ownership category transformation characteristic or business strategy, it was assumed that they face the same environmental conditions. Therefore, it was viewed that there could be some intervening variables, which interfere with the main relationship (effects of managers' perceptions of environmental conditions on CMIS on subject of the selected moderating variables). These intervening variables were managers' education levels, places and kinds of authority, kinds of consultants, and size of organisation. These variables were discovered in the management accounting literature. The effects of each of these intervening variables were tested using the Kruskal H. test, as it will be shown in Chapter Seven. Hence, the basic proposition was:



Chenhall (2003) argued that growth in size of organisation has enabled firms to improve efficiency, providing opportunities for specialisation and the division of labour. He claimed that large organisations tend to have more power in controlling their operating environment. Furthermore, when employing large-scale mass production techniques, task unpredictability reduces. Child and Mansfield (1972) argued that as an organisation becomes larger, the need for managers to handle greater quantities of information increases to a point where they have to institute controls such as rules, documentation and specialisation of role and functions. Chenhall (2003) claimed that contemporary large organisations often develop close associations with suppliers and customers, which shape the boundaries between organisations, thereby increasing further the size of the entity. He added that size has also provided organisations with the resources to expand into global operations, sometimes by way of mergers, take-overs, licensing or other collaborative arrangements.

Moreover, Khandwalla (1972) found that large organisations were more diversified in product lines, employed mass production techniques, were more divisionalised and made greater use of sophisticated controls and environmental information gathering such as forecasting and market research. Reid and Smith (2000) claimed that the role of CMIS in smaller or medium sized organisations has received little attention in the contingency-based CMIS literature.

4.5 The Research Instruments

As illustrated in section 4.1, the research method involved with conducting interviews and then asking each interviewee to fill in a questionnaire. This section discusses the design of these two instruments: the interview guide and questionnaire, in the following two sub-sections.

4.5.1 The Interview Guide

The interview guide was used during the interview to enable it be managed in a systematic way. The interview guide was divided into four parts as follows:

The first part was general background regarding both interviewee (e.g. education level and numbers of years of experience) and organisation (e.g. foundation year and information about the size)

The second part was devoted to two domains: complexity and technology. For Complexity: The interviewee was asked to differentiate between the production units. The interviewee was particularly invited to specify the organisation's main product in relation to three types of strategy (Govindarajan and Gupta, 1985 and Govindarajan and Shank, 1992). (1) Building strategy: e.g. to increase certain business activities by adding product lines or acquisition of entire business. (2) Holding strategy: e.g. to maintain certain business activities by keeping existing capacity and market share. (3) Divesting strategy: e.g. to maintain certain business activities by deleting a product line or selling an entire business. For Technology: The interviewee was asked about the level of technology used in the production process: e.g., manual work, intermediate technology or computer integrated manufacturing. In addition, the guide contained questions about the changes in the technology stance that had happened during the last five years. The aim of this part was to collect as much information about those two domains to discover - in the data analysis stage – intervening variables, which interfere with the main relationship.

The third part was devoted to CMIS policies over the last five years as dependent variables. The data was collected for five years to enable investigation of how and why the selected organisations adapted themselves during this period and to obtain a more long-term picture. Interviewees were asked to describe the environment as experienced over a number of years, not just at the particular point in time. Longer-term strategic cost management relates to underlying factors rather than the immediate situation. This part gives a definition of the three cost management policies, which are based on time; strategy, optimisation and efficiency policies. The interviewee was then asked to explore the existing cost management policies in his organisation in the light of the three types of cost management policies. Furthermore, the interviewee was asked about any significant changes that had taken place in CMIS policies, e.g. a shift from full absorption costing to activity based costing; in addition, how these changes happened, who instigated them (internal or external consultants), what his/ her/ their roles are, and his/ her opinion of capital investment expenditure in the organisation over the last five years, and its effects on cost reduction, increasing profits and CMIS.

The fourth part was related to the managers' perceptions of the two dimensions of their organisation's environment: intensity of competition and unpredictability as independent variables. In the beginning of this part, definitions of both terms were given to the interviewee. The interviewee was asked open questions, about the degree of competition intensity and unpredictability which his / her organisation had faced during the last five, years in relation to the three areas of environment: product market, factor market (raw material, labour, management, finance), and legislation. Furthermore, the interviewee was asked to rank the significance of these areas of environment and the five sub-divisions of the factor market in the organisation.

4.5.2 The Questionnaire

The structured questionnaire was divided into three parts, as follows:

Part one was related to general background regarding the organisations. I answered the questions in this part myself by using the organisation profile and with the help of the first interviewee in each organisation.

Part two was devoted to dependent variables. It contained a long table regarding the extent to which cost information was used in the organisation for efficiency, optimisation and strategy decisions. Five-point scales (as used by Al-Hazmi, 1994 and Ibbotson, 1976) were used to measure these variables.

Part three was devoted to enquiring about the degree of competition intensity and unpredictability, which the organisation faces on product market, factor market, and legislation. Then the respondent was asked to rank the significance of these three divisions of external environment relative to his organisation in order to express their importance. The last two questions in this part identified the degree of unpredictability which the organisation faced, by asking about the types of cost information (quantitative and qualitative) generated by the formal reporting system and the degree of repetition (daily, weekly, monthly, yearly) of the formal reporting system for decision-making.

4.6 Reliability of Construction of the Data

The number of questions used as a measurement of each variable was too great for the purposes of analysis. They were classified logically under main variables and sub-main variables in the questionnaire. There were nine main groups: using CMIS information for efficiency, optimisation and strategy, managers' perceptions of competition intensity

(MPCI) for each of the product market, factor markets and legislation and managers' perceptions of unpredictability (MPU) for each of the product market, factor markets and legislation. Furthermore, there were ten sub-main variables: managers' perceptions of competition intensity and unpredictability for each of raw material, labour, management, finance and technology. Therefore, there was a critical need to aggregate the questions which were strongly related. Factor analysis was tried, initially, to achieve this purpose. Factor analysis is a method to reduce a large number of questions to a smaller set of factors. Factor analysis achieves this aim by looking for questions that correlate highly with a group of other questions but correlate very badly with questions outside of that group, by reducing a data set from a group of interrelated questions into a smaller set of un-correlated factors (see for details Field, 2000; Bryman and Cramer, 2001). However, this smaller set of un-correlated factors still produced more than one factor under each main or sub-main variable. Therefore, a reliability test was used to get one value to represent each variable. Bryman and Cramer (2001) argued that internal reliability is particularly important in connection with multiple-items scales. Then, factor analysis was applied for the questions in each created new variable to be sure that they correlated highly with each other. The whole factor analysis test is in Appendix 4.

Reliability was established by testing for consistency. Consistency indicates how the items measuring a concept hang well together as a set. One of the currently widely used methods to measure reliability is Cronbach Alpha (Sekaran, 2000; Field, 2000; Bryman and Cramer, 2001). Cronbach's Alpha is a reliability coefficient that reflects how well the items in a set are positively correlated to one another. Cronbach's alpha is computed in terms of the average inter-correlation among the items measuring the concept (Sekaran, 2000; Gill and Johnson, 2002). Bryman and Cramer (2001) argued that this test is important in relation to multiple-item scales. They added that this test addresses the question of whether each scale is measuring a single idea and whether the items that make up the scale are internally consistent. The Alpha coefficient was used to examine the reliability of the constructs of the research instruments (interview's guide and questionnaire). Furthermore, one value was created for each main variable and sub main variable using a reliability test to decrease this number of questions by adding the value of each inter-correlated question.

Questions, which had low inter-correlation in each group, were deleted to reach a value of Alpha as close to 1 as possible. Statistics books (see as an example Sekaran, 2000, p: 287) advise that the closer Cronbach's Alpha is to 1, the higher the internal consistency

reliability. Therefore reliabilities less than 0.6 are generally considered to be poor, those in the 0.7 range to be acceptable, and those over 0.8 to be good. Table 4.3 illustrates the questions which were used to measure using CMIS for efficiency, optimisation and strategy and the Alpha coefficient for each group of questions.

Table 4.3 Alpha Coefficient for Using CMIS for Efficiency, Optimisation and Strategy

The Group of Questions	Alpha Value
For using of CMIS for Efficiency 1. Importance as scorekeeping of historical data 2. Measuring efficiency of production performance 3. To provide a means of communication 4. To enhance cost reduction programmes. 5. Measuring of efficiency and capacity utilisation 6. Motivating efficiency improvements 7. To enhance labour productivity 8. To enhance equipment productivity 9. To achieve target profit 10. To achieve target of production 11. To maintain certain profit margins 12. Role of standard cost in assessing performance 13. Performance evaluation of management 14. Planning of budgeting 15. Planned and actual product cost. 16. Management and control of period costs 17. Identification of necessary corrective measures 18. Importance of flexible budget for manufacturing cost control 19. Variance analysis and exception reporting	0.95
For using of CMIS for Optimisation 1. Importance of product cost as an input to pricing decision 2. Product mix decisions 3. Transfer prices for internal services 4. Make or buy decisions. 5. Determination of economic lot size 6. To emphasis throughput rate	0.88
For using of CMIS for Strategy 1. Development of better manufacturing methods 2. To manage long run cost structure 3. Evaluation of investment projects 4. Decisions of company strategy 5. Planned and actual customer profitability 6. Improvement of product characteristics 7. Importance of competitor cost analysis 8. To forecast the future 9. Importance of technology configuration 10. Importance of product configuration 11. Product quality analysis 12. Market share analysis 13. Market growth analysis 14. New product development 15. Market development 16. Market and competition details	0.97

Table 4.4 represents the groups of questions and their Alpha, used to measure both managers' perceptions of competition intensity (PCI) and managers' perceptions of unpredictability (PU) for all the environment divisions; product market, factor market including raw material, labour, management, finance and technology, and legislation.

Table 4.4 Alpha Coefficient for CI & U for Environment Divisions

The Group of questions for	Alpha for PCI.	Alpha for PU.
For Product Market 1. Market Changes(Sales) 2. Competition intensity 3. Customers variety 4. Profit margins 5. product innovation 6. Nature of competition 7. Prices of products	0.88	0.83
For factor market **(1) Raw Material** 1. Supply 2. Sources of raw material 3. Competition between suppliers 4. Cost of raw material 5. Delivery time 6. Nature of suppliers 7. Prices of raw material	0.63	0.65
(2) Labour 1. Availability of skilled labour 2. Competing employers 3. Wage rates 4. Target union 5. Labour turnover 6. Labour dependency 7. Industrial relation	0.69	0.56
(3) Management 1. Availability of qualified managers 2. Salary of management 3. Competition for good managers 4. Staff turnover	0.48	0.54
(4) Finance 1. Availability of finance 2. Sources of finance 3. Cost of finance 4. Staff turnover	0.76	0.84
(5) Technology 1. Availability of equipment 2. Equipment supplier 3. Competition for equipment 4. Delivery of equipment 5. Equipment failure	0.95	0.95

The Group of questions for	Alpha for PCI.	Alpha for PU.
6. Nature of manufacturing technology 7. Nature of system technology 8. Technological development 9. Equipment obsolescence 10. Capital labour substitution		
For Legislation 1. Regulators in the industry 2. Number of legislation 3. Nature of legislation 4. Effect of legislation	0.90	0.93

Depending on the results of reliability tests, new values for each group and subgroup were created by computing the average of the answers of questions which were included to get an acceptable value for Cronbach's Alpha. Most of the values of the Cronbach's Alpha statistic were safely above the limit of acceptability, which is usually considered to be 0.6 or more. Thus, the result of the reliability test proved that the questions used to measure each variable were consistent.

Bryman and Cramer (2001) and Sekaran (2000) argued that a factor analysis test can be used to assess the factorial validity of the questions which make up a scale (by telling us the extent to which they will be measuring the same concepts or variables). Factor analysis was used for three main purposes: (a) to assess the degree to which items were tapping the same concept; (b) to determine the degree to which they could be reduced to a smaller set; (c) to try to make sense of the complexity of social behaviour by reducing it to a more limited number of factors. The results of the reliability test showed that the questions used to measure each variable and sub-main variable were inter-correlated. Therefore, the researcher thought it worthwhile to conduct factor analysis for these questions[1]. Fortunately, the results of factor analysis test for all the variables supported the results of the reliability test. The full details of the reliability and factor analysis tests are in Appendix 4.

In this research, factor analysis was used to ensure that the results of the reliability test, which was used to identify the most suitable questions for measuring each variable and sub-main variable, were correct. Bryman and Cramer (2001) claimed that the two widely used forms of factor analysis are 'Principal-Component' and 'Principal-Axis

[1] If there is no significant correlation between these items, they are unrelated and we would not expect them to form one or more factor (Bryman and Cramer, 2001: 273).

Factoring'. The researcher chose the principal component method[1]. The rationale for choosing principal-components analysis was that it analyses all the variance of a score or variable, including its unique[2] variance.

4.7 Data Analysis

A database was created for each organisation and for each sector. Each database for an organisation included archival documentation, the manuscript text of personal interviews, completed questionnaires and the notes. Each database for each sector included any documents collected during on site-visits. Each database was kept in separate manual files identified by the name of organisation and industry. The analysis will be in three levels as follows:

Level 1: Each organisation data was set in a unique account. Thus, the organisation as a whole was the unit of analysis to identify its CMIS as policies and practices.

Level 2: Within each group of the moderating variables, organisations provided insights into the nature and consequences of this moderating variable. Thus, the group of organisations as a whole was the unit of analysis to identify the differences between the organisations' policies and practices contained in each sector and to explain these differences by the moderating variables.

Level 3: Between industry sector organisations provided an examination of the perception of moderating variables and their consequences. The data of the independent (managers' perceptions of competition and unpredictability) and dependent (policies and practices of CMIS) variables were both quantitative and qualitative.

SPSS was used to analysis data to achieve the research aims. In this research, various descriptive statistical analyses were carried out to describe the dependent and independent variables in each level (all data, kinds of business level, transformation operation kind, ownership category level and business strategy postures). The use of a specific kind of descriptive analysis depended on the kind of variable described and the objective of carrying out this analysis. Sections 7.2.1 and 7.2.3 represent these analyses and the results.

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[1] The difference between the two methods is in the way they handle unique variance.

[2] Unique variance is a combination of both specific variance and error variance (for more details on 'variance' see Bryman and Cramer, 2001: 274.

Moreover, various statistical analyses for association were carried out, including Cross Tabulation, and Spearman's Rho Correlation, to study relationships between variables and compare their relationships between each level and other levels. The choice of analysis type, also, depended on the kind of variables. Sections 7.2.2 and 7.2.4 represent these analyses and their results.

Furthermore, the Kruskal-Wallis H. test was used to discover the existence of effects of moderating (conditional) variables in the relationships between cost management systems and managers' perceptions on environmental conditions. Section 6.2.5 represents this analysis and the related results.

Moreover, Spearman's Rho correlation coefficients and multiple regression analysis were used to test the linearity hypothesis. Curve-Linear Regression test is used to test the non-linearity hypothesis. The Kruskal- Wallis H test is used to test the existence of effects of intervening variables; the third hypothesis. Chapter Seven represents the results of these analyses.

4.8 Conclusions from this Chapter

This chapter has focused on the methodology and method used to carry out this research. The research objective is to test the three hypotheses related to the relationships between managers' perceptions of environmental disturbances and use of CMIS in organisations. These hypotheses were built on the neo-contingency theory adopted in Chapter Two. Thus, the research is deductive work, because there were some hypotheses arising out of the theory, which needed to be tested. The ontological stance adopted is realist since the collected data is real. The epistemological stance is positivism, since the method of collecting the data is guided by an objectivist approach to social science. The theoretical framework is based on sociological functionalism with a pluralist view of organisations, as explained in Chapter Three.

Many authors (e.g. Otley, 1980; Donaldson, 2001) encouraged the use of the case study method when applying contingency theory as a theoretical base. The adopted theoretical base, which is neo-contingency theory, requires collection of data from many organisations to study how each organisation's circumstances affect CMIS policies and practices. Moreover, testing of the hypotheses required studying multiple organisations as case studies through collecting data by interviews and questionnaires. By administering the latter in the interview context, at the end of each session, the

interviews were conducted smoothly without interruptions and all the needed data could be collected without the risk of low responses typical of mailed questionnaires. Thus, the analysis included building multiple case studies to test the three hypotheses.

I gained access to 29 Egyptian organisations chosen from a variety of sectors depending on the moderating variables. I underlook 88 interviews and 88 questionnaires were completed by the managers. This research distinguished between policies and practices of CMIS. The measures adopted for CMIS as policies were facts or were reported by managers. However, the measures adopted for CMIS as practices were the managers' use of CMIS to achieve the three purposes: efficiency, optimisation and strategy which were discussed in Chapter Three.

The independent variables, which were the environmental conditions (Competition Intensity and Unpredictability) were measured based on managers' perceptions. As discussed in Chapter Two, an organisation was considered as a system. Thus, an organisation has input (factor market including raw material, labour, management, finance and technology), and output (product market) and this system works in a legislative environment. Therefore, the environmental dimensions considered were Product markets, Factor markets (including five sub-dimensions; Raw material, Labour, Management, Finance, and Technology) and Legislation.

The moderating variables adopted were business sectors, ownership, transformation characteristics and business strategies postures. The main assumption here is that each group of these moderating variables faces the same environmental conditions. The main aim in designing the interview guide was to try to collect data which could help in testing the mangers' views about the supposed intervening variables which might interfere with the main relationship. Fortunately, reliability and factor analysis tests proved that the questions used in the questionnaire to measure each variable were consistent. Thus, the data analysis stage could be started using this valid and reliable data.

Now that the research methodology and the method have been explained, identified the measures of variables identified and the design of the Interview Guide and the Questionnaire discussed in this chapter, the data collected will be presented and analysed in the next three chapters.

Chapter Five

Egyptian Economy and Presentation of the Case Studies

5.0 Introduction

Chapter Four discussed the collection of data for this study. It started by justifying the measures adopted for the variables and the design of the research instruments which were used in collecting data: the Interview Guide and the Questionnaire. It included also the results of reliability and factor analysis tests. All the organisations which participated in the study are located in Egypt. Consequently, the organisations are affected in general by economic developments in Egypt and, in particular, by the level of economic activity in Egypt in the period up to 1998 (the year in which the data were collected). Therefore, all the historical aspects, which influence the organisations, were up to that year. The economy of Egypt, like that of many emerging markets, has been characterised by significant Government involvement through direct ownership of organisations and through extensive regulation of market conditions, including foreign trade and financial services.

This chapter highlights the characteristics of the Egyptian economy, which affect all the organisations working in Egypt. It highlights some aspects of economic history, which influence the organisations. Moreover, it draws alteration to the significance of the private sector role in the Egyptian economy. It also describes the Egyptian exchange rate system, which applies to the organisations.

Furthermore, this chapter presents the case studies carried out in Egypt (which were collected by various tools: questionnaires, interviews and documentary materials). For each case, the presentation includes the name of organisation, its activities, the number of interviews and questionnaires, the duration of each interview, and the other documents collected. Appendix 3 contains profiles of each participating organisation. It includes an outline of the organisation's history and background, an account of the questionnaire data and observations from the interview data, from which the intervening variables were discovered. A note to be made here is that the main aim of the interviews was to discover the intervening variables, which could affect the main relationship: managers' perceptions of environmental conditions and CMIS as policies and practices to achieve efficiency, optimisation and strategy. To achieve this aim, there is no a need to translate and quote the Arabic comments noted during the interviews. It is enough to

describe the activities carried out in each organisation in the context of this chapter and refer to the most important issues in organisations, which lead to their being considered as intervening variables in Chapter Eight.

This chapter is divided into five sections. The first one contains some aspects of economic history which might affect the organisations. The second section contains discussion about the significant role which the private sector plays in investment in Egypt. It includes two sub-sections. The first sub-section discusses the privatisation system in Egypt, which started in 1996. The second sub-section refers to the methods used to reform and encourage the public organisations in Egypt. The third section describes briefly the Egyptian exchange rate system, which applies to the participating organisations. The fourth section presents the organisations that participated in the study and the final section contains the conclusions from this chapter.

5.1 History

During the presidency of Gamal Abdel Nasser (1952 - 1971), the economy of Egypt was radically socialised. Beginning in 1961, foreign trade, banking, insurance, and most wholesale and industrial establishments were nationalised. Those services, which remained in private hands, were placed under heavy regulatory restraints. Industry was expanded and production increased according to a five-year plan. Inadequate foreign investment, a sluggish bureaucracy and the disastrous 1967 Arab-Israeli War challenged subsequent development programmes until a process of economic reform was established by Abdel Nasser's successor, Anwar Sadat, in the aftermath of the October War of 1973.

By reversing many of Abdel Nasser's policies and opening Egypt to foreign investment, President Sadat (1970 – 1981) began a gradual revival of the Egyptian economy, which was significantly enhanced by payments from Egyptians working in the surrounding oil producing countries. The very slow but sure relaxation of import, currency and trade restrictions stimulated Egypt's foreign exchange economy.

Despite the many advances that Egypt has witnessed under President Hosni Mubarak (1981 - present), Egypt continues to suffer from regional instability and its exploding population. Government leaders openly admit that population growth is restricting all efforts toward developing the Egyptian economy. Another negative factor is servicing a foreign debt more than twice the size of the national budget. Under pressure from the

International Monetary Fund and World Bank, Egypt finally began to lift price controls, reduce subsidies and relax restrictions on trade and investment.

Furthermore, the government has drawn up a comprehensive programme to promote local and foreign investment, develop investment instruments available in the capital markets and establish new mechanisms and legislation necessary to protect investors in this area. A detailed investment promotion plan has been devised, which mainly aims at attracting and activating domestic and foreign investments, consequently generating additional job opportunities and production of exportable commodities in demand in world markets.

In 1991, the Government commenced an economic reform programme, the objectives of which are macroeconomic stability, financial sector reform and the reduction of price distortions and obstacles to foreign trade. Key elements of the reforms have been the introduction of a privatisation programme. The gradual replacement of central planning by market economics, the gradual reduction of government spending on subsidies, the deregulation of interest rates and foreign exchange, the introduction of Capital Market Law No. 95 of 1992 (the "Capital Market Law") and trade liberalisation. The economic reform programme, which has the support of the International Monetary Fund and the World Bank, has significantly improved the performance of the Egyptian economy since 1991.

5.2 Significance of the Private Sector's Role in Investment

In 1996, the government initiated its Economic Reform and Structural Readjustment Programme, which provided for a detailed plan to expand private ownership base in two ways. The first was by encouraging and motivating the private sector to increase its relative weight in the national economy. The second was by reducing the public sectors relative weight by means of transferring the ownership or management of state owned organisations to the private sector.

Therefore, two significant tasks have been undertaken; privatisation and reform of public organisations. The government amended the investment law in order to remove difficulties and simplify procedures for setting up new projects, offering several investment incentives and guarantees. To further encourage the private sector's role, the government has gradually abolished the public sector monopoly of many activities, such as maritime transport and most recently, insurance business.

The government directed its efforts to maximise participation of the private capital in addition to injecting public investment into specific channels, e.g. education and health, to ensure that development is achieved at higher rates. The government also protects private investments against any convulsions, which may occur due to abnormal capital market practices, normally associated with economic liberalisation.

Due to government encouragement of investment, the capability of Egypt's private sector has greatly increased and its activity has expanded. During 1996/97, private sector investments accounted for about 51% of the total national investments, expected to hit about 63% in 1997/98 [1].

Moreover, the inflow of direct foreign investments needs time until investors have been convinced that the positive Egyptian economic indicators are stable and sustained and the economy is capable of generating sustainable growth, ensuring and entrenching a favourable investment-attracting climate. Furthermore, Demirsar (1998) considered the development of free zones to strengthen its private sector, attract foreign investment, create jobs and ease pressure on crowded areas.

By 1997, global foreign direct investment inflows had reached about 364 billion US Dollars, of which 84% originated from the industrialised countries (whose share accounted for 60%), whereas the developing countries' share was 37% (135 billion US Dollars). The Arab countries received about 6 billion US Dollars, while the developing Southeast Asian countries received 85.1 billion US Dollars[1].

The following two sub-sections shed more light on the two approaches taken to expand the private ownership base: privatisation and reform of public organisations.

5.2.1 Privatisation Update

Privatisation is an integral part of Egypt's overall reform programme and it represents a major strategic objective. Following on the government's success in implementing stabilisation policies, efforts are being directed to stimulate and encourage a more active participation of the private sector in all fields of economic activity. Privatisation is meant to attain this objective by breaking up major state monopolies and by transferring

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[1] The source of this information: http://www.sisgov.eg/public/invest198/html/text.ht,

[1] The source of this information: http://www.sisgov.eg/public/invest198/html/text.ht,

the ownership of public sector organisations to the private sector. Privatisation is expected to strengthen competition and promote increased private sector investment in the economy, two necessary conditions for rapid growth and development.

The rate of privatisation had been slow until the beginning of 1996, partly on account of the time taken to introduce the necessary legislative and regulatory arrangements, and partly because the socio-economic climate was not ready for a comprehensive and major privatisation programme. First, the economy was suffering from a set of major price distortions and market imperfections. Second, the macroeconomic environment was unstable, with major imbalances in the structure of the economy. Third, the stabilisation policies adopted in the early phase of the 1991 reform programme produced a slowdown of the economy with some negative outcomes on the most vulnerable classes of the population. Given these conditions, the government moved cautiously on the privatisation programme.

May 1996 marked the entrance of the implementation of a determined privatisation programme where three initial public offerings took place. This privatisation was done via the stock market for the first time. Both the local and international markets have welcomed the government's new stance and reacted positively to these privatisation efforts. The response is reflected in the extent to which all public offerings have been over-subscribed and in the number of foreign investors who are expressing their interest.

The organisations offered for sale need a process of upgrading management systems and modernising applicable techniques so as to reinforce their financial structures and increase profitability. Then, sale will be affected to an investor that should hold the majority of votes in the organisation's general shareholders meeting in order to have the upper hand in management. The Ministry of Public Organisation Sector, in charge of implementing the privatisation programme in Egypt, is adopting new methods used for the first time to promote the sale of such organisations to an investor, whether Egyptian or foreign. It also seeks to provide for the important elements that will ensure the success of direct negotiations. Unlike the profit-making organisations sold under phase I of the privatisation programme, the organisations recently offered for sale will not be floated on the stock market. Due to the low profitability of organisations offered for sale under phase II, they have to be sold to an anchor investor, which is required to be technically pre-qualified in the specific organisation's activity (this is verified from the

interviewees' comments as illustrated in Table 5.3 . An anchor investor will not endeavour to inject capital and take the risk of investment anywhere unless he has guaranteed the right of management control. Such a right can be secured by holding the majority of shares at a minimum of 51% of the total shares and preferably above 66%, now that certain decisions require a majority of two thirds of the votes of the general meeting (according to Egyptian Company Law). An anchor investor may be an individual Egyptian and may be a group of individual investors.

As of the end of July 1996, 28 organisations had been majority privatised (including 10 organisations under liquidation), worth LE 3,751 million representing 5.2 percent of the total book value of Law 203 organisations (public sector organisations). Another 17 organisations had been minority privatised, worth LE 6,965 million and representing 9.6 percent of the total book value of public sector organisations. Moreover, the government had also sold part or all of its stake in a large number of joint venture organisations established under Egyptian Law 43. There is more than one method of privatisation, which may suit any type of investor, ranging from buying organisation assets to buying a large share in a given organisation.

5.2.2 Reform of Public Organisations

The process of reform of State-Owned Organisations (SOEs) is an ongoing process since the beginning of Egypt's comprehensive economic reform programme. The enactment of Law 203 of 1991 (the public organisation law) indicated the start of public organisation reform. The law was designed to eliminate the difference in treatment between public and private organisations and level the playing field for all business. The significance of the law is that it explains clearly the new rules of the SOEs; Profit maximisation is the primary objective for all SOEs. There are no subsidies for SOEs either directly via transfers to losing organisations, or indirectly via subsidised inputs. There are no special interest rates on loans to SOEs. SOE autonomy in all decisions is related to their operation. SOEs are affiliated to Public Holding Organisations, which monitor SOE performance and can name or change SOE management according to criteria of profitability. The issuing of the Egyptian Company Law 203 was coupled with the establishment of the Public Organisation Office, which is a technical office responsible for setting plans and monitoring the restructuring and privatisation programme. The Public Organisation Office has reorganised the entire structure of the SOE sector by shifting SOEs to the newly formed Public Holding Organisations.

Implementation of Law 203 has been successful in removing all sources of duplication between public and private business concerns and has raised the efficiency of SOEs by allowing them to operate under the same set of conditions and rules governing the private sector. Competition has been promoted, and SOEs are no longer constrained in their operations by any social burdens such as selling at controlled prices or hiring in excess of their required labour, which the Egyptian public organisations faced before those changes.

Public sector reform does not contradict privatisation. On the one hand, restructuring the organisation technically and/or financially makes the organisation much easier to privatise. On the other hand, SOE reform ensures that those assets that are still publicly held are no longer a liability on the government budget. SOEs operate under the same set of rules and regulations as those governing the private sector.

5.3 The Egyptian Exchange Rate System

For some of the organisations in the research sample, foreign imports represent approximately 50% or occasionally more of the organisation's cost of goods sold. Therefore, an exchange rate system could subject organisations to foreign exchange risk.

Prior to 1991, the Government exercised significant control over exchange rates between the Egyptian pound (the official currency of Egypt) and foreign currencies. This exchange rate system was replaced in early 1991 by a simpler system of one rate for private transactions (by banks and non-bank dealers) and another rate for government transactions, linked to the free market rates. The margin between the two rates gradually disappeared, and in October 1991 a unified free market rate was applied. This also resulted in the discontinuance of the Central Bank of Egypt pool into which export revenues from oil, cotton and rice (the main exports in that time) had previously been paid in order to contribute foreign debt servicing and subsidised food imports.

The International Monetary Fund (IMF), in 1995, recognised the success of Egypt's economy and its financial stability achieved as a result of the policies of Egyptian leadership, in opening the door for the private sector's participation in various economic activities. The actual application of this trend was helping the Egyptian economy to develop. Egypt also managed to realise a higher degree of general financial discipline

and stability of the national currency, reflected by the improvement in the Egyptian balance of payments.

The growth rate of the Egyptian economy accelerated, as the private sector maintained enthusiasm for investment and transfer of technology, despite the increasing rate of population. The government embarked on a rapid reform of the borrowing structure, limiting financial deficit through strict measures. This reform programme encouraged the policy-maker to continue it for the next five years.

Egypt has adopted policies to avoid the adverse effects of economic reform programs and the changes that could constitute burdens on low-income classes, as well as to improving standards of living. According to the IMF report, these policies achieved complete success. The Egyptian government came to depend on local loans to replace foreign ones in the form of treasury bills and bonds. Moreover, the government's intervention to relieve the Egyptian pound of pressures by other currencies led to the building of a big stock of foreign currencies in 1991, which grew later to be able to finance imports, an achievement unprecedented in third world promising economies.

In August 1994, the current Foreign Exchange Law was passed to complete the previous steps to liberalise the foreign exchange market. The Central Bank of Egypt, registered banks and the other authorised entities are now free to determine the applicable exchange rate within the framework of a free foreign exchange market. The Foreign Exchange Law and its executive regulations permit the free transfer of foreign currency inside and outside Egypt, provided such transfer is effected through registered banks. Therefore, the Central Bank of Egypt does not usually intervene directly in the foreign exchange market, but makes use of the four public sector banks to influence the exchange rate.

The Egyptian pound is not officially convertible outside Egypt through banks. Therefore, the Foreign Exchange Law provides that the entry and export of Egyptian currency, notes or coins will be in accordance with the terms and conditions set forth by the competent Government minister. Throughout the development of the exchange rate systems in Egypt, the exchange rate of the Egyptian pound to the US dollar (in 1995, 3.40 Egyptian Pounds equalled one US Dollar) has always provided the basis for determining the exchange rates between the Egyptian pound and other foreign currencies.

Egypt has been opening its doors wider to foreign trade and more aggressively seeking foreign investment since launching its economic reform programme in 1991. In 1995 the business climate was expected to continue to improve, with a number of laws and new incentive programmes already in place or under consideration. Egypt's reforms have created exchange rate stability and allowed the Central Bank to accumulate $18 billion in reserves. The Egyptian Pound (LE) is fully convertible and investors report no difficulty in repatriating profits. Most multi-national investors claim to be making money and Egypt is one of a handful of markets world-wide where the U.S. has a multi-billion dollar trade surplus. By far the largest Arab country by population, Egypt is in the heart of the Middle East and boasts of a reasonably well-educated and English-speaking labour force. The market is large: anywhere from five to ten million of Egypt's population of 60 million enjoy Western consumption patterns. The rest of the population is poor, but habits and consumption are changing rapidly; fast food licensing has been a particular area of recent growth. Moreover, given its strategic position in the region, Egypt continues to benefit from strong donor support, including about $2.3 billion annually in U.S. economic and military assistance. Increased tourism is evident and new regional energy projects are under active discussion.

5.4 Presentation of the Case Studies

I was able to access 29 organisations in Egypt. Table 5.1 represents a list of the organisations' names, classified depending on their business sectors and the sources of collected information, including the number of interviews, the number of questionnaires, and other documents. As explained in Chapter Four, the research method in this study was to conduct interviews and, at the end of each interview, ask the interviewee to fill in the questionnaire. Furthermore, the research method included collecting the available documents in each organisation. I was able to conduct 88 interviews in the 29 organisations. Therefore, there were also 88 completed questionnaires. Appendix 3 contains profiles of the organisations that participated in the research.

Moreover, Table 5.2 contains the organisations' names classified by the moderating variables: Business Sectors, Ownership Categories, Transformation Characteristics and Strategic Postures.

Table 5.1 List of Organisations' Names

Organisation Name	Activities	No. of Interviews	Interviewees	Interview Duration	Other documents
1- Savola Egypt	Refine crude and semi-refined edible oil for the purpose of processing and packing different oil products	4	1- Senior Cost Accountant 2- Managing Director 3- Financial Director 4- Marketing Manager	1 Hour 1 Hour 1.5 Hours 1.5 Hours	Balance sheets, income statements, and statements of cash flows for the last five years
2- Building Blocks Organisation	Manufacturing all sizes of Building Blocks	3	1- Senior Cost Accountant 2- Financial Director 3- Marketing Manager	1.5 hours for each	Balance sheets, and income statements for the last five year
3- Glaxo Wellcome Egypt	A pharmaceutical organisation	3	1- Senior Cost Accountant 2- Financial Director 3- Product Marketing Manager	1.5 hours for each	1- Balance sheets, income statements, and statements of cash flows for the last five years 2- The budget for 1998
4- Lever- Egypt	Manufacturing and distribution of detergents and consumer products	3	1- Senior Cost Accountant 2- Financial Director 3- Marketing Manager	1.5 hours for each	Balance sheets and income statements for the last five years
5- Sime Darby Oil Products Egypt Organisation	- Refining crude and semi-refined edible oil for the purpose of processing and packing different oil products - It is owned by non-Egyptian	3	1- Senior Cost Accountant 2- Financial Director 3- Marketing Manager	1 Hour 2 Hours 1 Hour	Balance sheets, income statements, and statements of cash flows for the last five years
6- Al-Ahram Beverages Organisation	Manufacturing and selling of alcoholic and non-alcoholic beer, carbonated soft drinks and malt.	3	1- Senior Cost Accountant 2- Financial Director 3- Marketing Manager	1 Hour 2 Hours 1 Hour	-Balance sheets, income statements, and statements of cash flows for the last six years

Organisation Name	Activities	No. of Interviews	Interviewees	Interview Duration	Other documents
7- Atlantic Industries Egypt Branch	Processing Coca-Cola concentrates and other products of Coca-Cola	3	1- Senior Cost Accountant 2- Financial Director 3- Marketing Manager	1 Hour 2 Hours 1 Hour	Balance sheets, income statements, and statements of cash flows for the last five years
8- Ragaegypt	Manufacturing agriculture equipment	2	1- Senior Cost Accountant 2- Financial Director	1 Hour 2 Hours	Balance sheets, and income statements for the last five years
9- Organisation of Toshiba Al-Arabi	Manufacturing motors for electrical equipment	2	1- Senior Cost Accountant 2- Marketing Manager	1.5 hours for each	None
10- Cement Beni-Suef Organisation	Manufacturing all kinds of cement	3	1- Senior Cost Accountant 2- Financial Director 3- Marketing Manager	1.5 hours for each	Balance sheets, and income statements for the last four years
11- Peugeot Egypt Organisation	Manufacturing and assembling Peugeot 405 and 505 passenger cars	2	1- Senior Cost Accountant 2- Financial Director	1.5 hours for each	Balance sheets, income statements, and statements of cash flows for 1995, 1996 and 1997
12- Suzuki Egypt Organisation	Manufacturing and assembling all kinds of Suzuki cars	2	1- Senior Cost Accountant 2- Financial Director	2 hours for each	None
13- Ghabbour Egypt	Manufacturing and assembling Luxury Buses, Services and maintenance of manufactured buses and trading of spare parts.	3	1- Senior Cost Accountant 2- Financial Director 3- Marketing Manager	1.5 hours for each	Balance sheets, income statements, and statements of cash flows for 1996 and 1997
14- Prima Engineering Industries	Passenger cars assemble, manufacturing trails rippers, manufacturing body of micro & minibus and assembling generators.	2	1- Senior Cost Accountant 2- Financial Director	1.5 hours for each	Balance sheets, income statements, and statements of cash flows for 1995, 1996 and 1997

Organisation Name	Activities	No. of Interviews	Interviewees	Interview Duration	Other documents
15- Al-Arabi for Manufacturing	Manufacturing and assembling Television sets (Toshiba)	2	1- Senior Cost Accountant 2- Marketing Manager	1.5 hours for each	None
16-Abou Ghali Cars	Authorised dealer in Mercedes Benz automobiles and Spare parts	3	1- Managing Director 2- Financial Director 3- Marketing Manager	1.5 hours for each	None
17- Free Markets Egypt	Dealing with all kinds of imported goods	4	1- Managing Director 2- Financial Director 3- Marketing Manager 4- Accountant Staff	1 hour 1 hour 1.5 hours 1.5 hours	Balance sheets, and income statements for the last five years
18- International Trading Agencies & Marketing Organisation (ITAMCO)	Marketing, distributing and trading in electrical equipment, household appliances and building material-local and imported	4	1- Managing Director 2- Financial Director 3- Marketing Manager 4- Accountant Staff	1 hour 1 hour 1.5 hours 1.5 hours	Balance sheets, and income statements for 1995, 1996 and 1997.
19- Ragie Abdel-Fatah Organisation	Marketing, distributing and trading in agricultural equipment	3	1- Managing Director 2- Financial Director 3- Marketing Manager	1 hour 1 hour 1.5 hours	Balance sheets, and income statements for the last five years
20- Tractors and Engineering Organisation	Marketing, distributing and trading in electrical equipment, household appliances and building material-local and imported	3	1- Managing Director 2- Financial Director 3- Marketing Manager	1 hour 1.5 hours 1.5 hours	- Balance sheets, and income statements for the last six years - A book containing a lot of analytical information
21- El-Masrya For Agencies and service station	Car dealer special focus on HONDA	2	1- Managing Director 2- Marketing Manager	1.5 hours 1.5 hours	None

Organisation Name	Activities	No. of Interviews	Interviewees	Interview Duration	Other documents
22-Egyptian Constructions Organisation (Moukhtar Ibrahim)	Constructing and developing major in Waste disposal, Potable Water, factories, Public buildings, Roads, Bridges, Land Reclamation , electric power, tourist villages and housing in Egypt as well as in Kingdom of Saudi Arabia, Republic of Algeria, Libyan Arab Jamahirya State of Kuwait and State of United Arab Emirates	3	1- Managing Director 2- Financial Director 3- Production Engineer	1.5 hours for each	-Annual Reports for 5 last years - A general booklet
23- Naser City Constructions	Land Reclamation, and Constructing and developing private and public housing in the local area in Egypt	3	1- Managing Director 2- Financial Director 3- Accountant Staff	1 hour 1.5 hours 1.5 hours	Annual Reports for 5 last years
24- Holyoplies Constructions Organisation	Land Reclamation, and Constructing and developing private and public housing in the local area in Egypt	4	1- Managing Director 2- Financial Director 3- Production Engineer 4- Senior Accountant	1 hour 1.5 hours 1.5 hours 1 hour	Annual Reports for 5 last years
25- Wadie Com Ambo For Land Reclamation Organisation	Land Reclamation, and Constructing and developing private and public housing in Egypt	5	1-General Manager 2- Financial Director 3- Production Engineer 4- Senior Accountant	Each 1 hour	- Annual Reports for 5 last years - A general booklet
26- Arab Constructors	Constructing and developing major in Waste disposal, Potable Water, factories, Public buildings, Roads, Bridges, Land Reclamation, electric power, tourist villages and housing in Egypt as well as in other countries around the world	3	1- Financial Director 2- Production Engineer 3- Senior Accountant	1 hour 1.5 hours 1.5 hours	Important Indicators for the last six years

Organisation Name	Activities	No. of Interviews	Interviewees	Interview Duration	Other documents
27- El Garahi for Constructions	Constructing and developing private and public housing in Egypt.	4	1-General Manager 2- Financial Director 3- Production Engineer 4- Senior Accountant	Each 1 hour	Balance sheets, and income statements for the last four years, offered to the Tax Authority
28- Al-Maamar for Constructions	Constructing and developing private and public housing in Egypt.	4	1-General Manager 2- Financial Director 3- Production Engineer 4- Senior Accountant	Each 1 hour	Balance sheets, and income statements for the last five years, offered to the Tax Authority
29- Al-Eaman for Constructions	Constructing and developing private and public housing in Egypt.	4	1-General Manager 2- Financial Director 3- Production Engineer 4- Senior Accountant	Each 1 hour	Balance sheets, and income statements for the last three years, offered to the Tax Authority

Table 5.2 The Organisations Classified depending on the Moderating Variables

Organisation Name	The Business Sector	The Ownership Category	The Transformation Characteristic	The Strategic Posture
1- Savola Egypt	Manufacturing	Private	Divergent	Prospector
2- Building Blocks Organisation	Manufacturing	Public	Divergent	Reactor
3- Glaxo Wellcome Egypt	Manufacturing	Private	Multiplex	Analyser
4- Lever- Egypt	Manufacturing	Private	Multiplex	Prospector
5- Sime Darby Oil Products Egypt	Manufacturing	Private	Divergent	Prospector
6- Al-Ahram Beverages	Manufacturing	Private	Divergent	Analyser
7- Atlantic Industries Egypt Branch	Manufacturing	Private	Divergent	Prospector
8- Ragaegypt	Manufacturing	Private	Divergent	Defender
9- Toshiba Al-Arabi	Manufacturing	Private	Convergent	Prospector
10- Cement Beni-Suef	Assembling	Private	Divergent	Reactor
11- Peugeot Egypt	Assembling	Private	Convergent	Analyser
12- Suzuki Egypt	Assembling	Private	Convergent	Analyser
13- Ghabbour Egypt	Assembling	Private	Convergent	Prospector
14- Prima Engineering Industries	Assembling	Private	Convergent	Prospector
15- Al-Arabi for Manufacturing	Assembling	Private	Convergent	Analyser
16-Abou Ghali Cars	Marketing	Private	Multiplex	Prospector
17- Free Markets Egypt	Marketing	Private	Multiplex	Analyser
18- International Trading Agencies & Marketing Organisation (ITAMCO)	Marketing	Private	Multiplex	Prospector
19- Ragie Abdel-Fatah Organisation	Marketing	Private	Multiplex	Defender
20- Tractors and Engineering Organisation	Marketing	Public	Multiplex	Reactor
21- El-Masrya For Agencies and service station	Marketing	Private	Multiplex	Prospector
22-Egyptian Constructions Organisation (Moukhtar Ibrahim)	Constructing	Public	Convergent	Prospector
23- Naser City Constructions	Constructing	Public	Convergent	Defender
24- Holyoplies Constructions	Constructing	Public	Convergent	Defender
25- Wadie Com Ambo For Land Reclamation	Constructing	Public	Convergent	Prospector
26- Arab Constructors	Constructing	Public	Convergent	Prospector

Organisation Name	The Business Sector	The Ownership Category	The Transformation Characteristic	The Strategic Posture
27- El Garahi for Constructions	Constructing	Private	Convergent	Defender
28- Al-Maamar for Constructions Organisation	Constructing	Private	Convergent	Defender
29- Al-Eaman for Constructions	Constructing	Private	Convergent	Defender

Some differences between the public and private sectors could be recognised from the interview data. These differences led to the decision to deal with ownership category as a moderating variable in this research, in order to study its effects on the relationship between managers' perceptions of environmental conditions and using CMIS to achieve efficiency, optimisation and strategy purposes, as will be illustrated in Chapters Six and Seven. Table 5.3 summarises the features of the private sector's work environment and the public sector's, as extracted and inferred from the interview data.

Table 5.3 Features and Implications of Public Sector vs. Private Sector
(Source: the respondents' comments on the questionnaire and interviews)

Public Sector	Private Sector
- Red Tape	- Flexibility
- Employees' concerns are narrow: struggle to sort out problems	- Employees' concerns are wide; environmental awareness, expansion,
- Central authority in taking decisions	- Delegating authority and responsibility to various levels
- Heavy governmental interference	- Management takes its own decisions
- Competition and unpredictability are not noticeable features	- Competition and unpredictability are fundamental feature and they try to cope with them
- Low work load & low pay	- Big work load & high pay
- No continuous development of staff's skills	- Training to develop staff skills is a basic practice
- Over employment	- Necessary staff only is employed.

5.5 Conclusions from this Chapter

This chapter discussed the economic concerns, which affect the Egyptian organisations participating in this research. Furthermore, it presented the organisations and the empirical activities undertaken to collect the data. Three aspects were discussed; the

Egyptian economic history, the significance of the private sector in investment in Egypt, which included the privatisation system and reforming of public organisations, and the main features of the exchange rate system that is used in Egyptian organisations. This discussion was related to the Egyptian economic situation effective up to the time of data collection (1998). An implication from these economic concerns is that Egyptian organisations face severe national and international competition intensity. Furthermore, they face severe unpredictability as a dimension of environmental conditions. The organisations tried to deal with this environment condition in a variety of ways, such as using CMIS more than before and co-operating with marketing research organisations to study the customers' desires and the competitors' behaviours, as illustrated in Chapters Six, Seven and Eight.

Another implication is that there are differences between public and private sectors when dealing with environmental conditions. This implication leads to ownership category being, considered as a moderating variable in the relationship between managers' perceptions of competition intensity and unpredictability and the use of CMIS to achieve efficiency, optimisation and strategy. The objective of studying the effects of moderating variables is to hold or control the results for some categories of a sample but not others (Bryman and Cramer, 2001). When carrying out the analyses for all the data, as will be seen in Chapter Six, the results were inconsistent. Therefore, there was a need to control the results by introducing moderating variables which affect the main relationship in this research. This issue will be illustrated in details in Chapter Six.

The presentation of the organisations was included in section 5.4. Appendix 3 includes a profile of each organisation. A note to be made here is that the main aim of the interviews in the research was to discover the intervening variables, which might interfere with the main relationship. This was achieved and the intervening variables are managers' education levels, location of authority, kinds of consultants, and size of organisation. For the purpose of this chapter, it sufficed therefore, to give a brief presentation of the case studies and include the profile for the organisations in the Appendix 3.

This explanation of the Egyptian Economy and presentation of the case studies as followed by a focus on the data analysis to achieve the research aims and test the three hypotheses, in Chapters Six and Seven.

Chapter Six

Preparation and Description of the Research Data

6.0 Introduction

After the data had been collected from the sample of organisations in Egypt, the next step was to analyse the data so that the research hypotheses could be tested. The collected data were recorded and then analysed using the SPSS statistical package. Before doing this, however, some preliminary steps needed to be completed. These steps helped prepare the data for analysis, and allowed the results to be interpreted. This chapter aims to discuss these preliminary steps and the main features of the research data from the questionnaires, all the relevant data and the impressions from the interviews.

This chapter includes three sections. Section one discusses the preparation of the data for analysing. It describes the preliminary six steps, including editing data, coding data, classifying the variables, creating the appropriate databases, creating new variables for analysis purposes and deciding what kind of tests would be appropriate (Parametric / Non-parametric).

Section two is divided into five sub-sections and describes the research data, the main features of each variable and relationships between each kind of variable (dependent and independent). The first sub-section identifies the existence of cost management information systems as policies (as managers believe to be the case) and as practices (as using CMIS) to achieve efficiency, optimisation and strategy purposes in the participating organisations. The second sub-section explores associations between the dependent variables which were described in sub-section one. The third one describes managers' perceptions of competition intensity and unpredictability in relation to three environmental divisions; product market, factor market (including raw material, labour, management, finance, and technology) and legislation. The fourth one explores associations between the independent variables described in sub-section three. The last sub-section explores whether or not there are effects of the selected moderating (conditional) variables.

The final section outlines the main features of the research data and the conclusions of this chapter.

6.1 Preparing Data for Analysis

After the questionnaires were collected, the data were edited, coded, and categorised. Appropriate databases were created and the variables had to be aggregated to reduce their quantities to facilitate meaningful analysis. Furthermore, a decision had to be made which kind of tests (Parametric / Non-Parametric) would be appropriate for the data analysis in this research (Sekaran, 2000).

6.1.1 Editing Data

The collected data often had to be edited. In other words, information that was written by the interviewers in a hurry had to be clearly decoded so that all of it could be coded systematically. Lack of such clarification at this stage would have resulted in confusion when the coding started. The data had to be categorised under broad headings, and errors in categorisation could have resulted from misinterpretation. Also, any inconsistencies in the responses that could be logically corrected they had to be rectified and edited at this stage. Moreover, it was recognised that whenever possible, it would be better to follow up with the respondent and get the correct data during the editing process (Sekaran, 2000). In this research, this stage was done after each meeting.

6.1.2 Coding Data

The next step was to code the responses. Firstly, the questionnaire variables were abbreviated and each item assigned a code name that referred to its name, e.g. the code of "effecinc" stands for using information for efficiency. Secondly, responses to the degree of importance questions in the questionnaire were coded using a 5 point Likert scale ranging from extremely important (5) to not important (1). If the answer to a question was "I do not know", it would score (0). The factual questions were asked to be answered on a yes (1) or no (0) scale. Where ranking was sought, the ranking was used as the code for the question.

One of the advantages of using the integrated techniques to collect data was that there was no question without answer, since when the respondents were filling in the questionnaires after the interviews; the researcher was able to obtain any clarification

that was needed. Therefore, there were no missing values for any of the variables, because of the researcher presence while each questionnaire was being filled.

6.1.3 Classifying the Variables

Statistical analysis depends on being able to measure the aspects of objects concerned. Measurement involves the assignment of numbers to observations according to certain rules. Since the type of statistical operation used to describe and draw inferences from empirical observations partly rests on the way in which an attribute or variable is measured, it was important to recognise the kinds of variables. One of the most important features of an understanding of statistical operations is an appreciation of when it is permissible to employ particular tests. Central to this appreciation is an ability to recognise the different forms that variables take. The majority of writers on statistics draw upon a distinction developed by Stevens (1946) between Nominal, Ordinal, and Interval/ Ratio variables[1]

First, nominal (sometimes called dichotomous when a variable compromises only two categories) variables entail the classification of individuals in terms of a concept. This level of measurement has simple properties defined in descriptive categories. In this research data, the variable **"sector",** which classified the organisations in terms of four kinds of business sectors (assembling, constructing, manufacturing, and retailer), and generally all the variables which measured facts, such as the variables of policies, were examples of nominal variables, since the answers of these variables were yes / no, "we have / do not have this kind of policy...". For this nominal type of variable, since the numbers have no quantitative measure, it makes no sense to carry out statistical tests on them, such as mean, median, standard deviation or any other central tendencies tests. The only mathematical operation that can be performed on them is to count the frequency of each number (or category).

The second, ordinal variable has descriptive categories that can be ordered on a scale. The existence of this scale does not mean that the intervals between numbers in the scale denote equal amounts of an attribute, but it means that the numbers on the scale are arranged in order. In this research data, all the variables selected to respondents'

[1] See for more details of characteristics of each kind of variable one of the books on statistics, such as: Reid (1988), Bryman and Cramer (2001) and Field (2000).

opinions were placed in a Likert scale. Therefore, these variables are examples of ordinal variables.

The third kind of variable is interval / ratio variable. An interval variable has the properties of an ordinal one, with the addition of a common unit of measurement. The intervals between numbers denote equal amounts of the attribute being assessed. Ratio variables have an identifiable fixed zero point. It is a normal measurement. In this research data, the variables, "Product Market" abbreviated "prodmark", "Factor Market" abbreviated "factorm" and "Legislation" abbreviated "legislat", which respondents were asked to evaluate in percentage terms for their importance, are examples of ratio variables. Interval and ratio variables are recognised to be the highest level of measurement because there is more that can be said about them than with the other types (nominal and ordinal variables). Moreover, a wider variety of statistical tests and procedures is available for interval and ratio variables.

Bryman and Cramer (2001) argued that variables which are derived from multiplex-item scales are ordinal variables, not interval variables. They argued that it was not known whether the difference between a score of 4 and 5 -as an example- is the same as the difference between 1 and 2. They added that inability to treat such variables as interval means that methods of analysis like correlation and regression, which are both powerful, could not be used in relation to them since these techniques presume the employment of interval variables. Therefore, they suggested that it is useful to deal with ordinal variables as if they are interval variables. Labovitz (1970) goes further in suggesting that most ordinal variables *can and should* be treated as interval variables. He argues that the amount of error that can occur is minimal compared with the considerable advantages. Therefore, in this research, the variables measured by multiplex-item scales (Likert Scale) were treated as interval variables, although, they are - in fact - ordinal variables in order to get the benefit of using powerful statistical techniques.

6.1.4 Creating Appropriate Databases

In this stage, the data collected from the questionnaires were recorded in a database. This database was named the "questionnaires database" because its data came directly from the questionnaires. The number of cases in this database was 88 is equal to the number of respondents. However, there was a need in this research to study some

factual variables, such as policies related to cost management information systems in the participating organisations themselves. A database for organisations was therefore created. The values for each organisation were computed as an average of the scores for the variables in the questionnaires from that organisation. This database was named the "organisations database". The number of cases in this database was 29 corresponding to the number of the participating organisations.

6.1.5 Creating New Variables for Analysis Purposes

In this research, there was a critical need to create new variables. **Firstly,** the huge number of questions used -as a measurement of each variable- had to be aggregated to get one figure for each group of questions, which represented this variable. This creation of new variables was done depending on the outcomes of the Reliability and Factor Analysis tests described in Chapter Four section 4.7. The answers to questions which were used as a measurement of each variable were aggregated together whenever there were strong inter-correlations and a high Alpha between them. In this way, the huge number of questions in the questionnaire and the interview guide became three dependent variables for each of policies and practices of CMIS and fourteen independent variables. Moreover, some notable comments were found during the data analysis, which gave rise to a need for further tests. When studying relationships between each of CMIS for efficiency, optimisation and strategy and managers' perceptions of environmental conditions, it was found that some of these relationships were in the same directions. The relationships related to the raw material and finance variables were in the same directions, and those to labour, management and technology were in the other direction. Therefore, there was a need to aggregate - after checking its K2 using the reliability test in SPSS - each of these two divisions together to get FM1 and FM2 variables to study their effects.

Secondly, achieving some objectives of the data analysis required changing the nature of some variables from interval variables to categorical variables. For example, in order to study the association between cost management information systems as policies and practices (the dependent variables) in section 6.2.2, there was a need to change the data on CMIS practices for achieving purposes of efficiency, optimisation, and strategies from ordinal variables to category (nominal) variables by using the "recode" order in SPSS. By using this order, the variable was collapsed into categories in order to allow a contingency table and its associated chi-square value to be provided from Cross-

tabulation analysis. Therefore, three new category variables for the CMIS practices for efficiency, optimisation and strategies were created to enable the analysis to be conducted.

6.1.6 Exploring the Kinds of Appropriate Tests (Parametric Vs. Non-Parametric)

One of the unresolved issues in data analysis is the question of when parametric rather than non-parametric tests should be used. The term parametric refers to a measure, which describes the distribution of the population such as the mean or variance. Since parametric tests are based on the assumption that we know certain characteristics of the population, from which the sample is drawn, they are called parametric tests. Non-parametric or distribution-free tests are so named because they do not depend on assumptions about the precise form of the distribution of the sampled populations. A fuller description of non-parametric tests may be found in Siegel and Castellan (1988) or Conver (1980). In this research, it could be argued that non-parametric tests should be used because the three conditions for applying parametric tests do not exist and the distributions of the variables are distribution-free tests, as will be illustrated in the following section.

All parametric tests have basic assumptions that must be met for the test to be accurate. Bryman and Cramer (2001) and Field (2000) argued that it is only appropriate to use parametric tests when the data fulfil the following three conditions:

1. The level or scale of measurement is of equal interval or ratio scaling.
2. The distribution of the population scores is normal.
3. The variances of both variables are equal or homogenous.

The first assumption about the data being of the interval type is, unfortunately, tested only by common sense (as discussed in section 6.1.3). Most of the variables in this research were ordinal variables, since there was no guarantee that the intervals were equal (however, it was suggested to treat them as interval variables to get considerable advantages). Thus, the first assumption was not fulfilled.

For the second assumption, the easiest way to check whether the variables are normally distributed is by looking at histograms and using various descriptive tests (e.g.

Skewness; Kurtosis). This gives a preliminary idea about whether a distribution is close enough to normality. Furthermore, there are tests to check whether a distribution is normal. In this research, the Kolmogorv-Smirnov test was used. This test compares the set of scores with the same mean and standard deviation. If the result is non-significant ($p>0.05$), it means that the distribution of the sample is not significantly different from a normal distribution (it is probably normal). If, however, the test is significant ($p< 0.05$) then the distribution in question is significantly different from a normal distribution (It is non-normal). In this research, after running this test for all data (the full results of all of these tests are in Appendix 5) the results offered evidence that all the newly created variables used in the data analysis, were non-normal in distribution.

The third assumption means that the variances should not change systematically throughout the data. In co relational design, this assumption means that the variance of one variable should be stable at all levels of the other variables. The Spearman correlation was computed for all the variables. The results showed that the correlations between the variables were very different. Thus, this assumption was not fulfilled also. Therefore, in this research, it could be argued that non-parametric tests should be used because the three conditions were not met and because there are distribution-free tests.

Bryman and Cramer (2001) described the way of working non-parametric tests as a sequence of steps. They said that most non-parametric tests work on the principle of ranking the data, that is, finding the lowest score and giving it a ranking of 1, then finding the next highest score and giving it a ranking of 2, and so on, results in high scores being represented by large ranking, and low scores being represented by small ranking. The analysis is then carried out on the ranking rather than the actual data. This process is an ingenious way around the problem of using data that breaks the parametric assumptions. However, there is a caution should be stated here; by ranking the data, some information might be lost about the magnitude of difference between scores. Therefore, statistical writers – e.g. Bryman and Cramer (2001) - claimed that non-parametric tests are less powerful than their parametric counterparts. However, using less powerful tests (non-parametric tests) is much better than using the wrong tests (parametric tests with data do not meet the assumptions of parametric tests).

6.2 Data Analysis

A cross sectional sample of 29 organisations with 88 questionnaires was selected according to the four moderating variables in this research. These moderating variables in this research were; business sectors (Assembling, Constructing, Manufacturing, and Retailer Organisations), transformation characteristics (Divergent, Multiplex, and Convergent), business strategic postures (Miles and Snow typology; Defending, Prospectors, Analysers and Reactors) and ownership categories (Public and Private). Table 6.1 represents the numbers of organisations (questionnaires) in each group. The interviewees were asked to identify their strategic postures. Then their responses were coded in the databases as a classification of organisations.

Table 6.1 Number of Organisations (and Questionnaires) in Each Group

Sectors	Miles & Snow Typology				Ownership		Transformation Characteristics			Total
	Defending	Prospect	Analysers	Reactor	Public	Private	Divergent	Multi	Convergent	
Assembling	0 (0)	2 (5)	3(6)	0 (0)	0 (0)	5 (11)	0 (0)	0 (0)	5 (11)	5 (11)
Constructing	3 (12)	3 (10)	0 (0)	2 (7)	5 (17)	3 (12)	0 (0)	0 (0)	8 (29)	8 (29)
Manufacturing	1 (2)	4 (12)	3(9)	2 (6)	1 (3)	9 (26)	7 (21)	2 (6)	1 (2)	10(29)
Retailer	1 (3)	3 (9)	1 (4)	1 (3)	1 (3)	5 (16)	0 (0)	6 (19)	0 (0)	6 (19)
Total	5 (17)	12 (36)	7 (19)	5 (16)	7(23)	22(65)	7 (21)	8 (25)	14 (42)	29 (88)
Divergent	1 (2)	3 (10)	1 (3)	2 (6)	1 (3)	6 (18)				
Multiplex	1 (3)	3 (9)	3 (10)	1 (3)	1 (3)	7 (22)				
Convergent	3 (12)	6 (17)	3 (6)	2 (7)	5 (17)	9(25)				
Total	5 (17)	12 (36)	7 (19)	5 (16)	7 (23)	22(65)				
Public	0 (0)	3 (10)	0 (0)	4 (13)						
Private	5 (17)	9 (26)	7 (19)	1 (3)						
Total	5 (17)	12 (36)	7 (19)	5 (16)						

This section presents the data analysis in the research sample. In the data analysis, there were five objectives:

1) Identifying the existence of the cost management information systems; policies and practices for achieving efficiency, optimisation, and strategies purposes variables, as the dependent variables in this research (section 6.2.1).

2) Exploring the association between the policy variables and the practice variables (section 6.2.2).

3) Identifying managers' perceptions of the environmental conditions: competition intensity (PCI), and unpredictability (PU) for product market, factor market (raw material, labour, management, capital and finance, and technology), and legislation, as independent variables in this research (section 6.2.3).

4) Exploring the association between the PCI and PU variables (section 6.2.4).

5) Exploring whether or not there are effects of moderating (conditional) variables which were assumed in the basic proposition in this research (section 6.2.5).

One further point should be registered. Non-parametric tests in this research were chosen because the assumptions of parametric tests were not met as the discussion in the previous section 6.1.6 revealed.

The following sections describe how these objectives were achieved:

6.2.1 Identifying Existence of CMIS Policies and Practices (the Dependent Variables)

This section includes descriptions of the existence of CMIS policies for efficiency, optimisation and strategies as facts (or as interviewees reported), and the average scores for use of CMIS practices for efficiency, optimisation and strategies in the organisations.

6.2.1.1 Existence of Cost Management Policies

Variables related to the business sector, transformation operations, kind of ownership, business strategy postures and existing cost management policies in organisations were classified as nominal variables, for example: existence of policies in relation to CMIS was coded in numerical form, with 1 for Yes and 0 for No. Numbers for the nominal or the ordinal variables were simply used to identify or to name the attribute or category being described. Therefore, the only mathematical operation could be performed was to count the frequency of each number (or category).

It should be noted that the analysis was carried out for: (a) the twenty-nine organisations as the all-data level; (b) the number of organisations in each of the four kinds of business as the business sector level; (c) the number of organisations in each of the three kinds of as the transformation operations level; (d) the number of organisations in each of the two ownership categories as the ownership category and (e) The number of

organisations in each of the four groups as business strategy postures. The analysis was not carried out for the questionnaires in each level because these variables were measured as facts, not as respondents' opinions. Therefore, analysis had to be carried out in the organisations' database, not in the questionnaires' database.

Table 6.2 is sorted by organisations. It reports the kind of business sector, the transformation operations, the kind of ownership and business strategy postures for each organisation, and the responses of the 29 organisations regarding the existence of CMIS policies.

Table 6.2 Existence of CMIS Policies for All Data

Organisation Number	No. Of Questionnaires	Business sector	Transformation operation	Ownership	Business strategy postures	CMIS Policies		
						Efficiency	Optimisation	Strategies
1	4	Manufacturing	Divergent	Private	Prospectors	Yes	Yes	Yes
2	3	Manufacturing	Divergent	Public	Reactors	Yes	No	No
3	3	Manufacturing	Multiplex	Private	Analysers	Yes	Yes	Yes
4	3	Manufacturing	Multiplex	Private	Analysers	Yes	Yes	Yes
5	3	Manufacturing	Divergent	Private	Prospectors	Yes	Yes	Yes
6	3	Manufacturing	Divergent	Private	Analysers	Yes	Yes	Yes
7	3	Manufacturing	Divergent	Private	Prospectors	Yes	Yes	Yes
8	2	Manufacturing	Divergent	Private	Defenders	Yes	Yes	Yes
9	2	Manufacturing	Convergent	Private	Prospectors	Yes	Yes	No
10	3	Assembling	Divergent	Private	Reactors	Yes	Yes	Yes
11	2	Assembling	Convergent	Private	Analysers	Yes	Yes	Yes
12	2	Assembling	Convergent	Private	Analysers	Yes	Yes	Yes
13	3	Assembling	Convergent	Private	Prospectors	Yes	Yes	Yes
14	2	Assembling	Convergent	Private	Prospectors	Yes	Yes	Yes
15	2	Assembling	Convergent	Private	Analysers	Yes	No	No
16	3	Retailer	Multiplex	Private	Prospectors	Yes	Yes	Yes
17	4	Retailer	Multiplex	Private	Analysers	Yes.	Yes	No
18	4	Retailer	Multiplex	Private	Prospectors	Yes	Yes	Yes
19	3	Retailer	Multiplex	Private	Defenders	Yes	Yes	No
20	3	Retailer	Multiplex	Public	Reactors	Yes	No	No
21	2	Retailer	Multiplex	Private	Prospectors	Yes	Yes	No
22	3	Construction	Convergent	Public	Prospectors	Yes	Yes	No
23	3	Construction	Convergent	Public	Reactors	Yes	Yes	No
24	4	Construction	Convergent	Public	Reactors	Yes	Yes	No
25	5	Construction	Convergent	Public	Prospectors	Yes	Yes	Yes
26	3	Construction	Convergent	Public	Prospectors	Yes	Yes	Yes
27	4	Construction	Convergent	Private	Defenders	Yes	No	No
28	4	Construction	Convergent	Private	Defenders	Yes	No	No
29	4	Construction	Convergent	Private	Defenders	Yes	No	No

In terms of the four moderating variables, Table 6.2 shows that the sample contained 21% assembling, 27% constructing, 31% manufacturing, and 21% retailer organisations. Nearly three quarters of the sample (76%) were private organisations (24 % public organisations). Nearly a half of the sample was convergent organisations (24% divergent and 28% multiplex organisations). Nearly a half of the sample (42%) was prospectors' organisations (17% defenders, 24% analysers and 17 % reactors)

In terms of existence of CMIS as policies; 100% of the organisations had CMIS policies for efficiency, 79.3% of the organisations had CMIS policies for optimisation, and 55.2% of the organisations had CMIS policies for strategies.

Table 6.3 represents the results regarding existence of CMIS policies for efficiency, optimisation, and strategies for each kind of business sector.

Table 6.3 Existence of CMIS Policies for Kinds of business sectors

Kinds of Business	No of Organisations	No. Of Questionnaires	No. Of Organisations Reporting CMIS Policies for					
			Efficiency		Optimisation		Strategies	
			Yes	No	Yes	No	Yes	No
Assembling	6	11	6	0	5	1	5	1
Construction	8	29	8	0	5	3	2	6
Manufacturing	9	29	9	0	8	1	7	2
Retailer	6	19	6	0	5	1	2	4
Total	29	88	29	0	23	6	16	13

Table 6.4 shows the results regarding existence of CMIS policies for efficiency, optimisation, and strategies for each kind of transformation operations.

Table 6.4 Existence of Cost Management Policies for Transformation Characteristics

Kinds of Transformation Operation	No of Organisations	No. Of Questionnaires	No. Of Organisations Reporting CMIS Policies for					
			Efficiency		Optimisation		Strategies	
			Yes	No	Yes	No	Yes	No
Divergent	7	21	7	0	6	1	6	1
Multiplex	8	25	8	0	7	1	4	4
Convergent	14	42	14	0	10	4	6	8
Total	29	88	28	0	23	6	16	13

Table 6.5 represents the results regarding existence of CMIS policies for efficiency, optimisation, and strategies for each ownership category.

Table 6.5 Existence of Cost Management Policies for Ownership Category

Kinds of Business	No of Organisations	No. Of Questionnaires	No. Of Organisations Reporting CMIS Policies for					
			Efficiency		Optimisation		Strategies	
			Yes	No	Yes	No	Yes	No
Public	7	23	7	0	5	2	2	5
Private	22	65	22	0	18	4	14	8
Total	29	88	29	0	23	6	16	13

Table 6.6 represents the results regarding existence of CMIS policies for efficiency, optimisation, and strategies for each business strategy posture.

Table 6.6 Existence of CMIS Policies for Kinds of Business Strategic Postures

Kinds of Business Strategy	No of Organisations	No. Of Questionnaires	No. Of Organisations Reporting CMIS Policies for					
			Efficiency		Optimisation		Strategies	
			Yes	No	Yes	No	Yes	No
Defenders	5	17	5	0	2	3	1	4
Prospectors	12	36	12	0	12	0	9	3
Analysers	7	19	7	0	6	1	5	2
Reactors	5	16	5	0	3	2	1	4
Total	29	88	29	0	23	6	16	13

The main conclusions of the analysis for existence of CMIS policies from Table 6.3 , Table 6.4 ,Table 6.5 and Table 6.6 were:

1. All of the organisations had CMIS policies. This could be explained from the interview data, which revealed that the Egyptian Organisations law requires all kinds of organisations have to have such policies.

2. The assembling sector had the largest number of organisations having CMIS policies for optimisation (88.9%) followed by the manufacturing (88.3%), and the retailer (83.3%) then the construction (62.5%) sectors.

3. The business sector having the largest number of organisations with CMIS policies for strategies was the assembling sector (83.3%) followed by manufacturing sector (77.8%), then the construction (25%) and retailer (33.3%) sectors.

4. The multiplex operations sector had the largest number of organisations having CMIS policies for optimisation (87.5%) followed by the divergent (85.7%) and the convergent (71.4%) sectors.

5. The sector having the largest number of organisations CMIS policies for strategies was the divergent sector (85.7%) followed by the multiplex sector (50.0%), then convergent sector (42.9%).

6. A larger number of organisations in the private category had both optimisation and strategies cost management policies than in the public category.

7. The prospectors and analysers groups had the largest number of organisations having CMIS policies for optimisation and strategy.

6.2.1.2 The Relative Importance of the CMIS Practices

Two descriptive techniques were used to describe the relative importance of the uses of CMIS information. The relative importance of the uses of CMIS was measured using five-point Likert scale. The descriptive techniques used were: (1) mean[1], and (2) standard deviation[2]. These were calculated for the questionnaires at the all-data level, and for each business sector, ownership category, transformation operations and strategic postures in the questionnaires' database. They were not calculated for the organisations in each level in the organisations' databases (as when studying cost management policies) because these variables were measured as respondents' opinions in the questionnaires. The results regarding the two descriptive techniques for the importance of the uses of CMIS for efficiency, optimisation, and strategies are shown in Table 6.7 for all data.

Table 6.7 the Relative Importance of the CMIS Practices for All Data

Descriptive Techniques	Mean	Standard Deviation
Using Cost Information for Efficiency	3.53	0.88
Using Cost Information for Optimisation	2.21	1.03
Using Cost Information for Strategies	3.23	1.16

Table 6.8 shows the results regarding the two descriptive techniques for the importance of the uses of CMIS for efficiency, optimisation, and strategies for each kind of business sector.

[1] The Mean is the value closest to all the other values. In order to calculate the mean: total of all the cases divided by the number of cases. Residual from the mean: the difference between each case in a distribution and the mean: if this value is positive, the value is above the mean; if it is negative, it is below the mean.

[2] The Standard deviation calculates the average amount of deviation from the mean. It is a main measure of dispersion. It has tended to emphasise interval variables. Therefore, the standard deviation reflects the degree to which the value in a distribution differs from the arithmetic mean. Standard deviation is usually presented in tandem with the mean, since it is difficult to determine its meaning in the absence of the mean. Thus, the standard deviation permits the direct comparison of degrees of dispersal for comparable samples and measures. A further advantage is that it employs all the values in a distribution. It summarised in a single value the amount of dispersion in a distribution, which, when used in conjunction with the mean, is easy to interpret (Bryman and Cramer, 2001).

Table 6.8 The Relative Importance of the CMIS Practices for Each kind of Business Sector

Descriptive Techniques	Mean				Standard Deviation			
Kind of Business Sector	Asse.	Cons.	Manu.	Reta.	Asse.	Cons.	Manu.	Ret.
Using CMIS for Efficiency	4.4	2.9	3.9	3.6	1.1	.44	.79	.66
Using CMIS for Optimisation	2.7	1.8	3.0	1.4	.65	.46	.86	1.2
Using CMIS for Strategies	3.8	2.4	3.6	3.6	1.1	.62	1.1	1.2
No. Of Questionnaires	11	29	29	19	11	29	29	19

Asse. = Assembling sector
Cons. = Construction Sector
Manu = Manufacturing Sector
Reta. = Retailer Sector

Table 6.9 shows the results regarding the two descriptive techniques for the importance of the uses of CMIS for efficiency, optimisation, and strategies for each transformation characteristic.

Table 6.9 The Relative Importance of the CMIS Practices for Transformation Characteristic

Descriptive Techniques	Mean			Standard Deviation		
Transformation Characteristic	Divergent	Multiplex	Convergent	Divergent	Multiplex	Convergent
Using CMIS for Efficiency	3.8	3.9	3.2	.59	.78	.97
Using CMIS for Optimisation	2.9	2.0	2.0	.81	1.4	.64
Using CMIS for Strategies	3.6	3.8	2.7	1.1	1.1	1.0
Number of Questionnaires	21	25	42	21	25	42

Table 6.10 shows the results regarding the two descriptive techniques for the importance of the uses of CMIS for efficiency, optimisation, and strategies for each ownership category.

Table 6.10 The Relative Importance of the CMIS Practices for Ownership Category

Descriptive Techniques	Mean		Standard Deviation	
Kind of Ownership	Public	Private	Public	Private
Using CMIS for Efficiency	3.0	3.7	.37	.93
Using CMIS for Optimisation	1.7	2.4	.57	1.1
Using CMIS for Strategies	2.5	3.5	.69	1.2
Number of Questionnaires	23	65	23	65

Table 6.11 contains the results regarding the two descriptive techniques for the importance of the uses of CMIS for efficiency, optimisation, and strategies for each business strategy posture.

Table 6.11 The Relative Importance of the CMIS Practices for Each kind of Business Strategy Posture

Descriptive Techniques	Mean				Standard Deviation			
Kind of Business Sector	Defen.	Pros.	Analys	React.	Defen.	Pros.	Analys	React
Using CMIS for Efficiency	2.8	3.9	4.21	2.81	.53	.72	.86	.32
Using CMIS for Optimisation	1.9	2.2	1.85	1.85	.52	1.15	.83	.89
Using CMIS for Strategies	2.1	3.8	2.04	2.04	.31	.83	.39	.36
No. Of Questionnaires	17	36	16	16	17	36	19	16

Defen. = Defenders organisations
Pros. = Prospectors organisations
Analys. = Analysers organisations
React. = Reactors organisations

Main conclusions of the analysis for the relative importance of the CMIS practices from Table 6.7 Table 6.8 Table 6.10 and Table 6.11 are:

1) The respondents in all organisations perceived that using cost information for efficiency purposes was most important, followed by using cost information for strategy purposes, then for optimisation purposes. The interview data provides some explanations for the lower importance given to optimisation; organisations make their product mix decisions, pricing decisions, and make or buy decisions using recent market studies, not using CMIS.

2) The respondents in the assembling sector were most achieved to see CMIS practices (measured by using cost information for efficiency, optimisation, and strategies) as very useful, and followed by respondents in the manufacturing sector. The respondents in the private category saw cost practices as more useful than the respondents in the public category.

3) The respondents in the prospectors group regarded CMIS practices for optimisation and strategy as more important than did the other respondents in the other groups. This finding supports Miles and Snow's (1978) view about the characteristics of this group (prospectors) compared with the other groups.

4) The pattern of responses in relation to in kinds of business sectors, kinds of transformation operations, ownership categories, and business strategy postures were the same in relation to both the existence of CMIS policies and the importance of CMIS practices. This conclusion encouraged us to extend the analysis to study the association between CMIS policies and practices, in section 6.2.2.

5) There are differences between organisations classified by kinds of business sector, kinds of transformation operation, ownership categories and kinds of business strategy postures. These differences were verified using K^2. The full results are given in Appendix 6 which shows that these differences are significant. It means that the organisations were different depending on the four variables (kinds of business sector, kinds of transformation operation, ownership category and business strategy posture) which in the context of this research were used as moderating variables. These results will be described in section 6.2.5.

6) The standard deviations in the kinds of business sectors, the transformation operations, the ownership categories and business strategy postures were very different. The variation in the responses in this sample was somewhat large.

6.2.2 Exploring Association between the Policies and Practices Variables

This section discusses whether there really is a relationship between the two dependent variables (policies and practices) or whether the relationship has arisen by chance. As the policy variables were nominal variables and the practice variables were interval variables, for cross-tabulation analysis, the latter variable needed to be "collapsed" into categories in order to allow a contingency table and its associated chi-square value to be provided (For more details: Bryman and Cramer, 2001, pp: 168, 169). The three practice variables (efficiency, optimisation, and strategies) were created as explained in section 6.1.5 using the "recode" procedure (under 3=1 & above 3=2).

The organisations' database was used in this analysis because policy variables are facts. Therefore, the number of the sample was 29 cases. It was not considered appropriate to divide this small sample into sub-samples (kinds of business, kinds of transformation operations, ownership categories and business strategy postures). Moreover, the evidence from the whole sample would provide a good approximation. Therefore, cross-tabulation analysis was carried out once, for all data. Table 6.12 represents the results of this analysis.

Table 6.12 Association between CMIS Policies and Using CMIS Information.

CMIS Practices	CMIS Policies					
	Efficiency		Optimisation		Strategies	
	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)
Under 3	**34.5**	**0**	**48.3**	**0**	**10.3**	**37.9**
Above 3	**65.5**	**0**	**31.0**	**20.7**	**44.8**	**6.9**
No. Organisations	**29**	**0**	**23**	**6**	**16**	**13**
	Chi-square = - P = -		**Chi-square =3.4 P<0.05**		**Chi-square =12.46 P=0.000**	

Table 6.12 shows that no statistics were computed for efficiency because CMIS policy for efficiency was a constant. The interviewees reported that the Egypt law requires that all organisations should use CMIS for efficiency. Furthermore, it shows that there was less than 0.05% chance that there was a relationship between the policies and practices

for optimisation purposes. A strong relationship (p =0.000) between the policies and the practices for strategies appears also in the table.

Some statistical writers, e.g. Bryman and Cramer (2001), go so far to study a measure of the strength of the relationship between an interval dependent variable and a category independent variable. They argued that the eta coefficient warrants consideration. They considered that eta provides a measure of strength of relationship in the contexts cited above. Furthermore, eta-squared refers to the amount of variation in the dependent variable (Practice variables) that is accounted for by the independent variables (policy variables). Both eta and eta-square were computed using Means Procedures in SPSS. Table 6.13 shows the results of this test as follows:

Table 6.13 Eta and Eta-Square between the Policies and Practices for Efficiency, Optimisation and Strategies.

The Results for	Eta	Eat-Square	Sig.
Efficiency	**.134**	**.018**	**.489**
Optimisation	**.349**	**.122**	**.063**
Strategies	**.673**	**.452**	**.000**

Table 6.13 shows that the significance for the relationship between policies and practices for efficiency was not acceptable for statistical significance in the social research (p= .489; the acceptable level in this research is 0.10). Therefore, this evidence supports the last results in Table 6.12. There was no relationship between policies and practices for efficiency purposes.

For optimisation, the evidence at the 0.063 significance level suggests a strong probability of relationship between policies and practices for optimisation. The eta-square suggested that 12.2% of the variance of practices for optimisation could be attributed to policies for optimisation.

For strategies, the evidence at the 0.000 significance level suggests a very strong relationship between policies and practices for strategies. The Eta-square suggested that 45.2% of the variance of practices for strategies could be attributed to policies for strategies.

The above results supported the Cross-Tabulation output in Table 6.12. There was no relationship between policies and practices for efficiency purposes, a strong relationship

between policies and practices for optimisation purposes, and a very strong relationship between policies and practices for strategy purposes.

6.2.3 Identifying Existence Perceptions of Environmental Conditions Variables

The independent variables in this research are the managers' perceptions of the environment in relation to both competition intensity, and unpredictability for product market, factor market (raw material, labour, management, capital and finance, and technology), and legislation.

The two descriptive techniques were also used to describe the management perception of the competition intensity (PCI) and unpredictability (PU). These statistics were also calculated for all the data in Table 6.14.

Table 6.14 Measuring the Managers' Perceptions of the Environmental Conditions Related to Competition Intensity and Unpredictability (For All Data)

Perceptions of Environment	Mean	Standard Deviation
PCI for:		
Product Market	3.58	0.74
Factor Market:		
Raw Material	2.13	0.61
Labour	2.34	0.54
Management	3.35	0.62
Finance and Capital	2.00	0.90
Technology	1.84	1.21
All Factor Market Division	2.32	0.31
Legislation	2.31	0.77
PU for:		
Product Market	2.93	0.6
Factor Market:		
Raw Material	2.13	0.58
Labour	1.96	0.42
Management	2.12	0.54
Finance and Capital	2.43	0.89
Technology	1.66	1.07
All Factor Market Division	1.98	0.35
Legislation.	2.17	0.74
No. Of Questionnaire	88	88

In this research, it was especially notable that the properties of CI and U for both finance and raw material are similar. Furthermore, the other three sub-divisions of factor market in organisations (labour, management and technology) have similar properties.

These remarks will be verified further in Chapter Seven, since the directions of correlation, which are related to each of these sub-divisions, are similar. Therefore, it is useful to distinguish between them and study descriptive analyses for these two divisions, "Factor Market 1 (FM1)" and "Factor Market 2 (FM2)" of the factor market division. For each table related to the components of the factor market, another similar table was created splitting the factor market division into FM1 and FM2. . Table 6.15 represents description of the data related to managers' perceptions of competition intensity and unpredictability in the case of the factor market (which contains five sub-divisions; raw material, labour, management, finance and technology) being classified into two divisions; FM1 and FM2 for all the data.

Table 6.15 Measuring the Managers' Perceptions of the Environmental Conditions Related to Competition Intensity and Unpredictability (Factor Market classified into FM1 and FM2) (For All Data)

Perceptions of Environment	Mean	Standard Deviation
PCI for:		
Product Market	3.58	0.74
Factor Market:		
FM1	2.10	0.50
FM2	2.21	0.66
All Factor Market Division	2.32	0.31
Legislation	2.31	0.77
PU for:		
Product Market	2.93	0.6
Factor Market:		
FM1	1.89	0.36
FM2	1.92	0.59
All Factor Market Division	1.98	0.35
Legislation	2.17	0.74
No. Of Questionnaire	88	88

Table 6.16 represents a description of managers' perceptions of competition intensity and unpredictability for each kind of business sector.

Table 6.16 Measuring the Managers' Perceptions of the Environmental Conditions Related to Competition Intensity and Unpredictability (For Kind of business sector level)

Perceptions of Environment	Mean				Standard Deviation			
Kind of Sector	Ass.	Cons.	Manu	Reta.	Ass.	Cons.	Manu	Reta.
PCI for:								
Product Market.	4.31	3.11	3.53	3.93	0.15	0.14	1.02	0.38
Factor Market:								
Raw Material	2.05	2.57	1.70	2.13	0.54	0.40	0.62	0.43
Labour	3.00	2.18	2.11	2.54	0.27	0.41	0.49	0.54
Management	3.59	3.03	3.60	3.29	0.44	0.26	0.59	0.90

Perceptions of Environment	Mean				Standard Deviation			
Kind of Sector	Ass.	Cons.	Manu	Reta.	Ass.	Cons.	Manu	Reta.
Finance and Capital	1.36	1.76	2.25	2.12	0.51	0.48	1.28	0.66
Technology	3.01	1.52	2.92	0.00	0.61	0.23	0.45	0.00
All Factor Market Division	2.60	2.21	2.52	2.01	0.28	0.17	0.28	0.20
Legislation	2.93	1.84	1.97	3.17	0.23	0.34	0.72	0.54
PU for: Product Market	3.30	2.73	2.75	3.30	0.64	0.33	0.75	0.42
Factor Market:	1.96	2.18	1.77	1.93	0.58	0.55	0.53	0.61
Raw Material	2.33	2.00	2.10	2.18	0.41	0.34	0.47	0.40
Labour	2.27	2.53	2.48	2.29	0.47	0.44	0.56	0.65
Management	1.48	1.39	2.33	1.53	0.38	0.35	1.22	0.61
Finance and Capital	2.57	1.41	2.64	0.00	0.54	0.25	0.37	0.00
Technology	2.13	1.90	2.27	1.58	0.27	0.19	0.29	0.20
All Factor Market Division	3.00	1.77	1.80	2.87	0.12	0.35	0.73	0.48
Legislation								
No. of Questionnaires	11	29	29	19	11	29	29	19

Ass. = Assembling sector
Cons. = Construction Sector
Manu. = Manufacturing Sector
Reta.= Retailer Sector

Table 6.17 represents the results in the case of the factor market being classified into the two groups for each kind of business sector.

Table 6.17 Measuring the Managers' Perceptions of the Environmental Conditions Related to Competition Intensity and Unpredictability (Factor Market is Classified into FM1 and FM2) (For Kind of business sector)

Perceptions of Environment	Mean				Standard Deviation			
Kind of Sector	Ass.	Cons.	Manu	Reta.	Ass.	Cons.	Manu	Reta.
PCI for: Product Market	4.31	3.11	3.53	3.93	0.15	0.14	1.02	0.38
Factor Market:								
FM1	1.87	2.28	1.92	2.26	0.47	0.33	0.60	0.47
FM2	3.08	2.00	2.69	1.32	0.36	0.11	0.37	0.24
All Factor Market	2.60	2.21	2.52	2.01	0.28	0.17	0.28	0.20
Legislation	2.93	1.84	1.97	3.17	0.23	0.34	0.72	0.54
PU for: Product Market	3.30	2.73	2.75	3.30	0.64	0.33	0.399	0.42
Factor Market:	1.80	1.90	1.97	1.81	0.29	0.35	0.31	0.36
FM1	2.45	1.73	2.44	1.09	0.38	0.10	0.75	0.19
FM2	2.13	1.90	2.27	1.58	0.27	0.19	0.29	0.20
All Factor Market	3.00	1.77	1.80	2.87	0.12	0.35	0.73	0.48
Legislation								
No. of Questionnaires	11	29	29	19	11	29	29	19

Ass. = Assembling sector
Cons. = Construction Sector
Manu. = Manufacturing Sector
Reta.= Retailer Secto.

Table 6.18 shows the results for each kind of transformation operations.

Table 6.18 Measuring the Managers' Perceptions of the Environmental Conditions Related to Competition Intensity and Unpredictability (For Transformation Operations).

Perceptions of Environment	Mean			Standard Deviation		
Transformation Operation	**Divergent**	**Multiplex**	**Convergent**	**Divergent**	**Multiplex**	**Convergent**
PCI for: Product Market	3.38	3.91	3.48	1.16	0.36	0.57
Factor Market:						
Raw Material	1.50	2.15	2.42	0.54	0.46	0.48
Labour	1.94	2.51	2.44	0.37	0.51	0.53
Management	3.50	3.48	3.19	0.61	0.86	0.40
Finance and Capital	2.40	2.05	1.67	1.41	0.72	0.50
Technology	2.73	0.83	2.00	0.36	1.51	0.81
All Factor Market	2.41	2.20	2.34	0.24	0.39	0.28
Legislation	2.06	2.73	2.18	0.69	0.93	0.59
P. Unpredictability for: Product Market	2.51	3.33	2.91	0.74	0.37	0.50
Factor Market:						
Raw Material	1.69	1.91	2.13	0.58	0.54	0.55
Labour	1.94	2.23	2.13	0.36	0.43	0.42
Management	2.29	2.46	2.49	0.51	0.66	0.46
Finance and Capital	2.41	1.68	1.44	1.43	0.60	0.47
Technology	2.52	.72	1.78	0.34	1.31	0.66
All Factor Market	2.17	1.80	2.00	0.28	0.43	0.27
Legislation	1.88	2.44	2.15	0.65	0.88	0.65
No. of Questionnaires	21	25	42	21	25	42

Table 6.19 represents the results for each transformation operation in the case of the factor market division being classified into two divisions; FM1 and FM2.

Table 6.19 Measuring the Managers' Perceptions of the Environmental Conditions Related to Competition Intensity and Unpredictability (Factor Marker is classified into FM1 and FM2) (For Transformation Operations)

Perceptions of Environment	Mean			Standard Deviation		
Transformation Operations	Divergent	Multiplex	Convergent	Divergent	Multiplex	Convergent
PCI for:						
Product Market	3.38	3.91	3.48	1.16	0.36	0.57
Factor Market:						
FM1	1.85	2.22	2.16	0.59	0.53	0.48
FM2	2.52	1.75	2.34	0.27	0.81	0.56
All Factor Market	2.41	2.20	2.34	0.24	0.39	0.28
Legislation	2.06	2.73	2.18	0.69	0.93	0.59
PU for:						
Product Market.	2.51	3.33	2.91	0.74	0.37	0.50
Factor Market:						
FM1	1.94	1.85	1.89	0.45	0.33	0.33
FM2	2.31	1.49	1.97	0.26	0.75	0.43
All Factor Market	2.17	1.80	2.00	0.28	0.43	0.27
Legislation.	1.88	2.44	2.15	0.65	0.88	0.65
No. of Questionnaires	21	25	42	21	25	42

Table 6.20 shows the results for each ownership category.

Table 6.20 Measuring the Managers' Perceptions of the Environmental conditions Related to Competition Intensity and Unpredictability (For Ownership Categories)

Descriptive Techniques	Mean		Standard Deviation	
Kind of Ownership	Public	Private	Public	Private
P. Competition Intensity for:				
Product Market	3.05	3.76	0.46	0.73
Factor Market:				
Raw Material	2.30	2.06	0.62	0.60
Labour	1.88	2.50	0.38	0.49
Management	2.76	3.55	0.58	0.49
Finance and Capital	1.12	1.89	1.21	0.77
Technology	1.53	1.95	0.68	1.33
All Factor Market	2.12	2.39	0.23	0.31
Legislation.	1.93	2.44	0.63	0.77

Descriptive Techniques	Mean		Standard Deviation	
Kind of Ownership	Public	Private	Public	Private
P. Unpredictability for:				
Product Market	2.71	3.01	0.48	0.63
Factor Market:				
Raw Material	2.11	1.91	0.77	0.49
Labour	1.86	2.20	0.37	0.39
Management	2.26	2.49	0.72.	0.45
Finance and Capital	1.67	1.77	1.34	0.67
Technology.	1.44	1.73	0.66	1.18
All Factor Market	1.87	2.02	0.34	0.35
Legislation	1.75	2.31	0.53	0.76
No. Of Questionnaire	23	65	23	65

Table 6.21 represents the results for each ownership category in the case of the factor market division being classified into two divisions; FM1 and FM2.

Table 6.21 Measuring the Managers' Perceptions of the Environmental conditions Related to Competition Intensity and Unpredictability (Factor Marker is classified into FM1 and FM2) (For Ownership Categories)

Descriptive Techniques	Mean		Standard Deviation	
Kind of Ownership	Public	Private	Public	Private
P. Competition Intensity for:				
Product Market	3.05	3.76	0.46·	0.73
Factor Market:				
FM1	2.27	2.04	0.42	0.52
FM2	1.85	2.34	0.40	0.69
All Factor Market	2.12	2.39	0.23	0.31
Legislation	1.93	2.44	0.63	0.77
P. Unpredictability for:				
Product Market	2.71	3.01	0.48	0.63
Factor Market:				
FM1	1.93	1.88	0.43	0.33
FM2	1.67	2.00	0.42	0.62
All Factor Market	1.87	2.02	0.34	0.35
Legislation	1.75	2.31	0.53	0.76
No. Of Questionnaire	23	65	23	65

Table 6.22 represents the results for each business strategy posture.

Table 6.22 Measuring the Managers' Perceptions of the Environmental Conditions Related to Competition Intensity and Unpredictability (For Kind of Business Strategy Postures)

Perceptions of Environment	Mean				Standard Deviation			
Kind of Sector	Defen.	Pros.	Analys	React.	Defen.	Pros.	Analys	React
PCI for:								
Product Market	3.3	3.9	3.8	2.8	.29	.59	.75	.67
Factor Market:								
Raw Material	2.7	1.9	2.0	2.2	.34	.35	.63	.90
Labour	2.3	2.5	2.4	1.9	.24	.58	.61	.33
Management	3.4	3.4	3.9	2.7	.23	.52	.34	.65
Finance and Capital	2.3	1.6	1.5	2.8	.46	.54	.67	1.3
Technology	1.2	2.0	2.4	1.6	.71	1.3	1.4	.97
All Factor Market Division	2.3	2.3	2.4	2.2	.15	.24	.47	.34
Legislation	2.2	2.5	2.3	2.1	.41	.90	.85	.62
PU for:								
Product Market	2.8	3.2	2.8	2.5	.42	.52	.58	.76
Factor Market:								
Raw Material	2.3	1.8	1.9	2.1	.21	.44	.54	.91
Labour	2.1	2.1	2.2	1.9	.24	.39	.56	.53
Management	2.5	2.3	2.7	2.3	.33	.48	.41	.83
Finance and Capital	1.8	1.5	1.6	2.4	.16	.49	.57	1.7
Technology	1.1	1.8	2.0	1.5	.62	1.2	1.2	.94
All Factor Market Division	2.0	1.9	2.1	2.0	.18	.33	.43	.42
Legislation	2.1	2.4	2.1	1.8	.25	.82	.89	.60
No. of Questionnaires	17	36	19	16	17	36	19	16

Defend. = Defenders organisations
Analys. = Analysers organisations
Pros. = Prospectors organisations
React. = Reactors organisations

Table 6.23 represents the results for each strategic posture in the case of the factor market division being classified into two divisions; FM1 and FM2.

Table 6.23 Measuring the Managers' Perceptions of the Environmental Conditions Related to Competition Intensity and Unpredictability (For Kind of Business Strategy Postures)

Perceptions of Environment	Mean				Standard Deviation			
Kind of Sector	Defen.	Pros.	Analys	React.	Defen.	Pros.	Analys	React
PCI for:								
Product Market	3.3	3.9	3.8	2.8	.42	.59	.75	.67
Factor Market:								
FM1	2.5	1.9	1.9	2.5	.17	.36	.61	.37
FM2	1.9	2.3	2.6	1.9	.39	.66	.73	.57
All Factor Market Division	2.3	2.3	2.4	2.2	.15	.24	.47	.34
Legislation	2.2	2.5	2.3	2.1	.41	.90	.85	.62

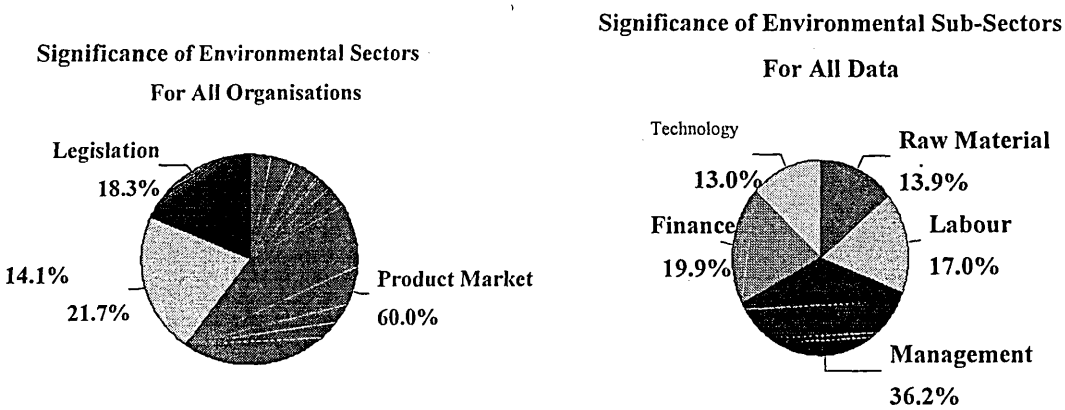
Perceptions of Environment	Mean				Standard Deviation			
Kind of Sector	Defen.	Pros.	Analys	React.	Defen.	Pros.	Analys	React
PU for:								
Product Market	2.8	1.7	2.8	2.5	.42	.52	.58	.76
Factor Market:								
FM1	2.1	1.7	1.8	2.2	.13	.35	.37	.18
FM2	1.6	2.0	2.2	1.8	.33	.60	.63	.60
All Factor Market Division	2.0	1.9	2.1	2.0	.18	.33	.43	.42
Legislation	2.1	2.4	2.1	1.8	.25	.82	.89	.60
No. of Questionnaires	17	36	19	16	17	36	19	16

Defend. = Defenders organisations
Pros. = Prospectors organisations
Analys. = Analysers organisations
React. = Reactors organisations

The main finding from these tables was that managers differentiate between the relative importance of the main environmental divisions depending on the organisation's kind of business, kind of transformation operations, ownership category and business strategy posture. These were tested using K2. The full results are given in Appendix 6 which shows that these differences are significant. It means that the organisations differed depending on the four variables named above, which this research context considers as moderating (conditional) variables.

Further evidence for the above findings, is given in Figure 6.1 for all data. Respondents were asked to rank the three main environmental divisions; product market, factor market, and legislation and also the five sub-divisions for factor market; raw material, labour, management, finance and capital, and technology in order of their relative importance. The main conclusions are summarised below.

Figure 6.1 Priority and Importance of Environmental Divisions and Sub-divisions (For All Data)

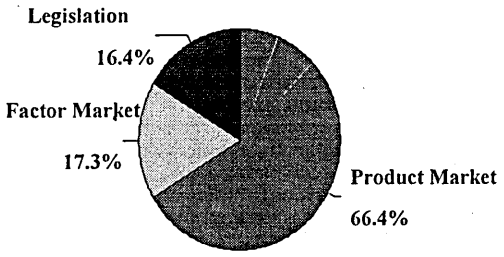


Moreover, Figure 6.2 shows the pie charts for each kind of business.

Figure 6.2 Priority and Importance of Environmental Divisions and Sub-divisions (For Kind of business sector).

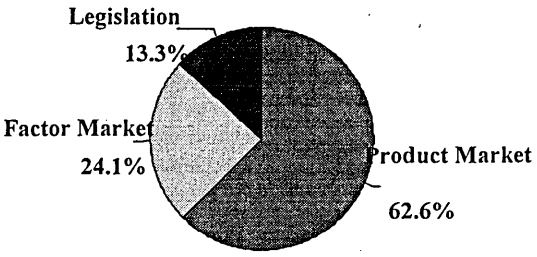
Significance of Environmental Sectors

For Assembling Organisations



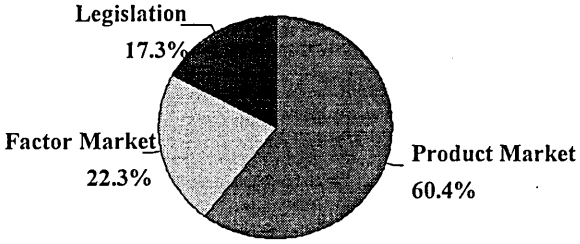
Significance of Environmental Sectors

For Constructing Organisations



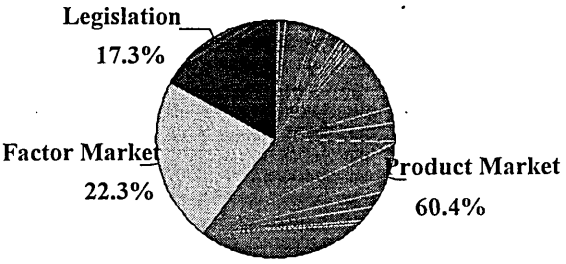
Significance of Environmental Sectors

For Manufacturing Organisations



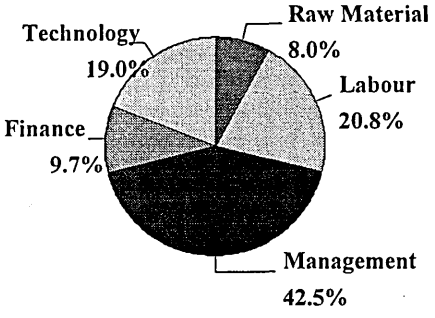
Significance of Environmental Sectors

For Marketing Organisations



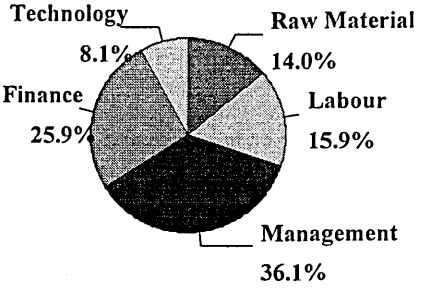
Significance of Environmental Sub-Sectors

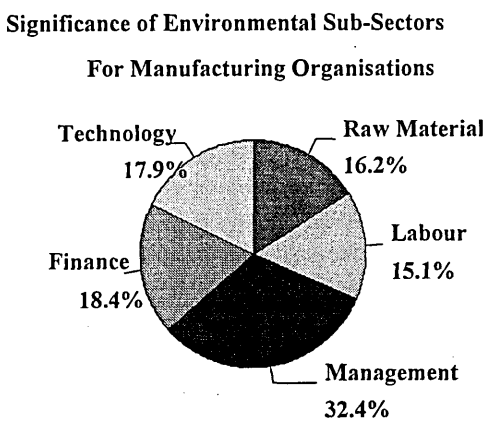
For Assembling Organisations



Significance of Environmental Sub-Sectors

For Constructing Organisations





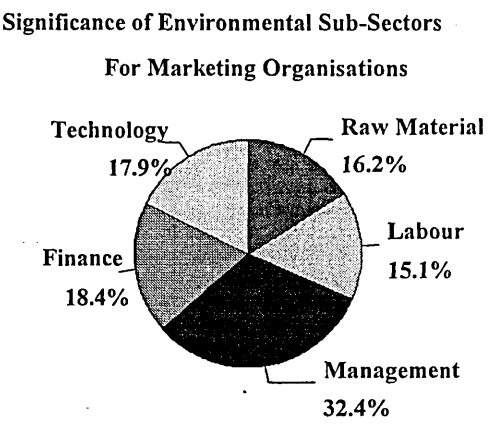
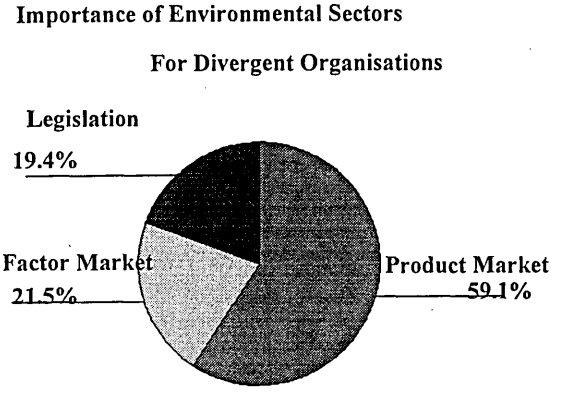
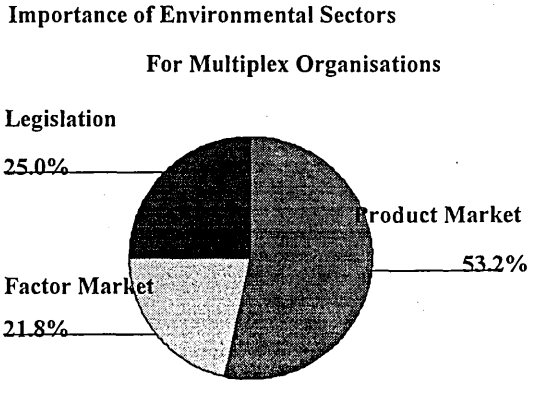
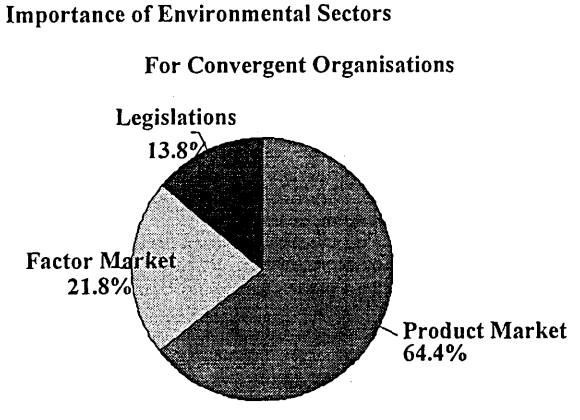


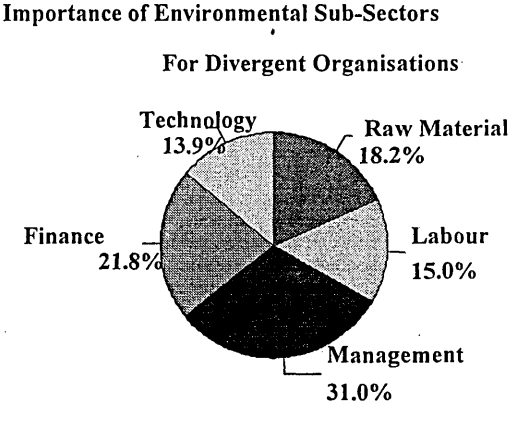
Figure 6.3 represents the charts for each kind of transformation operation.

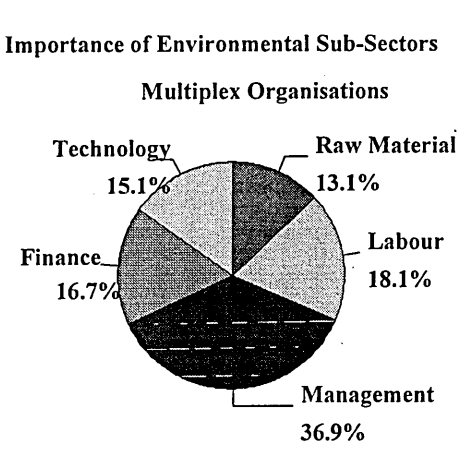
Figure 6.3 Priority and Importance of Environmental Divisions and Sub-divisions (For Transformation Operations)











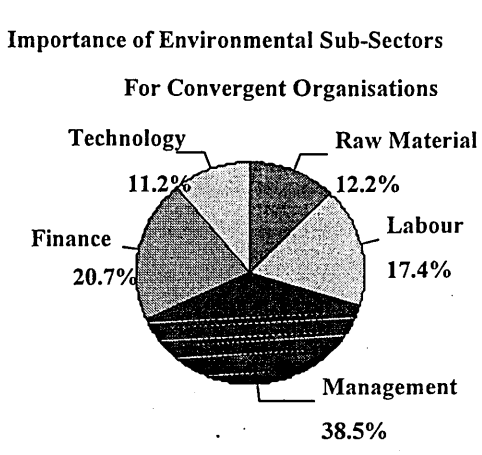
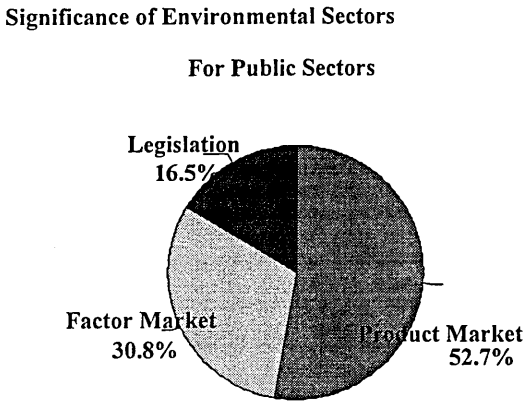
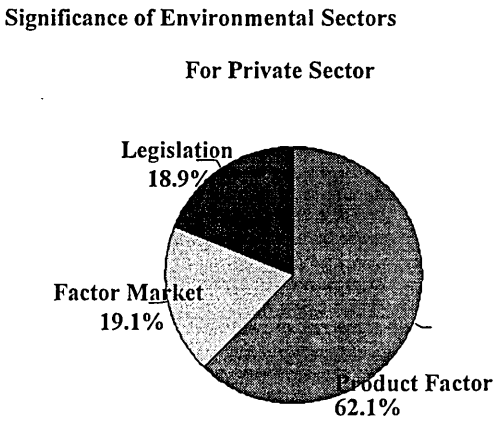
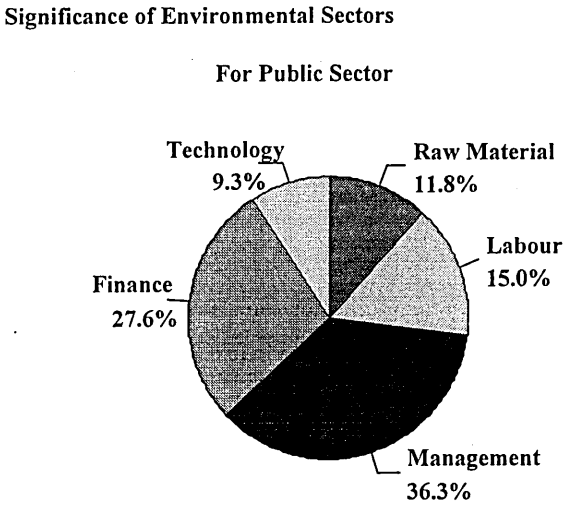


Figure 6.4 represents the results for each ownership category.

Figure 6.4 Priority and Importance of Environmental Divisions and Sub-divisions (For Ownership Categories).







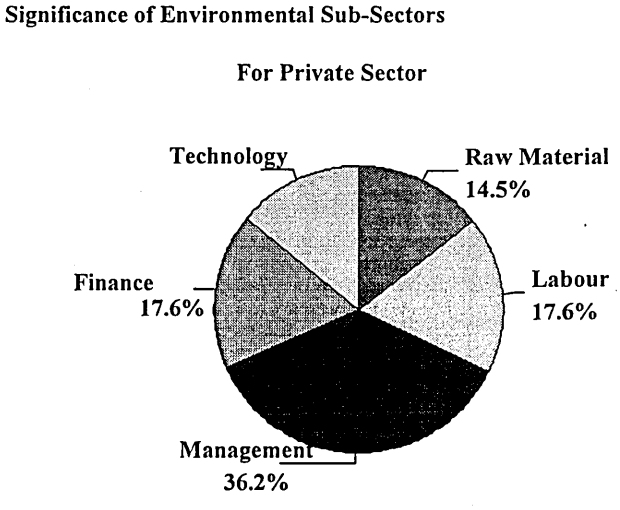
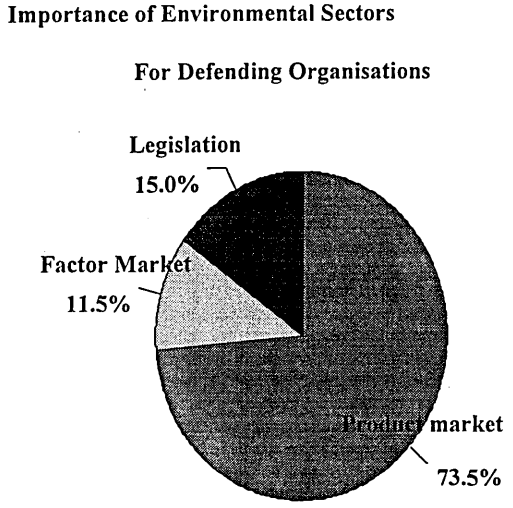
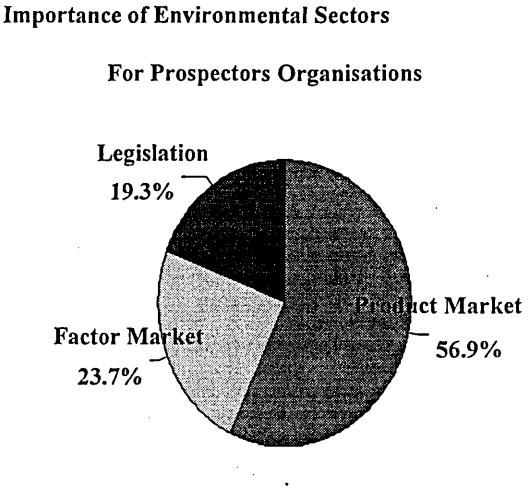
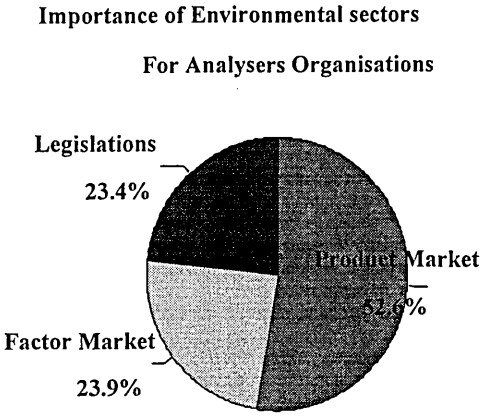


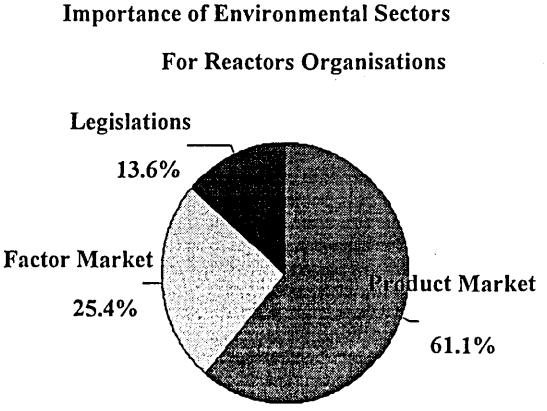
Figure 6.5 represents the results for each business strategy posture.

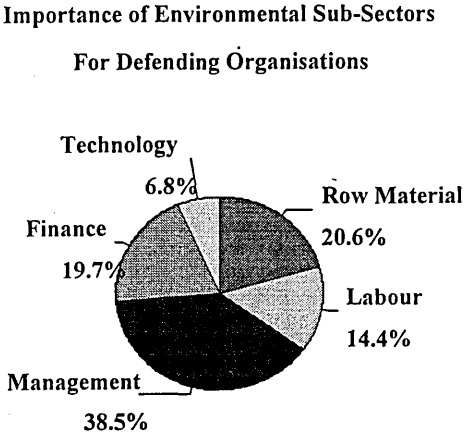
Figure 6.5 Priority and Importance of Environmental Divisions and Sub-divisions (For Kind of Business Strategy Posture).

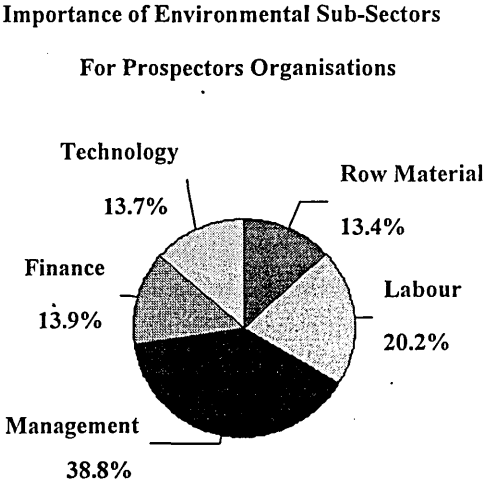






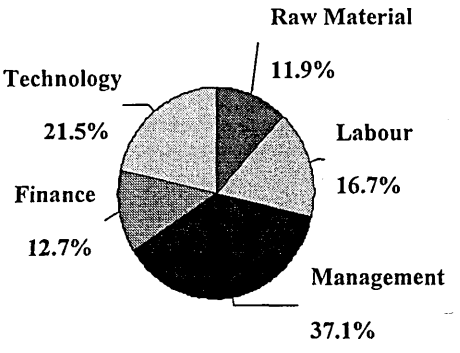






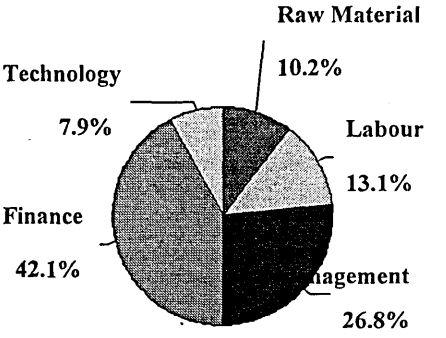
Importance of Environmental Sub-Sectors

For Analysers Organisations



Importance of Environmental Sub-Sectors

For Reactors Organisations



The main findings from the figures from Figure 6.1 to are:

For all data, managers reported that the product market factor had 60.0% importance among the environmental divisions. Meanwhile, legislation was of least importance in that group with had only 18.3%.

At the business sector level, managers agreed that the product market division was of the most importance. This is illustrates as 66.4% for assembling organisations, 62.6% for construction organisations and 60.4% for both manufacturing and retailer organisations. However, legislation was the least importance with 16.4% for assembling organisations, 13.3% for construction organisations and 17.3% for both manufacturing, and retailer organisations.

The findings were the same for the organisations when classified according to transformation operations, ownership categories and business strategy postures. All the categories of transformation operations, both ownership categories and the four kinds of business strategy postures agreed that the product market was of the most important among the environmental divisions. This can be seen as figures show 59.1% for divergent, 53.2 % for multiplex, 64.4% for convergent, 52.7% for public, 62.1% for private, 73.5% for defending, 56.9% for prospectors, 52.6% for analysers, 61.1 for reactors organisations.

When organisations were classified by transformation operations or ownership, legislation was the least important as figures show 19.4% for divergent, 52.0% for multiplex, 21.8% for convergent, 16.5% for public and 18.9% for private organisations.

However, when the organisations were classified according to business strategies, the above findings differed. The least important division in the environment was the factor market for defending organisations (11.5%). For the rest of the organisations, legislation was the least important division (19.3% for prospectors, 23.4% for analysers and 13.6% for reactors organisations).

The evidence shows that all organisations, all kinds of business sectors, transformation operations, ownership categories and all kinds of business strategy postures gave the most importance to Management (36.2% for all data, 42.5% for assembling, 36.1% for construction, 32.4% for both manufacturing, and retailer, 31.0% for divergent, 36.9% for multiplex, and 38.5 % for convergent, 36.3% for public, 36.2% for private, 38.5% for defending, 38.8 % for prospectors, 37.1% for analysers and 26.8% for reactors organisations).

The results show that the managers differentiated between the importance of the sub-divisions for factor market according to their business sector, their transformation operations, their ownership categories and their own strategy postures

The main Conclusions from these tables (Table 6.16 to Table 6.23 and figures (Figure 6.1 to Figure 6.5) are:

1. Managers differentiated between the relative importance of the main environmental divisions.

2. All respondents gave considerable importance to product market divisions, with the lowest importance being accorded to legislation in varying degrees. These results suggest the need for considerable attention to be given to the product market division when studying the relationship between managers' perception of environmental conditions and CMIS. This is done in Chapter Seven.

3. The results show that the managers differentiated between the importance of the sub-divisions of the factor market according to their kinds of business, kinds of transformation operation, ownership categories and business strategy postures. These results support the research proposition to deal with business sector, ownership, transformation characteristics and strategic postures as moderating variables in the main relationship.

6.2.4 Exploring Association between the PCI and PU Variables

The statistical correlation as a measure of association was been used in this research to test association between the independent variables (P. Competition Intensity and P. Unpredictability). Correlation techniques are widely used as measurements of the direction and strength of association between pairs of variables. The correlation technique, which was been used to test this association, is *Spearman's rho Correlation.* The reason behind this choice is that, Spearman's correlation is a non-parametric test and the data violated the parametric assumptions, as indicated in section 6.1.6. Spearman's tests works by first ranking the data and then applying Pearson's equation. Three pieces of information are given by these techniques: (1) the direction (positive or negative) of the correlation, (2) its strength and (3) the statistical *significance* of each correlation, which makes it possible to examine whether the correlation can be accepted or not on the light of the decided confidence interval (which is 95% in this research).

In order to determine whether to accept the correlation level and to classify the various levels of it, the statistics textbooks indicate that "the critical values of correlation" (Becker & Harnett 1987; Lentner 1979) depends on the sample size. Because the sample size of the whole data is: 88 cases, then the critical values of correlation at the 0.05 significance level are for all data (n = 88) as follows:

- Below 0.233 variables are not likely to be correlated
- Between 0.233 and 0.480 variables are not unlikely to be correlated (and this will be the first level for accepting a correlation)
- Between 0.480 and 0.715 variables have a moderate correlation
- Between 0.715 and 0.948 variables have strong correlation
- Between 0.948 and 1.00 variables have a very strong correlation

Meanwhile, since the sample sizes for each business sector is different, Table 6.24 introduces the critical values for each sector. Furthermore,

Table 6.25 introduces the critical values for each kind of transformation operation, Table 6.26 for each of the ownership categories and Table 6.27 for each of the business strategy postures.

Table 6.24 The Critical Values of Correlation for Each Business Sectors

Sectors	Assembling (n = 11)	Constructors (n = 29)	Manufacture (n = 29)	Retailer (n = 19)
-Variables are not likely to be correlated	Below.003	Below .076	Below .076	Below .050
-Variables are not unlikely to be correlated (and this will be the first level for accepting a correlation)	.003 : .006	.076 : .158	.076 :.158	.050 : .103
-Variables have a moderate correlation	.006 : .136	.158 : .236	.158 : .236	.103 : .154
-Variables have strong correlation	.136 : .205	.236 : .312	.236 : .312	.154 : .205
-Variables have a very strong correlation	.205 : 1.00	.312 : 1.00	.312 : 1.00	.205 : 1.00

Table 6.25 The Critical Values of Correlation for Each Transformation Characteristic

Transformation Characteristics	Divergent (n = 21)	Multiplex (n = 25)	Convergent (n = 42)
-Variables are not likely to be correlated	Below.056	Below.066	Below.111
-Variables are not unlikely to be correlated (and this will be the first level for accepting a correlation)	.056 : .115	.066 : .136	.111 : .229
-Variables have a moderate correlation	.115 : .171	.136 : .203	.229 : .341
-Variables have strong correlation	.171 : .226	.203 : .269	.341 : .452
-Variables have a very strong correlation	.226 : 1.00	.269 : 1.00	.452 : 1.00

Table 6.26 The Critical Values of Correlation for Each Ownership Category

Categories	Public (n = 23)	Private (n = 65)
-Variables are not likely to be correlated	Below .061	Below .172
-Variables are not unlikely to be correlated (and this will be the first level for accepting a correlation)	.061 : .125	.172 : .355
-Variables have a moderate correlation	.125 : .187	.355 :.528
-Variables have strong correlation	.187 : .247	.528 : .739
-Variables have a very strong correlation	.247 : 1.00	.739 : 1.00

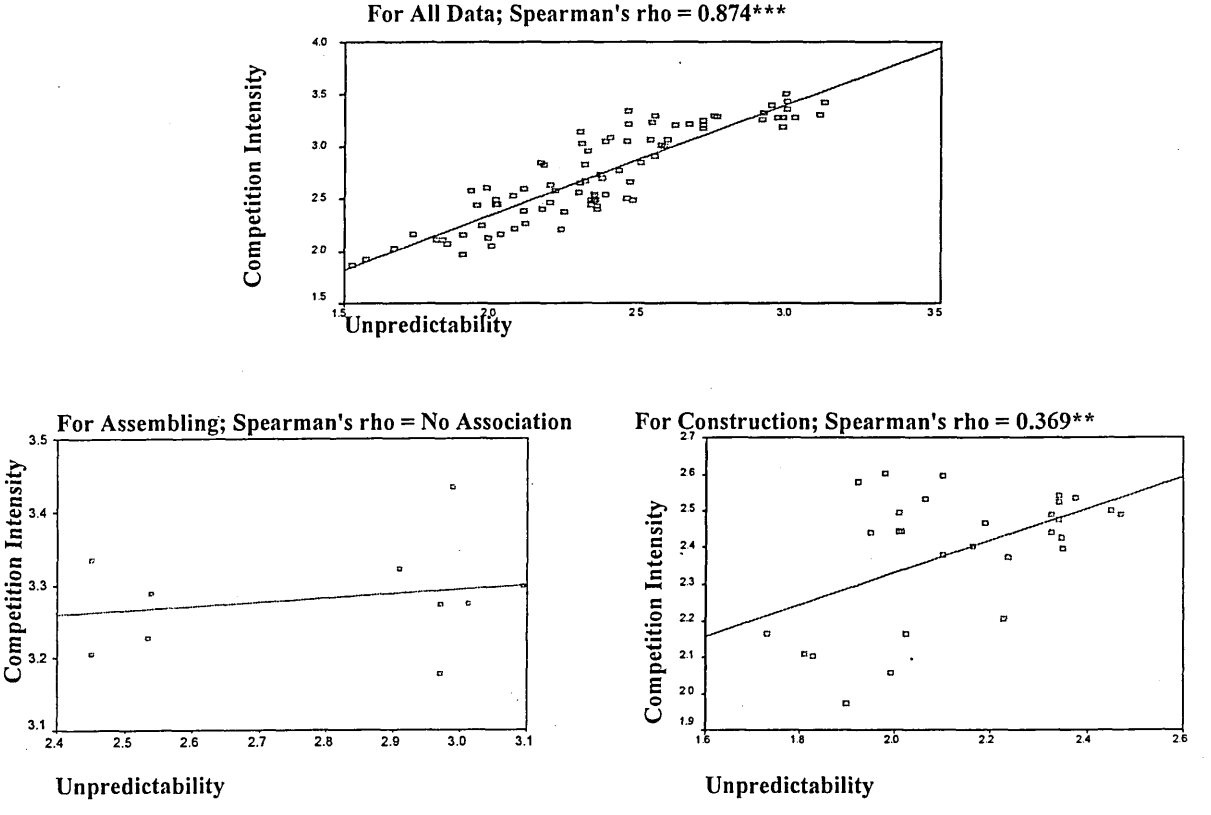
Table 6.27 The Critical Values of Correlation for Each Business Strategy Postures

Strategies	Defending (n =17)	Prospectors (n =36)	Analysers (n =19)	Reactors (n =16)
-Variables are not likely to be correlated	Below.005	Below .010	Below .005	Below .004
-Variables are not unlikely to be correlated (and this will be the first level for accepting a correlation)	.005 : .009	.010 : .020	.005 : .010	.004 : .009
-Variables have a moderate correlation	.005 : .210	.020 : .445	.010 : .235	.009 : .198
-Variables have strong correlation	.210 : .317	.445 : .671	.235 : .354	.198 : .298
-Variables have a very strong correlation	.317 : 1.00	.671 : 1.00	.354 : 1.00	.298 : 1.00

The patterns of relationships between PCI and PU for product market and all the total of components of environmental conditions are shown in Figure 6.6. Scatter plot diagram produces a picture of the association between two variables by plotting a point for each

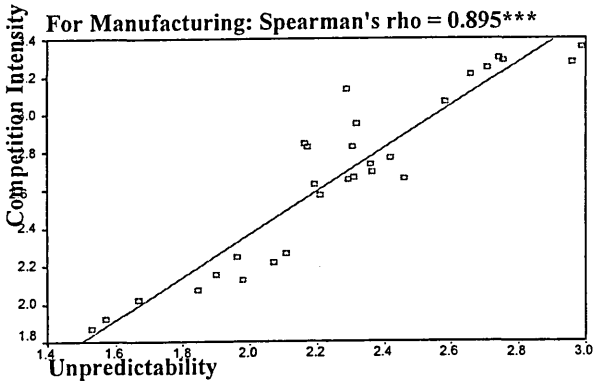
case. They are useful aids to the understanding of correlation. There was an association of PCI with PU for all data, different kind of business sectors, transformation operations, ownership categories and business strategy postures. The Spearman's rho correlation test results indicate a positive strong correlation between PCI and PU for all components of Product market, Factor market, and Legislation, except for the assembling sector (there is no result). For the Product Market, Spearman's rho correlation between perceiving competition intensity and unpredictability showed strong correlation at all levels of analysis, except for assembling, constructions and retailer sectors. There is no result for these sectors.

Figure 6.6 Association between PCI with PU for the total of components of Product market, Factor market, and Legislation[1]

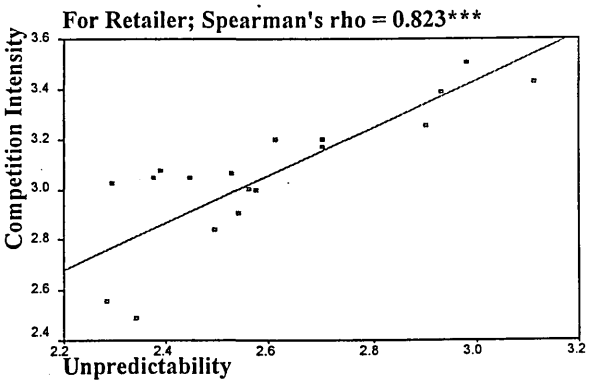


[1] *** P<0.01, ** P<0.05, * P<0.10

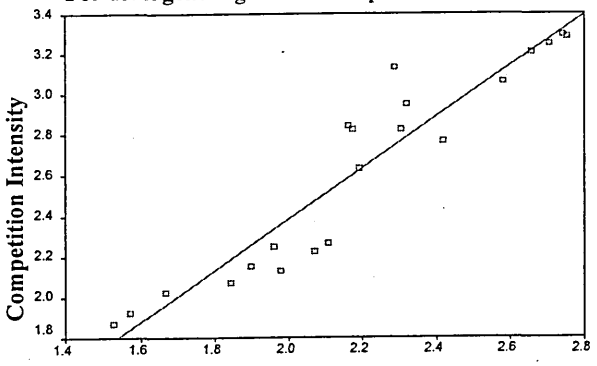
For Manufacturing: Spearman's rho = 0.895***



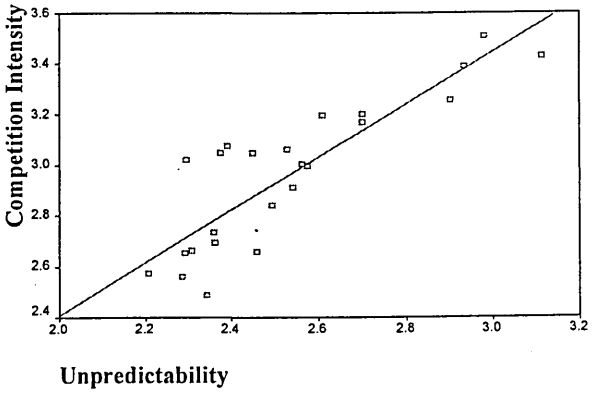
For Retailer; Spearman's rho = 0.823***



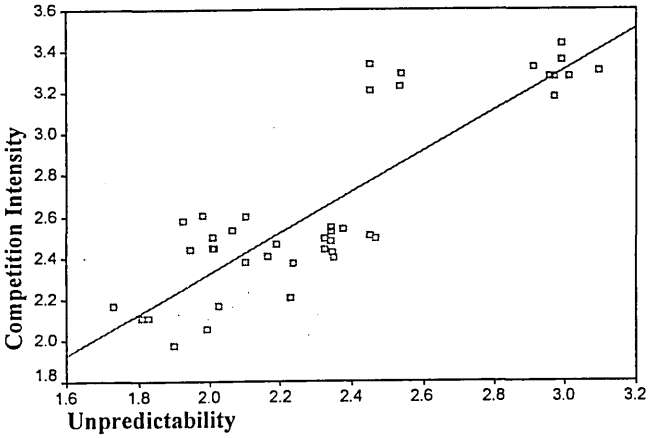
For divergent organisations Spearman's rho= 0.943***



For Multiplex; Spearman's rho=0.864***



For Convergent; Spearman's rho = 0.867***



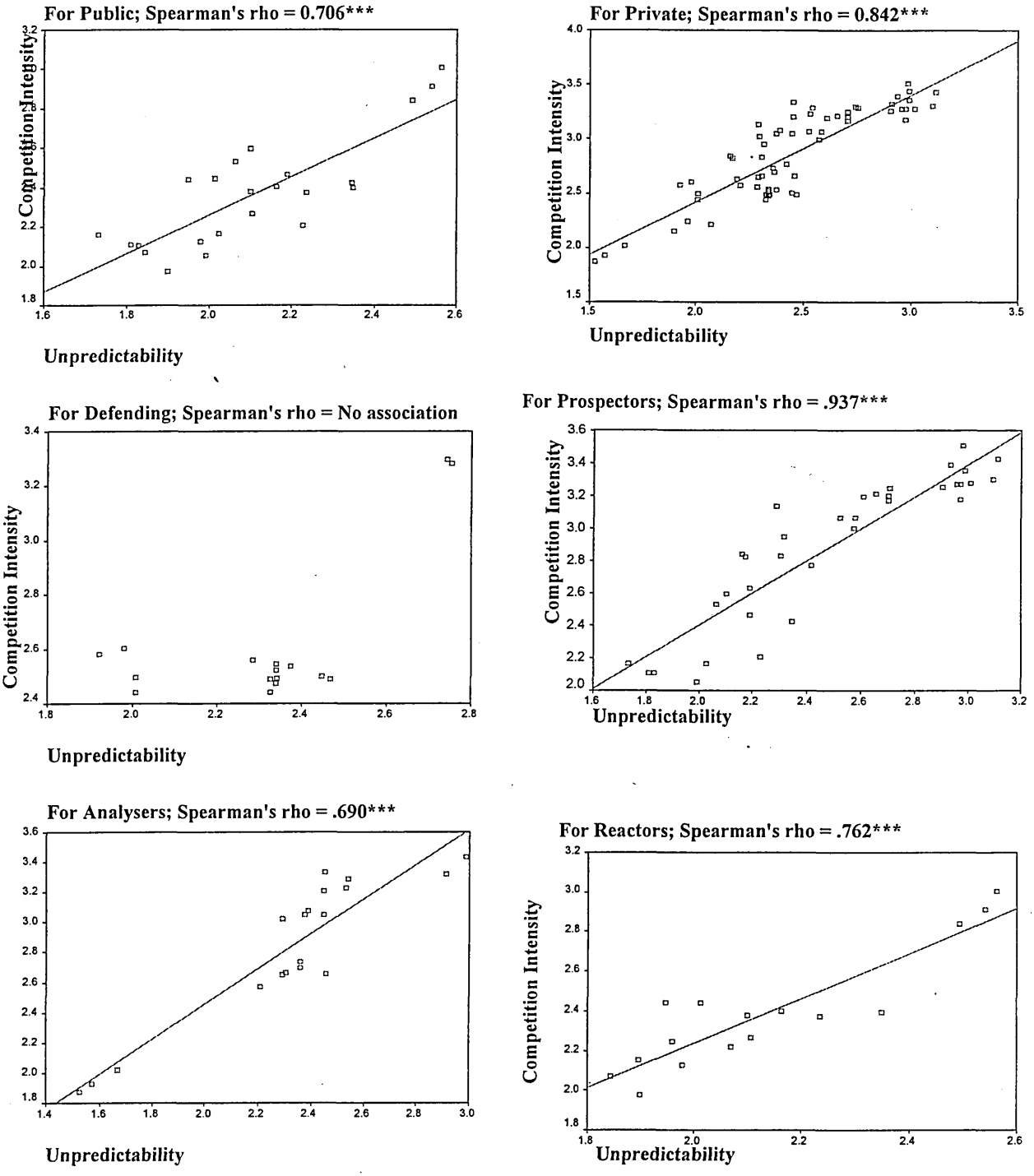
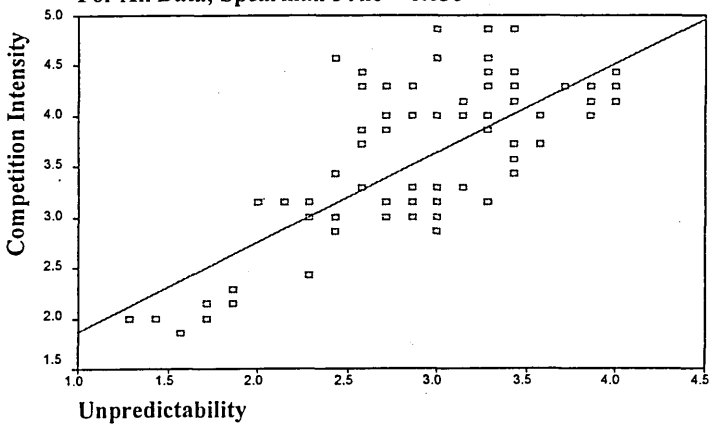


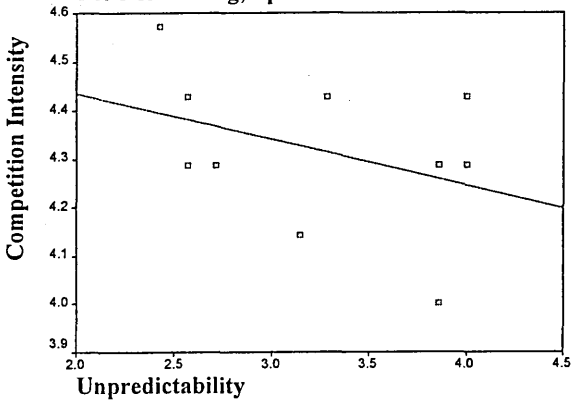
Figure 6.7describes the pattern of relationships between PCI and PU for the product market.

Figure 6.7 Association of PCI and PU (The Case of Product Market)[1]

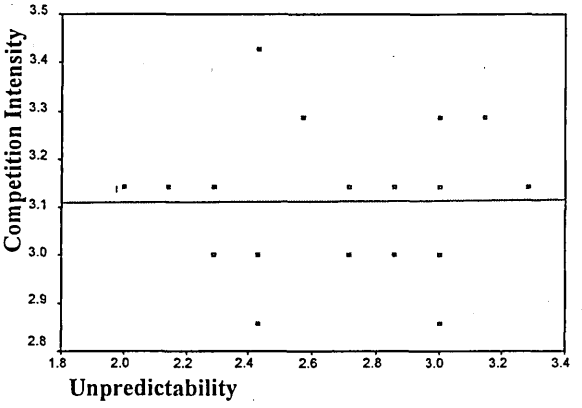
For All Data; Spearman's rho = 0.636***



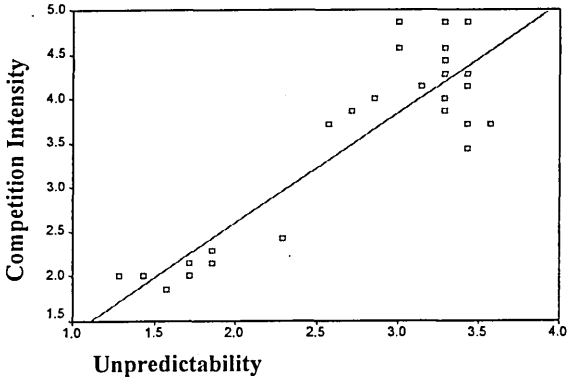
For Assembling; Spearman's rho = No Association



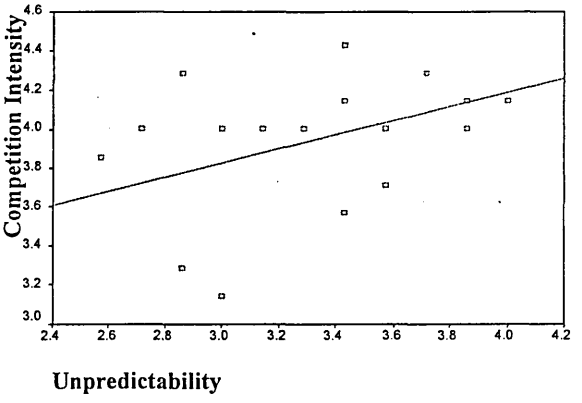
For Construction; Spearman's rho = No Association



For Manufacturing; Spearman's rho = 0.647***

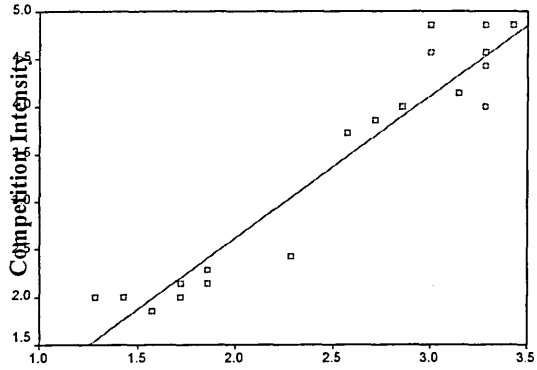


For Retailer; Spearman's rho = 0.405**

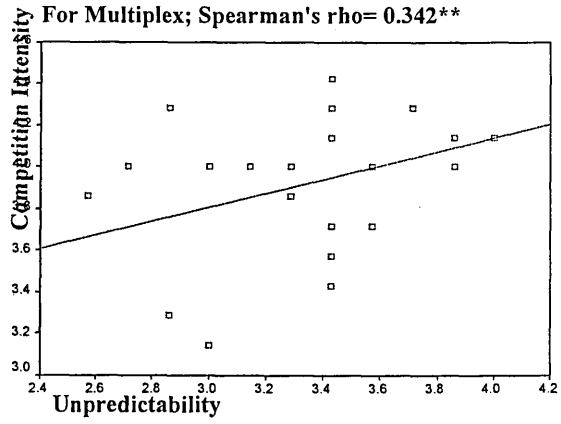


[1] *** P<0.01, ** P<0.05, * P<0.10

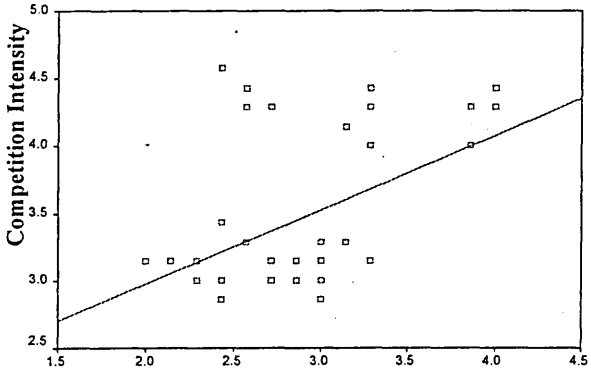
For Divergent; Spearman's rho= 0.955***



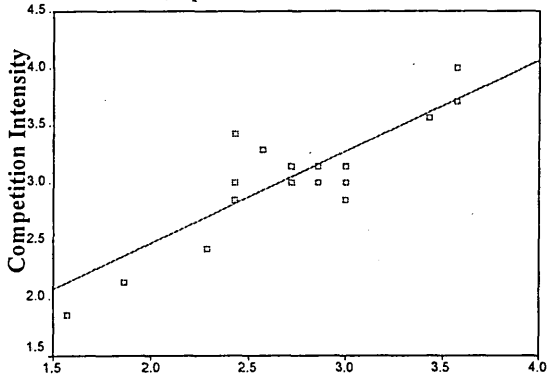
For Multiplex; Spearman's rho= 0.342**



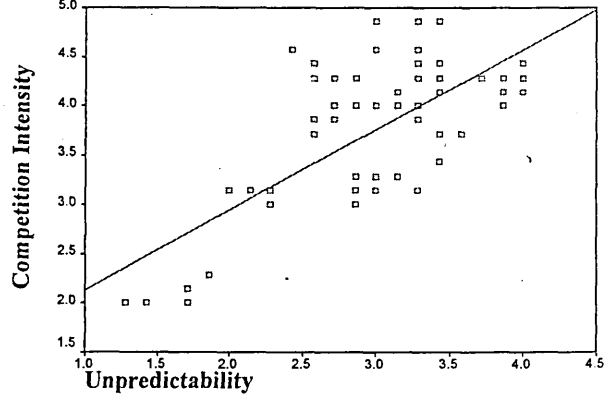
For convergent Organisations; Spearman's rho= 0.480***



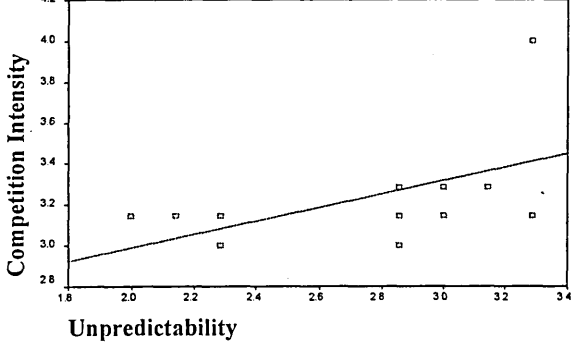
For Public; Spearman's rho = 0.562***



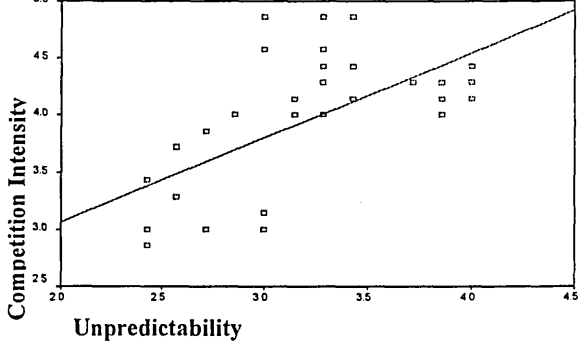
For Private; Spearman's rho = 0.527***

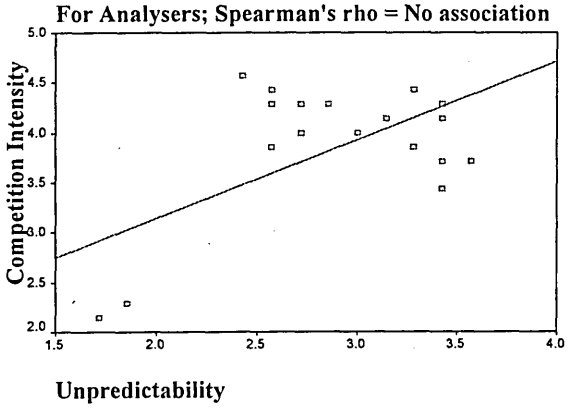


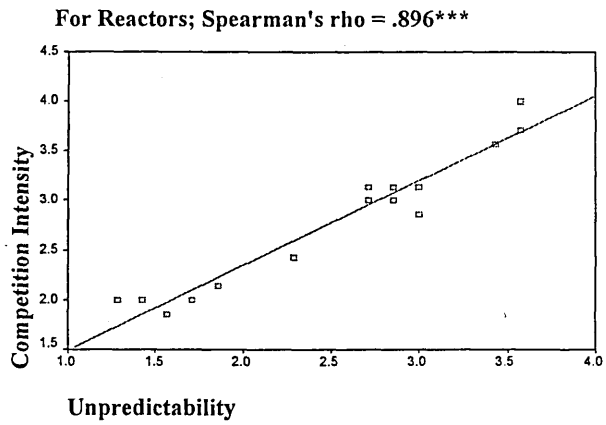
For Defending; Spearman's rho = .490**



For Prospectors; Spearman's rho = .631***







The main finding from this section is that the patterns of relationship between PCI and PU for all the variables indicated that, the more managers perceived the existence of competition intensity, the more they held perceptions of unpredictability. Similar results were recognised in the literature by Gupta and Wilemon (1990) and Gerwin and Tarodeau (1982), as will be illustrated in Chapter Eight. These results would have an effect when using regression analysis to test hypotheses, since SPSS would reject one of these two variables from the regression model as will be illustrated in Chapter Seven.

6.2.5 Exploring the Moderating variables

A moderated relationship occurs when the values of variables are different between categories of the sample. Bryman and Cramer (2001) argued that the discovery of such a relationship could occur by design or by chance. They added that when this relationship can be discovered by design, the researcher has usually anticipated the possibility that a relationship may be moderated (although the assumption may be incorrect of course). They added that a moderated relationship could be discovered by chance when the researcher finds a marked contrast in findings for different categories of the test variable. In this research, since the sample was chosen depending on moderating (conditional) variables, the moderated relationships were discovered by design.

There are relatively large numbers of statistical tests to determine whether a difference between two or more groups is significant. Each test is appropriate when specific conditions are respect. It is necessary to bear the following considerations in mind (Bryman and Cramer, 2001, p: 116 introduced a table showing the choice between different kinds of tests depending on these considerations):

- Whether the variables are ordinal or interval: each kind of variables has a specific appropriate kind of test. In this research, the data which was compared was either interval or ratio.

- Whether the comparison groups are related or unrelated: which test should be used also depends on whether the values come from different cases or from the same or similar ones. In this research, the comparison groups were unrelated. Different tests are generally used to compare two rather than three or more comparison groups. In this research, there were four comparison groups for kind of business sector (Assembling, Construction, Manufacturing, and Retailer), three comparison groups for transformation operations (Divergent, Multiplex and Convergent), two comparison groups for ownership category (Private and Public) and four comparison groups for business strategy postures (Defending, Prospectors, Analysers and Reactors).

- It is important to decide which kinds of tests are suitable for the data: whether they are parametric or non-parametric tests. For this research, the appropriate tests were non-parametric as indicated in section 6.1.6.

Depending on the above considerations, Bryman and Cramer (2001) advise the use Kruskal Wallis H test for a non-categorical data, when a non-parametric data test is needed, when the data are from unrelated groups and when comparison is between two or more groups. In this test, the cases in the different samples are ranked together in one series and the chi-square statistic and its significance level corrected for rank ties. Table 6.28 shows the numbers of organisations and their means and mean ranks for each kind of business sector. Table 6.29, Table 6.30 and Table 6.31 show the same results for transformation operations, ownership categories and business strategy postures respectively. The significance levels are less than 0.05 for all the variables for each level of the moderating variables. This indicates that there are differences between the organisations of the four kinds of business sectors, the three groups of transformation operations, the two ownership categories and the four kinds of business strategy postures in the mean rank. These results explain the differences in the descriptive tests calculated, depending on these moderating variables in sections 6.2.1 and 6.2.3.

The main conclusion from these four tables is:

The evidence suggests that kinds of business sectors, the transformation operations, ownership categories and business strategy postures are moderating (conditional) variables in this research.

Table 6.28 Comparisons of Means and Mean Ranks between Kinds of Business Sectors

Business Sectors	No.Org.	Efficiency		Optimisation		Strategy		PCI(PM)		PU(PM)		PCI(FM)				PU(FM)				PCI(Leg.)		PU(Leg	
												FM1		FM2		FM1		FM2					
		Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	M Ra
Ass.	5	4.3	21.2	3.1	19.3	3.9	18.0	4.4	24.4	3.3	19.0	1.7	9.8	3.2	24.6	1.8	11.2	2.4	20.7	2.9	20.2	3.0	24
Cons.	8	2.9	8.6	2.1	10.8	2.3	8.6	3.1	7.6	2.7	10.1	2.2	17.0	2.3	10.7	1.8	13.6	1.9	11.3	1.9	8.4	1.8	1
Man.	10	3.8	17.0	3.4	20.1	3.6	17.8	3.7	15.7	2.8	14.8	2.0	14.7	2.8	19.5	2.0	19.0	2.4	21.9	2.1	11.9	1.9	1(
Ret.	6	3.6	15.1	1.6	8.5	3.6	16.4	3.9	15.9	3.2	18.7	2.3	17.2	1.9	5.3	1.9	13.4	1.4	3.8	3.1	23.3	2.8	2(

Table 6.29 Comparisons of Means and Mean Ranks between Transformation Operations

Transformation Operations	No.Org.	Efficiency		Optimisation		Strategy		PCI(PM)		PU(PM)		PCI(FM)				PU(FM)				PCI(Leg.)		PU(I	
												FM1		FM2		FM1		FM2					
		Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	
Divergent	7	3.8	51.4	3.4	60.8	3.6	53.4	3.5	41.9	2.6	31.4	2.0	34.9	2.7	59.1	2.0	50.6	2.3	63.5	2.2	36.0	1.9	
Multiplex	8	3.9	54.9	2.4	40.2	2.4	56.6	3.9	55.5	3.6	62.8	2.2	48.8	1.9	25.8	1.9	40.7	1.8	27.0	2.6	57.14	2.4	
Convergent	14	3.4	34.9	2.4	38.9	2.8	32.8	3.6	39.2	2.9	40.2	2.0	46.7	2.7	48.4	1.8	43.7	2.1	45.4	2.3	41.2	2.3	

Table 6.30 Comparisons of Means and Mean Ranks between Ownership Categories

Ownership	No.Org.	Efficiency		Optimisation		Strategy		PCI(PM)		PU(PM)		PCI(FM)				PU(FM)				PCI(Leg.)		PU(Leg	
												FM1		FM2		FM1		FM2					
		Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	M Ra
Public	7	3.0	8.9	1.9	9.7	2.3	9.6	3.0	7.4	2.7	11.1	2.3	18.2	2.1	8.6	1.9	14.9	1.8	11.4	2.0	11.4	1.8	10
Private	22	3.8	16.9	2.9	16.7	3.6	16.7	3.9	17.4	3.0	16.3	2.0	14.0	2.7	17.1	1.9	15.0	2.2	16.1	2.5	16.2	2.4	16

Table 6.31 Comparisons of Means and Mean Ranks between Kinds of Business Strategy Postures

Strategic Postures	No.Org.	Efficiency		Optimisation		Strategy		PCI(PM)		PU(PM)		PCI(FM)				PU(FM)				PCI(Leg.)		PU(Leg	
												FM1		FM2		FM1		FM2					
		Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	M Ra
Defenders	5	2.83	8.70	2.32	12.80	2.03	7.60	3.29	9.80	2.84	11.9	2.53	69.9	1.91	34.0	209	35.2	1.62	29.0	2.21	15.1	2.13	14
Prospectors	12	3.89	17.75	2.52	14.13	3.76	17.38	4.04	18.50	3.19	19.0	1.86	30.3	1.72	57.7	2.31	31.0	1.97	46.1	2.47	16.3	2.40	17
Analysers	7	4.26	20.57	3.54	21.14	4.22	21.93	3.96	19.00	2.83	13.7	1.87	33.8	2.57	47.8	1.78	35.9	2.18	56.6	2.25	13.3	2.07	14
Reactors	5	2.77	6.90	1.96	10.70	1.95	7.00	2.83	6.20	2.54	10.3	2.47	62.1	1.90	32.8	2.20	69.6	1.80	43.1	2.13	14.1	1.81	11

6.3 Conclusions from this Chapter

This chapter described and justified the preliminary steps of data analysis and presented the research data. The SPSS package was used to describe and analyse the data for testing the research hypotheses. The research data could be classified into three kinds of variables: nominal (e.g. for measuring moderating variables and for reporting facts), ordinal (e.g. for measuring respondents' opinions using a Likert scale) and interval (e.g. for measuring respondents' opinions using percentages). This chapter concludes that the variables measured by Likert scale should be treated as interval variables in order to gain the advantages of using more powerful statistical techniques.

Two databases were created and used in this research. The first one was the questionnaires database, which contained 88 cases, corresponding to the number of respondents. The second one was the organisations database, which contained 29 cases, corresponding to the number of organisations in this research. This last database was mainly used when studying the variables measured as facts, such as policies of CMIS.

This chapter identified two reasons for creating new variables for analysis purposes. The first one was to get meaningful results from data analysis through aggregating the huge number of questions used for measurement of each variable. These aggregations were done depending on the outcome of reliability and factor analysis tests results. The second reason was to achieve some objectives of the data analysis from two different kinds of variables (e.g. interval and categorical). To achieve these objectives, it was needed to change one of the variables to the other kind. This was done using the "re-code" order in SPSS.

This chapter justified the use of non-parametric tests in this research, since the three conditions for applying parametric tests were not met by the research data. Therefore, all the tests reported in the next chapter should be suitable for the non-parametric data.

This chapter reported also the main features of the research data. The results showed that the respondents of all organisations considered the greatest importance of CMIS as both policies and practices in order to achieve efficiency purposes, followed by strategy purposes, then optimisation purposes. The interviewees reported that the Egyptian Law for Organisations requires all the organisations to use CMIS for efficiency purposes.

Furthermore, they reported between using recent market research for achieving optimisation, rather that using CMIS for optimisation purposes.

In relation to the relationship existed between policies and practices of CMIS, the results showed that there was no relationship between policies and practices for efficiency purposes, but there was a strong relationship between policies and practices for optimisation purposes, and also a very strong relationship between policies and practices for strategy purposes.

All respondents gave considerable importance to product market divisions, with the lowest importance given to legislation to varying degrees. This result will be tested in the next chapter. It is especially noted from the correlation tests that the managers' perceptions of the factor market cluster (raw material and finance) effects are negatively related to CMIS for the three purposes; efficiency, optimisation and strategy, whereas perceptions of the other cluster (labour, management and technology) are positively related to CMIS for the three purposes. These results lead to a need to distinguish between those two clusters of the factor market (FM1 & FM2) and provide descriptive analyses for them in this chapter.

The results from the Scatter plot diagrams showed strong relationships between the two independent variables in this research: managers' perceptions of competition intensity and unpredictability. It means the more managers perceive of competition intensity, the more the perceive unpredictability. This result will affect the testing of hypotheses using regression tests and the variables which should be used in each regression equation, as will be illustrated in the next chapter.

The results from this chapter supported the research proposition that business sectors, ownership categories, transformation characteristics and strategic postures should be considered as moderating (conditional) variables in this research. These results were verified while describing (using Mean and Standard Deviation as descriptive tools and using pie charts for the priority and importance of environmental divisions and sub-divisions of factor market) the different variables in each category in each moderating variable whenever there were differences between the categories in each moderating variable. Furthermore, when the Kruskal-Wallis H test was applied to variables split into the categories of the moderating variables, K2s were significant. This result supports the selection of these variables as moderating variables in the context of this

research. Therefore, these variables should be considered as moderating variables in the main relationship in this research (between managers' perceptions of environmental conditions on using CMIS for achieving efficiency, optimisation and strategy purposes) when testing the research hypotheses in the next chapter.

Having prepared and described the data, next chapter will report on the testing of the three hypotheses of this research.

Chapter Seven

Testing of the Research Hypotheses

7.0 Introduction

Chapter Six reported the preliminary steps to prepare the data for analysing and describing the variables and the existence of inter-relationships between the dependent and the independent variables. Furthermore, Chapter Six included evidence of the existence of the effects of four moderating variables. Therefore, all the tests reported in this chapter are conducted five times: for All Data and depending on each of Business sectors, Ownership Categories, Strategic Postures, and Transformation operations

In this research, two aspects of the environmental conditions have been selected, which might explain the behaviours of the dependent variables, as the independent variables; managers' perceptions of competition intensity and unpredictability for three kinds of divisions; product market, factor market (with five subdivisions of factor market; raw material, labour, management, finance and capital, and technology), and legislation. Furthermore, three aspects of CMIS practices have been selected as the dependent variables; for efficiency, optimisation, and strategy.

The basic proposition is:

Subject to Moderating Variables **Lin. H_1 or Non-Lin H_2**

[Managers' Perceptions (Environment Conditions) ------→ Cost Management System]

↑

Intervening Variables H3

The main hypothesis is that the more managers perceive the presence of environmental conditions, the more sophisticated CMIS practices will be used as illustrated in the following:

Managers' Perceptions (Environment Conditions) ⇑-------→ Using CMIS ⇑

In this research, there are three sub-hypotheses were tested as following:

H1. There is a linear relationship between managers' perceptions of degree of competition intensity and unpredictability as elements of environmental conditions

and practices of CMIS in relation to achieving; efficiency, optimisation, and strategy purposes.

H2. There is a non-linear (curvilinear) relationship between managers' perceptions of the degree of competition intensity and unpredictability as elements of environmental conditions and practices of CMIS in relation to achieving; efficiency, optimisation, and strategy purposes.

H3. Managers' education levels, location of authority, kinds of consultants and size of organisation are intervening variables which affect the relationship between managers' perceptions of the degree of competition intensity and unpredictability as elements of environmental conditions and the CMIS practices in relation to efficiency, optimisation, and strategy purposes.

In the following three sections, the tests and results for these hypotheses are reported. The fourth section will contain the conclusions drown from these results and a discussion of these results will be in Chapter Eight.

7.1 Tests and Results for the Linearity Hypothesis; H_1

The effects of the perceptions of environmental conditions variables on CMIS were tested by means of Spearman's Rho correlation coefficients. The reason for using this non-parametric correlation test was that the research data, as indicated in Chapter Six, were tested and found to be non-parametric. In this chapter of the research, correlation was used as a measure of linear association and the strength of relationship and direction of this association (positive or negative). Furthermore, Multiple Ordinary Least-Square Regression was carried out. Hartmann and Moers (1999, 2003) used regression analysis as the dominant statistical format to detect contingency effects. Dunk (2003) supported this idea. The idea of carrying out the multiple regression tests was to summarise the relationship between each of the dependent variables (efficiency, optimisation and strategy) and the independent variables (all the components of the environmental conditions). In regression analysis, an explanatory model is fitted to the data. This regression model could be used to explain the values of the dependent variable from one or more independent variables. The results of the regression tests are equations that describe the relationships and explain the value of dependent variable

with other values of the independent variables. The correlation test can be a useful tool, but it introduces nothing about the explanatory power of variables.

Moreover, correlation analysis cannot describe the relationship between one dependent and more than one independent variable. However, the results from both correlation and multiple regression tests could be integrated. The correlation test describes the relationship between each two variables only and the multiple regression tests describe the relationship between each dependent variable and all the independent variables. Therefore, the use of both correlation and multiple regression models in this study seems to fit its objectives.

The findings from correlation tests revealed some relationships between the practices of CMIS in relation to efficiency, optimisation and strategy purposes and managers' perceptions of environmental conditions. However, multiple regression provides an estimation of the relationship between the variables to fit an explanatory model. Regression parameters indicate an overall influence which the set of independent variables on the dependent variable (practices for each of efficiency, optimisation and strategy purposes). Regression parameters can also show the contribution of each individual variable (e.g. within the set of environmental conditions) in the set of independent variables in the change in the dependent variable. Also the result from the regression is a determination coefficient that describes the percentage of variability in the dependent variable due to one unit change in the independent variable. The regression coefficients indicate the unique contribution made by each independent variable. The regression models in the research are used to explain the behaviours of dependent variables rather than to predict, since the main aim of the research is to discover and explain the relationship between the dependent and independent variables rather than to predict this relationship.

In this research, "Multicollinearity" appeared. As shown in section 6.2.4, there was a strong association between managers' perceptions for both competition intensity and unpredictability. Therefore, the regression test itself rejected one of them, in most of the calculated models, after its being included in the regression tests, because of its low significance. For this reason, regression tests were conducted twice more with one of the variables included each time, as will be shown in Table 7.19 and Table 7.20.

Furthermore, it led to the creation of new variables by aggregating PCI and PU[1] to get managers' perceptions of environmental conditions (PEC), as will be shown in Table 7.21.

The results for correlation and regression for testing the linearity relationships are reported in two sections: 7.1.1 for correlation tests and 7.1.2 for multiple regression tests.

7.1.1 Tests of the Linearity Hypothesis Using Correlation Tests

The results for correlation to test the linearity relationships are reported in four sections: 7.1.1.1 for all data, 7.1.1.2 for business sectors, 7.1.1.3 for transformation characteristics 7.1.1.4 for ownership categories and 7.1.1.5 for business strategy postures.

7.1.1.1 The Results of Correlation Test for All Data

The results of the correlation test for all data, presented in Table 7.1 provide some support for the linearity hypothesis. These results are compared with the critical values of correlation for all data as illustrated in section 6.2.4 to identify the power of the correlation. H_1 is supported for some variables, in varying degrees. However, there were negative relationships or no relationship for the other variables, as illustrated in the table.

Table 7.1 The Spearman's Rho Correlation between Practices for Efficiency, Optimisation and Strategy, and Perceived Environmental Conditions Variables for All Data (n = 88)

	Management Accounting Systems Practices		
Components of CMIS	**Efficiency**	**Optimisation**	**Strategy**
Environmental conditions:			
1- PCI. for:			
Product Market	**.532*** **	**.239** **	**.460*** **
Raw Material	-.451***	-.239**	-.465***
Labour	.273**	-	-
Management	.615***	.494**	.636***
Finance	-.383**	-.226**	-.371**
Technology.	.365**	.614***	-
All FM Compound	-	**.452*** **	-
Legislation	-		

[1] PCI means managers' perceptions of competition intensity.
PU means managers' perceptions of unpredictability.

	Management Accounting Systems Practices		
Components of CMIS	**Efficiency**	**Optimisation**	**Strategy**
		-	-
2- PU. for			
Product Market	**.259****	-	-
Raw Material	-.410***	-.239**	-.429***
Labour	-	-	-
Management	-	-	-
Finance	-	-	-
Technology.	.358***	.618***	-
All FM Compound	-	**.431*****	-
Legislation	-	-	-

- = No Association, *= P<0.10, **= P<0.05, ***= P<0.01.

As illustrated in Chapter Six, it was notable that the properties of both finance and raw material are similar. Furthermore, the other three sub-divisions of the factor market in organisations (labour, management and technology) have similar properties. Therefore, it was useful to distinguish between these two sub-divisions of the factor market and to study descriptive analyses for these two sub-divisions "Factor Market 1 (FM1)" and "Factor Market 2 (FM2)" of the factor market division. This section, as illustrated in Table 7.1 confirms these observations since the directions of correlation tests related to each of these sub-divisions appear similar. As was done in Chapter Six for each table related to study the components of factor market, therefore, similar tables will be created splitting the factor market division into FM1 and FM2. Table 7.2 contains the results of Spearman's Rho correlation tests in the case of classifying the factor market into FM1 and FM2.

Table 7.2 The Spearman's Rho Correlation between Practices for Efficiency, Optimisation and Strategy, and Perceived Environmental Conditions Variables (Factor Market classified into FM1 and FM2) for All Data (n = 88)

	Management Accounting Systems Practices		
Components of CMIS	**Efficiency**	**Optimisation**	**Strategy**
Environmental conditions:			
1- PCI. for:			
Product Market	**.532*****	**.239****	**.460*****
FM1	-.485***	-.241**	-.499***
FM2	.374***	.600***	.215**
All FM Compound	-	**.452*****	-

	Management Accounting Systems Practices		
Components of CMIS	**Efficiency**	**Optimisation**	**Strategy**
Legislation	-	-	-
2- PU. for:			
Product Market	**.259****	-	-
FM1	-.475***	-	-.505***
FM2	.275***	.582***	-
All FM Compound	-	**.431*****	-
Legislation	-	-	-

- = No Association, *= P<0.10, **= P<0.05, ***= P<0.01.

Table 7.1 and Table 7.2 show that:

1- **In the relationships between perceived environmental for product market and the practices for efficiency, optimisation and strategy purposes:** The results offer evidence that there was a strong positive linear relationship between PCI for product market and practices for efficiency, optimisation and strategy purposes. Moreover, there was a weak positive linear relationship between PU(PM) and the practices for efficiency purposes. There was no relationship between PU for product market and the practices for optimisation and strategy purposes.

2- **In the relationships between perceived environmental for factor market and the practices for efficiency, optimisation and strategy purposes:** There was a strong negative linear relationship between both PCI and PU for raw material and practices for all purposes. Furthermore, while there was a moderate negative linear relationship between PCI for finance and practices for all purposes, there was no association in the relation to the PU (finance) and practices for all purposes. These results support the idea of aggregating raw material and finance as sub-divisions to get the new variable, FM1. There was no relationship between both PCI and PU for labour and practices for all purposes except for PCI for labour. While there was a strong positive linear relationship between PCI for management and practices for all purposes, there was no relationship between the PU (management) and practices for all purposes. For both PCI and PU for technology, there was a strong positive linear relationship related to practices for optimisation, a weak positive linear relationship

related to practices for efficiency and no relationship related to practices for strategy. Again, these positive results (in varying degrees) support the idea of collecting the labour, management and technology sub-divisions together to get the new variable FM2. The results as shown in Table 7.1 lead to confusion when the components of the factor market are combined together. Therefore, it was important to look at the results of each component separately and ignore the results for the factor market as a whale. The reason for this confusion is that each component has its own characteristics. This issue was illustrated in section 4.7.1 in this research where the Alpha between the variables was computed and the alpha between the components of factor markets was not acceptable.

3- **In the relationships between perceived environmental for legislation and the practices for efficiency, optimisation and strategy purposes:** There was no evidence that there was a relationship between both PCI and PU for legislation and practices for all purposes.

Table 7.3 shows a summary of the magnitude and the strength of the relationship between environmental conditions (PCI and PU) and CMIS for the three purposes; efficiency, optimisation and strategy.

Table 7.3 Magnitude and Strength of the Relationship Perceived Environmental Conditions and Practices for Efficiency, Optimisation and Strategy Purposes (For All Data Level)

When The Variable Increases	CMIS Practices		
	Efficiency	Optimisation	Strategy
PCI for PM	↑↑	↑	↑↑
PU for PM	↑	-	-
PCI for Raw Material	↓↓	↓	↓↓
PU For Raw Material	↓↓	↓	↓↓
PCI for Labour	↑	-	-
PU for Labour	-	-	-
PCI for Management	↑↑	↑↑	↑↑
PU for Management	-	-	-
PCI for Finance	↓↓	↓	↓
PU for Finance	-	-	-
PCI for Technology	↑↑	↑↑	-
PU for Technology	↑↑	↑↑	-
PCI for Legislation	-	-	-
PU for Legislation	-	-	-

↑(↓) means that there is a positive (a negative) relationship
↑↑(↓↓) means that there is a strong positive (negative) relationship

Based on Table 7.3, there were some observations in relation to the strength and magnitude of these relationships as follows:

- When managers perceived more CI in their economic market for their products, they increased the practice of CMIS for all the purposes: efficiency, optimisation, and strategy. However, when they perceived more unpredictability in their economic market for their products, they increased CMIS practices for efficiency purposes only.

- When managers perceived more both competition intensity and unpredictability in their supplying the raw material and finance, they decreased CMIS practices for all the purposes: efficiency, optimisation, and strategy.

- When managers perceived more CI in their management issues, they increased CMIS practices for all the purposes of their CMIS: efficiency, optimisation, and strategy. However, when they perceived more unpredictability in their management issues, there were no effects on their practices for all the purposes of their CMIS; efficiency, optimisation, and strategy.

- When managers perceived both more competition intensity and more unpredictability in their technology issues, they increased the practices of their CMIS for efficiency and optimisation purposes. However, there were no effects on their practices for strategy purposes.

-When managers perceived both more competition intensity and more unpredictability in their legislation issues, there were no effects on their practices for all the purposes of their CMIS: efficiency, optimisation, and strategy.

7.1.1.2 The Results of Correlation Test for Business Sectors Level

Table 7.4 and Table 7.5 show the results of the Spearman's Rho correlation between practices of CMIS in relation to efficiency, optimisation and strategy and managers' perceptions of environmental conditions on the Business Sectors level. These results are compared with the critical values of correlation for each business sector as illustrated in Table 6.24.

The findings from these two tables related to the product market will be illustrates below. However, there were different relationships between the other factors and CMIS in relation to efficiency, optimisation and strategy. These relationships will be discussed

when studied using Regression tests. Caution should be taken here, however, given the small size of the samples in each business sector.

For Assembling Organisations: There was no support for H_1 for both PCI and PU for the product market and CMIS practices for all purposes. Moreover, there was strong negative linear relationship with PU for product market and strategy.

For Constructing Organisations: There was mixed evidences to support H_1 as follows:

PCI for product market was very strongly negatively correlated with practices for both efficiency and strategy. However, there was no relationship with optimisation.
PU for product market was very strongly negatively correlated with practices for both efficiency and optimisation. However, there was no relationship with strategy.

For Manufacturing Organisations: There was support for H_1 except for PCI for product market and practices for strategy, where there was no relationship.

Table 7.4 The Spearman's Rho Correlation between Practices for Efficiency, Optimisation and Strategy, and Perceived Environmental Conditions Variables for Business Sectors

	CMIS Practices											
Components of CMIS	**Efficiency**				**Optimisation**				**Strategy**			
Business Sectors	**Ass.**	**Con.**	**Man**	**Ret.**	**Ass.**	**Con.**	**Man**	**Ret.**	**Ass.**	**Con**	**Man**	**Ret.**
1-PCI for:												
Product Market	-	-.34**	.34*	.49**	-	-	.36*	-	-	-.38**	-	.50**
Raw Material	-.76***	-.48**	.38**	-.66***	-	-	.36**	-	-	-.60***	-	-.65***
Labour	-	-.47**	-	.75***	-	-	.40**	-.49**	-	-.58***	-	-.77***
Management	-	-	.63**	.62***	-	-	.43**	-	-	-	.59***	.53**
Finance	-.67**	-	-.47**	-.79***	-	-	-	-	-	-	-.57***	-.80***
Technology.	-	.78***	.37**	-	-	-	.45**	-	-.62**	.84***	-	-
All FM Compound	-	-.38**	-	-	-	-	-	-	-	-.54***	-	-
Legislation	-	-.38**	-.44**	.51**	-	-	-	-	-.57*	-.51***	-.34*	60**
2- P.U for												
Product market	-	-.58***	.53***	-	-	-.65***	.47**	-.82***	-.53*	-	.34*	-
Raw Material	-	-.57***	-	-.71***	-.79***	-.32*	-	.58***	-	-.48****	-	-.82***
Labour	-	-.46**	-	.72***	-	-	-	-	-.54*	-.47***	-	.61***
Management	-.66**	-.48***	.37**	.62***	-	-.45**	.38**	-	-	-.31*	-	.53**
Finance	-	-39**	-	-	-	-	-	-	-	-.55	-.38**	-.41*
Technology.	-	.62***	.32*	-	-	-	.49**	-	-.61**	.77***	-	-
All FM Compound	-	-.92***	-	-	-	-.37**	-	-	-.55*	-.52***	-.33	-
Legislation	-	-.35*	-.43**	.55**	-	-	-	-.63***	-	-.50***	-.39**	.66***
No. Questionnaires	11	29	29	19	11	29	29	19	11	29	29	19

- = No Association, '= P<0.10, "= P<0.05, "'= P<0.01.

Ass. = Assembling sector, Con. = Constructing Sector, Man. = Manufacturing Sector, Ret. = Retailer Sector.

Table 7.5 The Spearman's Rho Correlation between Practices for Efficiency, Optimisation and Strategy, and Perceived Environmental Conditions Variables (Factor Market classified into FM1 and FM2) for Business Sectors

	CMIS Practices											
Components of CMIS	**Efficiency**				**Optimisation**				**Strategy**			
Business Sectors	**Ass.**	**Con.**	**Man**	**Ret.**	**Ass.**	**Con.**	**Man**	**Ret.**	**Ass.**	**Con**	**Man**	**Ret.**
1-PCI for:												
Product Market	-	-.34**	.34*	.49**	-	-	.36*	-	-	-.38**	-	.50**
FM1	-.662***	-.497***	-	-.682***	-	-	-	-	-	-.590***	-.371	-.652***
FM2	-	-	-.412**	.731***	-	-	.491***	-	-	-	-	.674***
All FM Compound	-	-.38**	-	-	-	-	-	-	-	-.54***	-	-
Legislation	-	-.38**	-.44**	.51**	-	-	-	-	-.57*	-.51***	-.34*	60**
2- P.U for												
Product market	-	-.58***	.53***	-	-	-.65***	.47**	-.82***	-.53*	-	.34*	-
FM1	-.791***	-.559***	-	-.835***	-.559***	-	-	-	-	-.581	-.563***	-.917***
FM2	-	-	-.888***	.839***	-	-	.436***	-	-.888***	-	-	.710***
All FM Compound	-	-.92***	-	-	-	-.37**	-	-	-.55*	-.52***	-.33	-
Legislation	-	-.35*	-.43**	.55**	-	-	-	-.63***	-	-.50***	-.39**	.66***
No. Questionnaires	**11**	**29**	**29**	**19**	**11**	**29**	**29**	**19**	**11**	**29**	**29**	**19**

- = No Association, '= P<0.10, "= P<0.05, "'= P<0.01.
Ass. = Assembling sector, Con. = Constructing Sector, Man. = Manufacturing Sector, Ret. = Retailer Sector.
FM1 =Factor Market 1
FM2 =Factor Market 2

For Retailer Organisations: There was mixed evidences to support H_1 as follows:
PCI for product market was very strongly positively correlated with practices for both efficiency and strategy. However, there was no relationship with optimisation.
PU for product market was very strongly negatively correlated with practices for optimisation. However, there was no relationship with either efficiency or strategy.

Table 7.6 shows a summary of the magnitude and the strength of the relationship between environmental conditions (PCI and PU) for product market and CMIS for the three purposes: efficiency, optimisation and strategy for business sectors level.

Table 7.6 Magnitude and Strength of the Relationship Perceived Environmental Conditions and Practices for Efficiency, Optimisation and Strategy Purposes (For Business Sectors Level)

When The Variable Increases	Management Accounting Systems Practices		
	Efficiency	Optimisation	Strategy
PCI for PM:			
Assembling.	-	-	-
Constructing	↓	-	↑
Manufacturing.	↑	↑	-
Retailer.	↑↑	-	↑↑
PU for PM:			
Assembling.	-	-	-
Constructing	↓↓	↓↓	↓↓
Manufacturing.	↑↑	↑	-
Retailer	-	↑↑	↑

Based on Table 7.6, some observations can be made in relation to the strength and magnitude of these relationships as follows:

When managers perceived more CI in their economic market for their products; in assembling organisations, there were no effects on their practices for all the purposes of their CMIS; efficiency, optimisation, and strategy. **In constructing organisations,** while they decreased the practices of their CMIS for efficiency purposes, they increased them for strategy purposes. However, there were no effects on their practices for optimisation purposes. **In manufacturing organisations,** they increased the practices of their CMIS for both efficiency and optimisation purposes. However, there were no effects on their practices for strategy purposes. **In retailer organisations,** they increased the practices of their CMIS for both efficiency and strategy purposes. However, there were no effects on their practices for optimisation purposes.

When managers perceived more unpredictability in their economic market for their products: **In assembling organisations,** there were no effects on their practices for efficiency and optimisation purposes. However, they decreased the practices of their CMIS for strategy purposes. **In constructing organisations,** they decreased the practices of their CMIS for both efficiency and optimisation purposes. However, there were no effects on their practices for strategy purposes. **In manufacturing organisations,** they increased the practices of CMIS for all three purposes. **In retailer organisations,** they decreased the practices of their CMIS for optimisation purposes. However, there were no effects on their practices for either the efficiency or strategy purposes.

There is another observation related to assembling and retailer organisations. Since raw material as a component of the factor market is more important for these two kinds of sectors than constructing and manufacturing sectors, the association between raw material and CMIS for efficiency, optimisation and strategy for these two kinds of sectors is much stronger than in the other sectors.

7.1.1.3 The Results of Correlation Test for Transformation Characteristics level:

Table 7.7 and Table 7.8 show the results of the Spearman's Rho correlation's between CMIS practices in relation to efficiency, optimisation and strategy and managers' perceptions of environmental conditions according to transformation characteristics. These results are compared with the critical values of correlation for each transformation characteristics as illustrated in Table 6.25. The findings from this table related to product market will be discussed below. The other relationships will be discussed when using regression tests in the next section. Table 7.7 and Table 7.8 show that:

- **For Convergent Organisations:** There was strong support for H_1 for both PCI and PU for the relationships between product market and use of CMIS for all the purposes.

- **For Multiplex Organisations**: There was no support for H_1, as there was no relationship between either PCI or PU of product market and using CMIS for all purposes. Moreover, there was a reverse support for H_1 in terms of a negative correlation between PU (PM) and using CMIS for optimisation.

- **For Divergent Organisations:** There was no support for H_1, as no relationships were found between either PCI or PU of product market and using CMIS for all purposes, except between PCI (PM) and using CMIS for optimisation.

Table 7.7 The Spearman's Rho Correlation between Practices for Efficiency, Optimisation and Strategy, and Perceived Environmental Conditions Variables for Transformation Characteristics

	CMIS Practices								
Components of CMIS	**Efficiency**			**Optimisation**			**Strategy**		
Transformation Characteristics	Convergent	Multiplex	Divergent	Convergent	Multiplex	Divergent	Convergent	Multiplex	Divergent
Environmental conditions:									
1-PCI for:									
Product Market	**.65*** **	-	-	**.55*** **	-	**.33** **	**.51*** **	-	-
Raw Material	.45**	-	-.49***	.37*	-	-.28*	-	-.52***	-.50***
Labour	.50**	.37*	-	.72***	-.36*	.32**	-	.55***	-
Management	.50**	.71***	-	-	.45**	.32**	.54**	.52***	-
Finance	-.60***	-.52***	-.50***	-	-	-	-.69***	-.65***	-.45***
Technology.	-	.73***	.49***	.58***	.74***	.48***	-	.38*	.55***
All Factor Market	-	**.67*** **	-	-	**.40** **	**.35** **	**-.42***	**.40** **	-
Legislation	-	**-.34***	-	-	**-.71**	**.39** **	-	-	-
2-PU for:									
Product Market	**.53*** **	-	-	**.37** **	**-.38**	-	**.39***	-	-
Raw Material	.56***	-.39*	-.53***	.54*	.41**	-.43***	-	-.70***	-.43***
Labour	-	.36***	-.26*	-	-	-	-	.52***	-
Management	-	.71***	-.65***	-	.53***	-.58***	-	.51***	-.51***
Finance	-.52**	-	-.44***	-	-	-	-.61***	-	-.43***
Technology.	-	.73***	.49***	.58***	.75***	.45***	-	.38*	.56***
All FM Compound	**-.44** **	**.55*** **	**-.36** **	-	**.69*** **	-	**-.53** **	-	**-.27***
Legislation	-	**-.36***	-	-	**-.84**	**.39** **	-	-	-
No. Questionnaires	**21**	**25**	**42**	**21**	**25**	**42**	**21**	**25**	**42**

- = No Association, *= P<0.10, **= P<0.05, ***= P<0.01.

Table 7.8 The Spearman's Rho Correlation between Practices for Efficiency, Optimisation and Strategy, and Perceived Environmental Conditions Variables (Factor Market classified into FM1 and FM2) for Transformation Characteristics

	CMIS Practices								
Components of CMIS	**Efficiency**			**Optimisation**			**Strategy**		
Transformation Characteristics	Convergent	Multiplex	Divergent	Convergent	Multiplex	Divergent	Convergent	Multiplex	Divergent
Environmental conditions:									
1-PCI for:									
Product Market	**.65*** **	-	-	**.55*** **	-	**.33** **	**.51*** **	-	-
FM1	-.509***	-.470**	-.464**	-	-	-	-.501***	-.529***	-.636***
FM2	.314***	.870***	.557***	.492***	.417***	.725	.303	.661***	.661***
All Factor Market	-	**.67*** **	-	-	**.40** **	**.35** **	**-.42***	**.40** **	-
Legislation	-	**-.34***	-	-	**-.71**	**.39** **	-	-	-
2-PU for:									
Product Market	**.53*** **	-	-	**.37** **	**-.38**	-	**.39***	-	-
FM1	-.679***	-.398**	-.516***	-.491***	-	-	-.587***	-.742***	-.617***
FM2	-	.912***	-	-	.621***	.614***	-	.673***	-
All FM Compound	**-.44** **	**.55*** **	**-.36** **	-	**.69*** **	-	**-.53** **	-	**-.27***
Legislation	-	**-.36***	-	-	**-.84**	**.39** **	-	-	-
No. Questionnaires	**21**	**25**	**42**	**21**	**25**	**42**	**21**	**25**	**42**

Table 7.9 Shows a summary of the magnitude and the strength of the relationship between environmental conditions (PCI and PU) and CMIS for the three purposes; efficiency, optimisation and strategy for transformation characteristic.

Table 7.9 Magnitude and Strength of the Relationship Perceived Environmental Conditions and Practices for Efficiency, Optimisation and Strategy Purposes (For Transformation characteristics)

When The Variable Increases	CMIS Practices		
	Efficiency	Optimisation	Strategy
PCI for Product Market:			
Convergent.	↑↑↑	↑↑↑	↑↑↑
Multiplex.	-	-	-
Divergent.	-	↑↑	-
PU for Product Market:			
Convergent.	↑↑↑	↑↑	↑
Multiplex.	-	↓	-
Divergent.	-	-	-

Based on Table 7.9, the following observations can be made in relation to the strength and magnitude of these relationships:

When managers perceived more competition intensity and unpredictability in their economic market for their products: in convergent organisations, they increased the practices of their CMIS for all the three purposes in varying degrees. In multiplex organisations, there were no effects on their practices for any of the three purposes, except for optimisation, where they decreased the practices of CMIS when they perceived more unpredictability of product market. In divergent organisations, there were also no effects on their practices for all the three purposes, except for optimisation, where managers increased the practices of CMIS when they perceived more C (PM).

7.1.1.4 The Results of Correlation Test for Ownership Categories

Table 7.10 and Table 7.11 show the results of the Spearman's Rho correlation between CMIS practices in relation to efficiency, optimisation and strategy and managers' perceptions of environmental conditions on ownership category levels. These results are compared with the critical values of correlation for each ownership category as illustrated in Table 6.26. The findings from these two tables related to product market will be summarised below. The other relationships will be discussed when using regression tests in the next section.

Table 7.10 The Spearman's Rho Correlation between Practices for Efficiency, Optimisation and Strategy, and Perceived Environmental Conditions Variables for Ownership Categories

	CMIS Practices					
Components of CMIS	Efficiency		Optimisation		Strategy	
Ownership Categories	Public	Private	Public	Private	Public	Private
Environmental conditions:						
1-PCI for:						
Product Market	-	**.50*** **	**-.38***	**.21***	**-.44****	**.40*** **
Raw Material	-.45**	-.37***	-	-	-.55***	-.35***
Labour	.38*	-	.47**	-.29**	-	-
Management	.50**	.49***	-	.32***	.36*	.58***
Finance	-.41**	-.46***	-	-.25**	-	-.40***
Technology.	.46**	.36***	-	.60***	.53***	-
All Factor Market	-	-	**.55*** **	**.43*** **	-	-
Legislation	**-.53****	-	**-.58*** **	**-.33*** **	**-.58*** **	-
2-PU for:						
Product Market	**-.49****	**.33*** **	**-.45****	-	**-.53*** **	-
Raw Material	-.57***	-.34***	-	-	-.63***	-.38***
Labour	.36*	-	.53***	-	-	-
Management	-	-	-	-	-	-
Finance	-	-	-	-	-	-.26**
Technology.	-	.37***	-	.62***	.47**	-
All FM Compound	-	-	-	**.47*** **	-	**-.20***
Legislation	-	-	**-.45****	**-.34*** **	-	-
No. of Questionnaires	**65**	**23**	**65**	**23**	**65**	**23**

- = No Association, *= P<0.10, **= P<0.05, ***= P<0.01.

Table 7.11 The Spearman's Rho Correlation between Practices for Efficiency, Optimisation and Strategy, and Perceived Environmental Conditions Variables (Factor Market classified into FM1 and FM2) for Ownership Categories

	CMIS Practices					
Components of CMIS	**Efficiency**		**Optimisation**		**Strategy**	
Ownership Categories	**Public**	**Private**	**Public**	**Private**	**Public**	**Private**
Environmental conditions:						
1-PCI for:						
Product Market	-	**.50*** **	**-.38***	**.21***	**-.44****	**.40*** **
FM1	-.737***	-.418***	-	-	-.716***	-.390***
FM2	.492**	.392***	.563***	.543***	.364**	-
All Factor Market	-	-	**.55*** **	**.43*** **	-	-
Legislation	**-.53****	-	**-.58*** **	**-.33*** **	**-.58*** **	-
2-PU for:						
Product Market	**-.49****	**.33*** **	**-.45****	-	**-.53*** **	-
FM1	-.609***	-.441***	-	-	-.537***	-.489***
FM2	-	.273**	-	.576***	-	-
All FM Compound	-	-	-	**.47*** **	-	**-.20***
Legislation	-	-	**-.45****	**-.34*** **	-	-
No. Questionnaires	**65**	**23**	**65**	**23**	**65**	**23**

1- For the Public Organisations: There was no evidence to support H_1 as follows:

PCI for product market was moderately negatively correlated with practices for both optimisation and strategy. However, there was no relationship with efficiency.

PU for product market was moderately negatively correlated with all the three practice purposes.

2- For Private Organisations: There was mixed evidence to support H_1 as follows:

PCI for product market was strongly positively correlated with all the three practice purposes.

PU for product market was strongly positively correlated with efficiency purposes only. However, there was no relationship with either optimisation or strategy purposes.

Table 7.12 shows a summary of the magnitude and the strength of the relationship between environmental conditions (PCI and PU) and CMIS for the three purposes: efficiency, optimisation and strategy for ownership categories.

Table 7.12 Magnitude and Strength of the Relationship Perceived Environmental Conditions and Practices for Efficiency, Optimisation and Strategy Purposes (For Ownership Categories Level)

When The Variable Increases	CMIS Practices		
	Efficiency	Optimisation	Strategy
PCI for Product Market:			
Public.	-	↓↓	↓↓
Private.	↑	↑	↑↑
PU for Product Market:			
Public.	↓↓	↓↓	↓↓
Private	↓	-	-

Based on Table 7.12, the following observations can be made in relation to the strength and magnitude of these relationships as follows:

- When managers perceived more CI in their economic market for their products: in public organisations, there were no effects on their practices for the efficiency purposes. In private organisations, they increased the practices of their CMIS for all the three purposes, to varying degrees.

- When managers perceived more U in their economic market for their products; in public organisations, they decreased the practices of their CMIS for all the three purposes. In private organisations, they increased the practices of their CMIS for efficiency purposes only. However, there were no effects on their practices for either optimisation or strategy purposes.

7.1.1.5 The Results of Correlation Test for Strategic Postures:

Table 7.13 and Table 7.14 show the results of the Spearman's Rho correlation between practices CMIS in relation to efficiency, optimisation and strategy and managers perceptions of environmental conditions on the strategic postures level. These results are compared with the critical values of correlation for each strategic postures category as illustrated in Table 6.27. The findings from these two tables related to product market will be summarised below. The other relationships will be discussed when using regression tests in the next section.

Table 7.13 The Spearman's Rho Correlation between Practices for Efficiency, Optimisation and Strategy, and Perceived Environmental Conditions Variables for Strategic Postures

	CMIS Practices											
Components of CMIS	**Efficiency**				**Optimisation**				**Strategy**			
Business Sectors	**Defen**	**Prosp**	**Analy**	**React**	**Defen**	**Prosp**	**Analy**	**React**	**Defen**	**Prosp**	**Analy**	**React**
1-PCI for:												
Product Market	-	.49***	-	-.71***	-	-	-	-.77***	.42*	.47***	-	-.56**
Raw Material	-.43*	-.50***	-	-.49**	-.42*	-	.42*	-.50**	-.57**	-.35**	-	-
Labour	-.79***	.39**	-	.55**	-.72***	-.37**	-	.59**	-.73***	-.41**	-	-
Management	.43*	.31*	.46**	.69***	-	-	-	.49*	.55**	-	-	-
Finance	.85***	-.30*	-	-	.71***	-.47	-	-	.81***	-	-	-
Technology.	-	.36*	-	.70***	-	.70***	-	.69***	-	-	-	-
All FM Compound	-	.49***	.40*	.78***	-	.43***	.41*	.81***	-	-	-	.49*
Legislation	.83***	.35**	-	-	.71***	-.37**	-.46*	-	.79***	.36**	-	-.49*
2- P.U for												
Product market	-	.53***	-	-.70	-	-	.54**	-.82***	-	.40**	-	-.47*
Raw Material	-	-	-	.48*	-	.39**	-	-.47*	-	-	-	-
Labour	-.78***	-	-	.65***	-.83***	-	-	.65***	-.84***	-	-	.87***
Management	-.44*	-	-	.43*	-.45*	-	.41*	-	-	-	-.42*	-
Finance	.84***	-	.45*	-	.69***	-	.55**	-	.78***	-	-	-
Technology.	-	.41**	-	.58**	-	.77***	.39*	.67***	-	-	-	-
All FM Compound	-	.28*	-	.77***	-	.67***	-	.76***	-	-	-	.61**
Legislation	.81***	.35**	-	-	.71***	-.36**	-.55**	-	.77***	-	-	-.65***
No. Questionnaires	17	36	19	16	17	36	19	16	17	36	19	16

- = No Association, '= P<0.10, "= P<0.05, "'= P<0.01.

Defend = Defending Organisations.

Prosp = Prospectors Organisations.

Analys = Analysers Organisations.

React = Reactor Organisations.

Table 7.14 The Spearman's Rho Correlation between Practices for Efficiency, Optimisation and Strategy, and Perceived Environmental Conditions Variables (Factor Market classified into FM1 and FM2) for Strategic Postures

	CMIS Practices											
Components of CMIS	**Efficiency**				**Optimisation**				**Strategy**			
Miles & Snow	**Defen**	**Prosp**	**Analy**	**React**	**Defen**	**Prosp**	**Analy**	**React**	**Defen**	**Prosp**	**Analy**	**React**
Environmental conditions:												
1-PCI for:												
Product Market	-	.49***	-	-.71***	-	-	-	-.77**	.42*	.47***	-	-.56**
FM1	.73***	-.29*	-	-	.67***	-.53***	.41*	-	.56**	-	-	-
FM2	-	.41**	-	.81***	-	.69***	-	-	-	-	-	-
All Factor Market	-	.49***	-	.78***	-	.43***	.41*	-	-	-	-	-
Legislation	.82***	.35**	-	-	.71***	-.37**	-.46**	-	.79***	.36**	-	-.49*
2-PU for:												
Product Market	-	.53***	-	-.7***	-	-	.54**	-.82**	-	.4***	-	-.47**
FM1	-	-.53**	-	-	.67***	-	.41*	-	-	-	-	.47*
FM2	-	.41**	-	.76***	-	.28	-	.88***	-.44*	-	-	.57**
All FM Compound	-	.28*	-	.77***	-	.67***	-	.76***	-	-	-	.61**
Legislation	.81***	.35**	-	-	.71***	-.36**	-.55**	-	.77***	-	-	-.65***
No. Questionnaires	17	36	19	16	17	36	19	16	17	36	19	16

Defend = Defending Organisations.
Prosp = Prospectors Organisations.
Analys = Analysers Organisations.
React = Reactor Organisations.

The findings from these two tables (Table 7.13 and Table 7.14 related to product market will be presented below. However, there were different relationships between the other factors and CMIS in relation to efficiency, optimisation and strategy. These relationships will be discussed when they are studied using Regression tests. Caution should be taken here, however, given the small size of samples for each strategic posture.

For Defending Organisations: There was no support for H_1 for either PCI or PU for product market and the practices for all the purposes except for PCI for product market and practices for strategy purposes. PCI(PM) was found to be positively correlated to CMIS for strategy.

For Prospectors Organisations: There was a strong support for H_1. Spearman's correlation test showed strong positive associations between PCI and PU for product market and CMIS for all three purposes (efficiency, optimisation and strategy).

For Analysers Organisations: There was no support at all for H_1. Spearman's correlation tests showed no significant association between PCI and PU for product market and CMIS for all the three purposes.

For Reactors Organisations: There was a strong reverse support for H_1. PCI and PU for product market were found to be negatively strongly correlated to CMIS for all the three purposes.

Table 7.15 Magnitude and Strength of the Relationship Perceived Environmental Conditions and Practices for Efficiency, Optimisation and Strategy Purposes (For Strategic Postures)

When The Variable Increases	CMIS Practices		
	Efficiency	Optimisation	Strategy
PCI for Product Market:			
Defending	-	-	↑
Prospectors	↑↑	-	↑↑
Analysers	-	-	-
Reactors	↓↓	↓↓	↓↓
PU for Product Market:			
Defending	-	-	↑↑
Prospectors	↑↑	-	-
Analysers	-	↑↑	↓
Reactors	↓↓	↓↓	

Based on Table 7.15 , the following observations can be made in relation to the strength and magnitude of these relationships:

When managers perceived more CI in their economic market for their products; in defending and analysers organisations, there were no effects on their practices for all the purposes of their CMIS; efficiency, optimisation, and strategy, except in defending organisations for strategy. However, **in constructing organisations,** they increased the practices for all the purposes of their CMIS; efficiency, optimisation, and strategy. **In reactors organisations,** they decreased the practices of their CMIS for all the purposes of their CMIS: efficiency, optimisation, and strategy.

When managers perceived more unpredictability in their economic market for their products: In defending and analysers organisations, there were no effects on their practices of CMIS for efficiency, optimisation and strategy purposes. **In prospectors organisations,** they increased the practices of CMIS for efficiency and strategy only. **In reactors organisations,** they decreased the practices of their CMIS for all purposes.

7.1.2 Tests and Results for the Linearity Hypothesis Using Regression test

The model that be fitted to the data is a linear one and could be imagined by trying to summarise a data set with a straight line. However, with any data set, there are a number of lines that could be used to summarise the general trend. Field (2000) claimed that the method of least squares as a mathematical way to choose the best line is the most useful one. Since, it chooses the line where the sum of squared differences for residuals is small. After finding the line of best fit, it is important to assess how well this line fits the actual data (the goodness-of-fit of the model). In this research, three indicators were used to estimate the regression model as follows:

A. The R^2 Statistic:

R^2 provides descriptive information to compare observed values with those explained from the model. R^2 is commonly interpreted as the percentage of the variability in the dependent variable that is explained by the independent variables in the model[1]. Generally, it provides an indication of how well the model fits the

[1] R^2 in the simple regression (with one independent variable) is the square root of R which is the Pearson correlation coefficient between the two variables (dependent and independent variables). However, in

data and R^2 provides a good estimate of the substantive size of the relationship. For example, from a R^2 value of 0.569, it could be concluded that 56.9% of the variability in the dependent variable is accounted by the independent variables in the regression model in the participated organisations. SPSS also calculates another useful value which is 'Adjusted R^2'. This adjusted value indicates the loss of predicative power of the regression model. Whereas R^2 tells how much of the variance in the dependent variable in the regression model is accounted by the data, the adjusted value tells how much of this variance is derived from the population itself. It is preferable for adjusted R^2 to be the same as or very close to the value of R^2.

Another use of adjusted R^2 is to be sure that the number of independent variables does not affect of the value of R^2. As, Bowerman and O'Conell (1990) argued, the equation used to calculate R^2 does not contain the number of independent variables. Thus, the bigger the number of independent variables is, the bigger the value of R^2. However, the equation which is used to calculate adjusted R^2 contains the number of independent variables. Thus, the bigger the number of the independent variables, the smaller the value of adjusted R^2. Therefore, if the value of adjusted R^2 is much smaller than R^2, it means that the value of R^2 was affected by the number of independent variables and the regression model does not fit the data. Gupta (2000) claimed that adjusted R^2 is sensitive to the addition of irrelevant variables. Therefore, in this research, after calculating each regression model, a quick comparison between the values of R^2 and adjusted R^2 was made.

B. The Significance of F:

Whilst R^2 provides an indication of the explanatory power of a model, it does not indicate the level of significance (that is, how likely it was that the R^2 value had been obtained by chance). The F test indicates whether the model as a whole is significant. It tests whether R^2 is significantly different from zero. If the value of the F test is not significant, the null hypothesis of non-relationship between the variable is accepted. In this research, the acceptable value for significance of F is 0.10.

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multiple regression analysis R is multiple correlation between the dependent and the independent variables in the model (Field, 2000).

C. Normally Distributed Errors:

It is assumed that the residuals (the errors) in the model are randomly, normally distributed, variables with a mean of zero. This assumption simply means that the differences between the model and the observed data are most frequently zero or very close to zero and that differences much greater than zero happened only occasionally. In this research, the Kolmogorov-Smirnov test was used to examine the normality of distribution of the residuals.

Therefore, after calculating each regression model, these three indicators should be examined to estimate each one. Then, it is possible to test the goodness of this model in each level of data.

In this research, multiple regression analysis was used to test relationships between each dependent variable (efficiency, optimisation and strategy) and the independent variables (PCI and PU for product market, factor market including five sub-divisions and legislation). In multiple regression analysis, there are two important issues to decide. The first one is which variables should be included in the regression analysis. In this research, multiple regression analysis was carried out many times to test different assumptions using different groups of variables in each analysis, as it will be illustrated in this section. Sub-section 7.1.2.1 will introduce regression analyses for testing the relationships in cases of using PCI(PM)[1] and PU(PM), PCI and PU for factor market components, and PCI and PU for all the environmental conditions (including PM, all the components of FM[2] and legislation). Sub-section 7.1.2.2 will introduce the results of regression analyses in cases of PCI, PU and PEC for PM, factor market components classified into two sub-divisions FM1 and FM2 and legislation.

The second issue is the way in which these independent variables are entered into the model. Statisticians, e.g. Field, 2000 and Howell, 1997, claimed that the method used has a great impact on the result of the regression model. Therefore, they advised that the independent variables should be entered based on substantive theoretical importance of these variables. Otherwise, SPSS offers many methods to choose from[3]. One of these methods is Stepwise. In this method, the computer searches for the independent variable

[1] PM means product market.
[2] FM means Factor market.
[3] For more details about these methods, see please Field, 2000.

(out of the ones available) that best explains the dependent variable by selecting the independent variable that has the highest simple correlation with the dependent variable. If this independent variable significantly improves the ability of the model to explain the dependent variable, then this independent variable is retained in the model and the computer searches for a second independent variable. The criterion used for selecting this second independent variable is that it has the largest semi-partial correlation with the dependent variable. Field (2000), Wright (1997) and others assorted the value of Stepwise methods. In this research, Stepwise methods were used in all regression analyses.

A caveat about these results it should be stated here. While the sample for all data (n=88) is enough large for the results to be trust worthy, the sub-samples after splitting into either the four business sectors, three transformation characteristics or the two ownership categories become quite small. Therefore, the results should be viewed with caution due to the small sub-samples, especially in the assembling sector sample (n=11 only). Therefore, there is no value for this kind of business sectors in the most states. This is because statisticians (e.g. Bryman & Cramer, 2001) indicated that regression results for a sample of fewer than 30 observations would have limited importance.

Moreover, all the models stated here are stated in terms of the three indicators: R^2, significance level and normally distributed errors. The rest of the results are with the researcher and can be obtained by requested. The acceptable level of significance in this research is 90%. In practice, some regression models had significance levels of 80% whenever it is stated in the tables.

7.1.2.1 The Results of Regression Analysis in the Cases of PCI and PU for ....

Table 7.16 contains the multiple linear regression results between CMIS practices for efficiency, optimisation and strategy as dependent variables and managers' perceptions for competition intensity for product market (PCI (P.M.)) and managers' perceptions for unpredictability for product market (PU (P.M.)) as independent variables. The complete equations for all the models are in Appendix 7. This consideration of the product market as a division of environmental conditions arose from the observation reported to the section 6.2.3 that the respondents in all the organisations gave the most importance for product market rather than factor market or legislation. Therefore, following these views, regression analyses were conducted to trace the changes in PCI(PM) and

PU(PM) on the one hand and each of the three dependent variables (using CMIS for achieving efficiency, optimisation and strategy) on the other. Then, regression analyses were recalculated to trace the changes in PCI(FM) and PU(FM) on the one hand and each of the three dependent variables, as will be illustrated in Table 7.18. Then the analyses could be compared to test the view that PM is more important than either FM or legislation.

Table 7.17 includes the results of multiple linear regression between CMIS practices for each of efficiency, optimisation and strategy as dependent variables and managers' perceptions of both competition intensity and unpredictability for all the environmental conditions under study as independent variables. The independent variables in this table are managers' perceptions of competition intensity for the product market (PCI(PM)), all the components of the factor market (raw material (PCI(Raw)), Labour (PCI(Labour)), Management (PCI(Mana)), Finance (PCI(Finan)) and Technology (PCI(Techn)) and legislation (PCI(Leg)), and managers' perceptions of unpredictability for the product market (PCI(PM)), all the components of the factor market (raw material (PU(Raw)), Labour (PU(Labour)), Management (PU(Mana)), Finance (PU(Finan)) and Technology (PU(Techn)) and legislation (PCI(Leg)).

Table 7.18 contains the multiple linear regression results between CMIS practices for efficiency, optimisation and strategy as dependent variables and managers' perceptions of competition intensity for all the components of the factor market (raw material (PCI(Raw)), Labour (PCI(Labour)), Management (PCI(Mana)), Finance (PCI(Finan)) and Technology (PCI(Techn)) and managers' perceptions for unpredictability for all the components of the factor market (raw material (PU(Raw)), Labour (PU(Labour)), Management (PU(Mana)), Finance (PU(Finan)) and Technology (PU(Techn)) as independent variables.

The following, are the interpretations and findings related to these three tables:

The three models (for efficiency, optimisation and strategy) in Table 7.16 indicate that the results are vary greatly depending on the kind of business sector, kind of transformation operation, kind of ownership and strategic posture. These results support the argument that those classifications are moderating variables in the relationships between CMIS practices and environmental conditions. Furthermore, the performance of the model, in terms of the value of R^2, improved significantly by allowing for

business sectors, ownership categories, transformation operations and strategic postures when accounting for variations in the independent variables.

There was negative association between using CMIS for optimisation and PU (P.M.) for all the categories except for the manufacturing sector, where this association was positive.

The more managers' perceptions of environmental conditions, the more they used of CMIS for efficiency and strategy and the less they used CMIS for optimisation, since they depended on many other methods such as market research for optimisation purposes. There were exceptions to this principle, however, manufacturing organisations used more CMIS for the three purposes when facing more perceptions of environmental conditions. The other exception was for public and constructing organisations, which mainly used CMIS to satisfy the government regulations only. They did not care about achieving the purposes of CMIS; they just obeyed the current instructions.

The values of R^2s in Table 7.17 are bigger than in Table 7.16 for all the models. This means that more of the variability in using CMIS for efficiency, optimisation and strategy was explained by PCI (product market, all the components of factor market and legislation) than by PCI (Product Market) only in the samples.

The values of R^2 in Table 7.17 are bigger than in either Table 7.16 or Table 7.18 since Table 7.17 indicates the aggregation of both the independent variables in the other two tables. However, this does not mean that it the figures in Table 7.16 and Table 7.18 could be added to get the figures of Table 7.17. This remark supports the view of Van de Ven and Drazin (1985) as illustrated in sub-section 2.2.2.2. They argued that the overall effect of multiple effects is not the sum of their individual effects and so is not additive. This point will be discussed later in Chapter Eight, in more details.

The values of R^2 in Table 7.18 are bigger than the values of R^2 in Table 7.16 . This means that factor market components (raw material, labour, management, finance and technology) have a stronger explanatory power for CMIS usage for efficiency, optimisation and strategy than the product market. This result does not support the view that PM is the more important than FM, as the respondents said.

Table 7.16 Regression Results for the Linearity between Using CMIS for Eff., Opt. And Str. & PCI (P.M.) and PU (P.M.) for All the Levels.

CMIS;	All Data	Strategic Postures				Kinds of Business sectors				Ownership		Transformation Operation		
		Defen	**Prosp**	**Analy**	**React**	**Ass**	**Con**	**Man**	**Ret**	**Public**	**Private**	**Divergent**	**Multiplex**	**Convergent**
Efficiency &														
Constant	+1.47	-	+1.71	-	+3.81	-	+5.048	+2.468	-	+4.066	+1.583	+2.750	-	-
PCI(P.M.)	+.58	+1.48	-	-	-.36	-	-	-	+.871	-	+.571	+.610	-	+1.024
PU(P.M.)	-	-.751	+.67	-	-	-	-.804	+.510	-	-.404	-	-	-	-
R^2	.223	.544	.248	-	.57	-	.376	.232	.274	.270	.201	.515	-	.325
Optimisation &														
Constant	+2.12	-	-	-	+4.146	-	+4.191	+1.535	+9.210	+3.392	+2.396	+2.231	+8.021	-
PCI(P.M.)	+.90	-	-	-	-	-	-	+.415	-	-	+.798	+1.543	-	+.786
PU(P.M.)	-1.07	-	-	+.77	-.94	-	-.886	-	-2.368	-.760	-.999	-1.813	-1.814	-.451
R^2	.223	-	-	.283	.640	-	.412	.241	.740	.311	.182	.639	.215	.379
Strategy&														
Constant	+.94	-	-	-	+3.02	-	+7.533	+1.998	-	+4.275	+.580	+1.813	-	-
PCI(P.M.)	+1.08	+.52	+.62	-	-.35	-	-1.655	+.468	+1.944	-	+.774	+.529	+1.512	+.882
PU(P.M.)	-.54	-	-	-	-	-	-	-	-	-.654	-	-	-	-
R^2	.272	.236	.193	-	.412	-	.151	.174	.384	.204	.228	.306	.243	.250

Defend = Defending Organisations. Prosp = Prospectors Organisations. Analys = Analysers Organisations. React = Reactor Organisations
Ass. = Assembling sector, Con. = Constructing Sector, Man. = Manufacturing Sector, Ret. = Retailer Sector.

Table 7.17 Regression Results for the Linearity between Using CMIS for Eff., Opt. and Stra. & All the Variables of Environmental Conditions for All the Levels

CMIS;	All	Strategic Posture				Kinds of Business Sectors				Ownership		Transformation Operation		
		Defend	Prosp	Analys	React	Ass	Cons	Man	Ret	Public	Private	Divergent	Multiplex	Convergent
Efficiency&														
Constant	1.806	+4.25	+2.28	-	+1.97	+24.49	+6.391	-	+3.647	+2.758	+2.260	+3.110	+5.274	+2.800
PCI(P.M)	+.681	-	-	-	-	-	-1.224	-	-	-	+.841	-	-	+1.330
PU(P.M)	-	-	+.69	-	-.14	-	-.564	-	-	-	-	+.188	-.324	-
PCI(Raw)	-	-	-	-	-	-	-	-	-.905	-	-	-	-	-
PU(Raw)	-.623	-	-	-	-	-	-	-	-	-	-.822	-	-.750	-.504
PCI(Labour)	-	-	-	-	-	-	-	-	-	-	-	-	-	+1.493
PU(Labour)	-.587	-1.59	-	-	+.24	-	-	-	-	-	-.875	-	-	-2.134
PCI(Mana.)	+.456	-	-	+1.22	+.27	-	-	+.822	-	+.272	+.437	-	-	-
PU(Mana.)	-	-	-	-	-	-2.43	-	-	+.422	-	-	-	+.354	-
PCI(Finan.)	-	-	-.38	-	-	-	-	-	-	-	-	-.794	-	-
PU(Finan.)	-	-	-	-	-	-	-	-	-	-	-	+.481	-	-.615
PCI(Techn.)	+.123	-	-	-	-	-	+1.190	-	-	-	+.129	-	+.279	-
PU(Techn.)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PCI(Legis)	-	-	-	-	-	-	-	-	+.279	-.279	-	-	-	-.618

CMIS;	All	Strategic Posture				Kinds of Business Sectors				Ownership		Transformation Operation		
		Defend	Prosp	Analys	React	Ass	Cons	Man	Ret	Public	Private	Divergent	Multiplex	Convergent
PU(Legis)	-	+.867	-	-	-	-4.87	-	-	-	-	-	+.491	-	-
R^2	.639	.929	.335	.237	.888	.776	.816	.373	.966	.664	.650	.897	.959	.845
Optimisation&														+1.114
Constant	-.153	+5.27	+3.32	-	+1.23	+12.58	+4.191	+1.535	+9.761	-	-	-2.466	+9.269	
PCI(P.M)	-	-	+.91	-	-	-	-	+.415	-	-	-	-	-	+.973
PU(P.M)	-	-	-.96	+.77	-.84	-	-.886	-	-.840	-	+.923	-	-1.085	-
PCI(Raw)	-	-	-	-	-	-	-	-	-	-	-.815	-	-	-
PU(Raw)	-	-	-1.07	-	-	-	-	-	-	-	-	-	-	-.524
PCI(Labour)	-	-	-	-	+1.42	-	-	-	-	-	-	+1.818	-	-
PU(Labour)	-	-1.89	-1.04	-	-	-	-	-	+1.158	+.951	-	-	-	-
PCI(Mana.)	+.442	-	-	-	-	-	-	-	-	-	-	+.526	-	-
PU(Mana.)	-	-	-	-	-	-	-	-	+.261	-	+.283	-	+.813	-.567
PCI(Finan.)	-	-	-	-	-	-.83	-	-	-	-	-		-	+1.210
PU(Finan.)	-	-	+.51	-	-	-	-	-	-1.790	-.780	-	-	-1.201	-1.377
PCI(Techn.)	+.479	-	-	-	-	-	-	-	-	-	-	-	-	-
PU(Techn.)	-	-	+.94	-	-	-	-	-	-	-	-	-	-	-
PCI(Legis)	-	.25	-	-	-	-3.00	-	-	-1.882	-	-	-	-	-
PU(Legis)	-	-	-	-	-	-	-	-	-	-	-	-	-1.498	-
R^2	.460	.92	.895	.283	.900	.644	.412	.241	.968	.853	.593	.733	.952	.721
Strategy&														
Consant	+1.472	+2.03	+3.73	-	+1.53	-	+2.858	+6.613	+6.455	-	+2.869	+5.247	+6.127	+1.687
PCI(P.M)	+1.031	-	+1.13	-	-	-	-1.141	-	-	-	+1.235	-	-	+1.944
PU(P.M)	-	-	-	-	-	-	-	-	-.543	+1.477	-	-	-	-
PCI(Raw)	-	-.35	-	-	-	+.981	-	-	-	-	-.324	-	-	-
PU(Raw)	-1.085	-	-1.38	-	-	-	-.655	-	-1.157	-.927	-.923	-	-1.678	-
PCI(Labour)	-	+.61	-	-	-	+4.115	-	-.664	+.716	-	-	-	-	-
PU(Labour)	-.730	-.72	-1.22	-	+.62	-4.480	+.625	-	-	+1.486	-1.830	-	-	-
PCI(Mana.)	+.639	-	-	-	-	-	-	-	-	-	+.403	-.687	-	-
PU(Mana.)	-	-	-	-	-	-	-	-	-	-	+.725	-	+.488	-.763
PCI(Finan.)	-	+.49	-	-	-	-	+.483	-.693	-.322	+.676	-.491	-	-	-
PU(Finan.)	-	-	+.45	-	-	-	-	-	-	-.916	-	-	-	-.934
PCI(Techn.)	-	-	-	-	-	-	+1.133	-	-	-	-	-	-	-
PU(Techn.)	-	-	-	-	-	-	+1.145	-	-	-	-	-	-	-
PCI(Legis)	+.611	-	-	-	-.31	-	-	-	-	-	-	-	+1.382	-1.135
PU(Legis)	-.831	-	-	-	-	-	-.531	-	-	-	-	-	-1.682	-
R^2	.720	.988	.610	-	.879	.954	.927	.564	.989	.908	.817	.760	.974	.683

Defend = Defending Organisations, Prosp = Prospectors Organisations, Analys = Analysers Organisations, React = Reactor Organisations
Ass. = Assembling sector, Con. = Constructing Sector, Man. = Manufacturing Sector, Ret. = Retailer Sector.

Table 7.18 Regression Results for the Linearity between Using CMIS for Effi., Opti. and Str. & All the Components of Factor Market for All the Levels.

CMIS;	All	Strategic Postures				Kinds of Business Sectors				Ownership		Transformation Operation		
		Defend	Prosp	Analys	React	Ass	Cons	Man	Ret	Public	Private	Divergent	Multiplex	Convergent
Efficiency&														
Constant	+2.508	+4.18	+5.48	-	+1.55	+8.63	+1.863	+.913	+4.623	+2.294	+2.815	+3.175	+3.276	+4.913
PCI(Raw)	-	-	-.85	-	-	-	-	-	-.416	-	-	+.350	-	-
PU(Raw)	-.402	-	-	-	-	-	-	-	-.363	-.194	-.554	-	-.415	-.311
PCI(Labour)	-	-	-	-	-	-	-	-	-	-	-	+.405	-	+1.763
PU(Labour)	-	-1.37	-	-	+.26	-	-	-	-	-	-	-	-	-2.334
PCI(Mana.)	+.664	-	-	+1.22	+.21	-	-	+.822	-	+.393	+.745	-	-+.179	-
PU(Mana.)	-	-	-	-	-	-1.88	-.312	-	+.382	-	-	-	+.359	-
PCI(Finan.)	-.210	+.57	-	-	-	-	-	-	-.161	-	-.354	-.302	-.149	-
PU(Finan.)	-	-	-	-	-	-	-	-	-	-	-	-	-	-.868
PCI(Techn.)	-	+.11	-	-	+.14	-	+1.168	-	-	-	-	-	+.218	+.451
PU(Techn.)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
R^2	.444	.949	.184	.237	.887	.598	.561	.373	.971	.684	.407	.832	.966	.814
Optimisation&														
Constant	-.153	+6.18	+1.67	+1.78	-1.68	-	+3.055	-.040	-	-	-	-2.466	+1.414	+3.130
PCI(Raw)	-	-	-	+.61	-	-	-	-	-	-	-	-	-	-
PU(Raw)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PCI(Labour)	-	-	-.38	-	+1.29	-	-	-	-	+.679	-	+1.1818	-	-
PU(Labour)	-	-2.06	-	-	-	-	-	-	-	-	-	-	-	-
PCI(Mana.)	+.442	-	-	-	-	-	-	-	-	-	+.447	+.526		-
PU(Mana.)	-	-	-	-	-	-	-.507	-	-	-	-	-	-	-.640
PCI(Finan.)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PU(Finan.)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PCI(Techn.)	+.479	-	-	-	+.62	-	-	-	-	+.528	-	-	.692	+1.519
PU(Techn.)	-	-	+.79	-	-	-	-	+1.151	-	-	+.556	-	-	-1.449
R^2	.460	.887	.762	.216	.819	-	.235	.237	-	.624	.420	.733	.518	.536
Strategy&														
Constant	+2.970	+2.03	+8.71	-	+.55	-	+3.991	+6.613	+5.948	+3.989	+2.330	+5.247	+8.315	+6.850
PCI(Raw)	-.422	-.35	-1.32	-	-	+.981	-	-	-1.521	-	-	-	-.855	-
PU(Raw)	-.564	-	-1.16	-	-	-	-.554	-	-	-.842	-.775	-	-1.138	-
PCI(Labour)	-	+.61	-	-	-	+4.115	-	-.664	+1.259	-	-	-	-	-
PU(Labour)	-	-.72	-.76	-	+.65	-4.480	-	-	-.687	-	-	-	-	-.782
PCI(Mana.)	+.904	-	-	-	-	-	-.840	-	-	-	+1.059	-	-	-
PU(Mana.)	-	-	-	-	-	-	-	-	-	+.283	-	-	-	-.849
PCI(Finan.)	-	+.49	-	-	-	-	-	-.693	-.399	-	-.593	-.687	-.345	-
PU(Finan.)	-.436	-	+.84	-	-	-	-	-	-	-.211	-	-	-	-1.022
PCI(Techn.)	-	-	-	-	+.17	-	+1.407	-	-	-	-	-	-3.449	+2.735
PU(Techn.)	-	-	-	-	-	-	-	-	-	-	-	-	+4.267	-2.442
R^2	.582	.988	.425	-	.796	.954	.753	.564	.993	.695	.559	.760	.976	.672

Defend = Defending Organisations, Prosp = Prospectors Organisations, Analys = Analysers Organisations, React = Reactor Organisations
Ass. = Assembling sector, Con. = Constructing Sector, Man. = Manufacturing Sector, Ret. = Retailer Sector.

7.1.2.2 The Results of Regression Analysis in the Cases of PCI, PU or PEC for ....

Section 6.2.4 showed that there was a strong association between PCI and PCU. Therefore, it was an important to apply regression tests for each of them separately in relation to product market, factor market split into FM1 and FM2 and legislation as independent variables and CMIS for each of efficiency, optimisation and strategy. Table 7.19 represents these results for managers' perceptions of competition intensity (PCI). Table 7.20 shows the same results for managers' perceptions of unpredictability (PCU). However, Table 7.21 represents these results for managers' perceptions of environmental conditions (PEC) since new variables were created by aggregating competition intensity and unpredictability, which represent the environmental conditions in this research.

The main comments on the three tables (Table 7.19 , Table 7.20 and Table 7.21) are given in the following paragraphs. However, the discussion in Chapter Eight will highlight these points in more details:

1. The results in these three tables are nearly similar in the case of all data, where the Spearman's rho correlation tests showed a very strong association between PCI and PU as illustrated in section 6.2.4. Furthermore, in the cases, where data were split into the moderating variables, the results are also nearly similar in the three tables wherever Spearman's rho correlation between PCI and PU is strong. However, for the defending and assembling sectors, the results in the three tables are not similar, since the Spearman's rho for each of these two sectors showed no association between PCI and PU.

2. In Table 7.21, use of cost management information for achieving strategy in the public organisations is affected negatively by legislation. However, using cost management information for achieving strategy in the private organisations is affected positively by product market.

3. In the three tables, defending and reactors organisations are affected by the factor market and legislation. However, analysers and prospectors organisations are affected mainly by the product market.

Table 7.19 Regression Results for the Linearity between Using CMIS for Eff., Opt. and Str. & PCI(PM, FM (FM1& FM2) and Legislation) for All the Levels

CMIS;	All	Strategic Posture				Kinds of Business Sectors				Ownership		Transformation Operation		
		Defending	Prospectors	Analysers	Reactors	Assembling	Constructing	Manufacturing	Retailer	Public	Private	Divergent	Multiplex	Convergent
Efficiency&														
Constant	+2.48	-1.93	+1.68	-	+1.85	-	+4.13	+3.40	+3.20	+4.59	+3.02	+2.57	+3.86	+2.58
PCI(PM)	+.43	-	+.553	-	-	-	-	+.35	-	-	+.47	+.36	-	+.72
PC(FM1)	-.53	+1.46	-	-	-	-	-.56	-	-.68	-.716	-.53	-	-.53	-.86
PCI(FM2)	+.283	-.52	-	-	+.50	-	-	-	+1.44	-	-	-	+.68	-
PCI(Leg.)	-	+.90	-	-	-	-	-	-	-	-	-	-	-	-
R^2	.395	.887	.219	-	.806	-	.175	.312	.886	.661	.282	.491	.786	.426
Normality	92%	91%	99%	-	99%	-	98%	80%	80%	80%	80%	97%	92%	93%
Optimisation&														
Constant	-	-3.32	-	-	-3.51	+7.97	-	+1.535	-	-	+1.56	-4.18	+5.19	-
PCI(PM)	-	-	-	-	-	-	-	+.415	-	-	-	-	-	+.60
PC(FM1)	-	+1.57	-	-	-	-	-	-	-	-	-	-	-	-
PCI(FM2)	+.924	-	+1.17	-	+1.92	-	-	-	-	+1.06	+.74	+2.43	-	-
PCI(Leg.)	-	+.54	-.42	-	+.76	-1.82	-	-	-	-	-.37	+.47	+.47	-
R^2	.366	.848	.627	-	.848	.397	-	.241	-	.556	.354	.721	.566	.284
Normality	80%	92%	99%	-	80%	99%	-	80%	-	96%	99%	80%	95%	92%
Strategy&														
Constant	-3.446	+1.85	+1.67	-	+2.96	-	+5.70	+3.71	+2.75	+5.28	+3.14	+5.26	-	-
PCI(PM)	+.58	-	+.79	-	-	-	-	+.38	-	-	+.60	-	-	+1.78
PC(FM1)	-1.088	-	-	-	-	-	-.81	-.74	-1.20	-1.22	-.93	-1.88	-.89	-.86
PCI(FM2)	-	-.57	-.42	-	-	-	-	-	+2.67	-	-	-	+1.32	-
PCI(Leg.)	-	+.60	-	-	-.433	-	-.81	-	-	-	-	+.88	+.82	-1.25
R^2	.446	.549	.549	-	.549	-	.551	.318	.95	.559	.385	.601	.778	.503
Normality	80%	80%	91%	-	80%	-	80%	80%	80%	80%	80%	89%	99%	80%

Table 7.20 Regression Results for the Linearity between Using CMIS for Eff., Opt. and Str. & PU(PM, FM (FM1& FM2) and Legislation) for All the Levels

CMIS;	All	Strategic Posture				Kinds of Business Sectors				Ownership		Transformation Operation		
		Defending	Prospectors	Analysers	Reactors	Assembling	Constructing	Manufacturing	Retailer	Public	Private	Divergent	Multiplex	Convergent
Efficiency&														
Constant	+3.485	+1.01	+1.71	-	+1.71	+15.01	+3.08	+3.21	+1.10	+3.07	+5.21	+2.53	+1.58	+4.65
PU(PM)	+.321	-.72	+.67	-	+.67	-	-.55	+.49	-	-	-	+.49	-.83	-
PU(FM1)	-1.01	-	-	-	-	-3.22	-.77	-	-.38	-.56	-1.22	-	-	-1.55
PU(FM2)	+.53	-.55	-	-	-	-1.97	+1.58	-	+2.90	+.59	+.41	-	+1.83	-
PU(Leg.)	-	+2.20	-	-	-	-	-	-.38	-	-	-	-	+.95	+.70
R^2	.319	.951	.248	-	.817	.946	.603	.352	.958	.764	.229	.387	.91	.485
Normality	80%	80%	80%	-	99%	80%	80%	80%	80%	80%	99%	80%	80%	80%
Optimisation&														
Constant	-	+3.43	+1.39	-	-	-	+4.19	+1.62	+12.35	+1.11	+1.51	-3.46	+6.95	+2.61
PU(PM)	-	-.43	-.71	+.77	-	-	-.89	+.50	-2.76	-	-.42	-	-2.19	-
PU(FM1)	-	-1.85	-	-	-	-	-	-	-1.03	-.512	-	-.64	-	-.79
PU(FM2)	+1.09	-.80	+1.54	-	+1.21	-	-	-	-	.939	+1.08	+2.52	+1.57	-
PU(Leg.)	-	+2.26	-	-	-	-	-	-	-	-	-	+.93	-	+.41
R^2	.387	.944	.708	.283	.666	-	.412	.186	.822	.553	.406	.739	.864	.334
Normality	80%	97%	99%	85%	98%	-	80%	97%	83%	99%	99%	80%	97%	80%
Strategy&														
Constant	+4.654	+1.11	+1.98	-	-	+13.45	+5.73	+5.06	-	+3.42	+7.11	+4.59	-	+4.82
PU(PM)	+.352	-.19	+.57	-	-	-	-	+.66	-	-	-	+.72	-1.52	-
PU(FM1)	-1.741	-	-	-	+.55	-2.21	-1.29	-1.64	-1.22	-1.18	-1.93	-1.45	-	-1.76
PU(FM2)	+.437	-.59	-	-	.27	-2.31	-.51	-	+4.39	+.82	-	-	2.90	-
PU(Leg.)	-	+1.16	-	-	-.29	-	-	-	-	-	-	-	+2.06	+.57
R^2	.359	.943	.124	-	.830	.839	.687	.461	.85	.700	.293	.564	.874	.460
Normality	94%	80%	80%	-	80%	80%	100%	85%	80%	80%	80%	80%	80%	99%

Table 7.21 Regression Results for the Linearity between Using CMIS for Eff., Opt. and Str. & PEC(PM, FM (FM1& FM2) and Legislation) for All the Levels

CMIS;	All	Strategic Posture				Kinds of Business Sectors				Ownership		Transformation Operation		
		Defending	Prospectors	Analysers	Reactors	Assembling	Constructing	Manufacturing	Retailer	Public	Private	Divergent	Multiplex	Convergent
Efficiency&														
Constant	+3.15	+2.93	+1.23	-	+1.89	-	+7.91	+3.27	+2.69	+3.41	+3.97	+2.52	+4.52	+5.25
PEC(PM)	+.45	-1.24	+.74	-	-	-	-1.32	+.43	-	-	+.48	+.42	-	-
PEC(FM1)	-.897	-	-	-	-	-	-.57	-	-.71	-.57	-.95	-	-.92	-1.61
PEC(FM2)	+.344	-.57	-	-	+.495	-	-	-	+1.93	+.42	-	-	+.74	-
PEC(Leg.)	-	+2.13	-	-	-	-	-	-.40	-	-	-	-	-	+.57
R^2	.402	.94	.28	-	.82	-	.61	.35	.94	.76	.30	.46	.84	.47
Normality	98%	80%	99%	-	96%	-	80%	80%	80%	80%	80%.	95%	99%	80%
Optimisation&														
Constant	-	+2.94	+.38	+2.16	-4.42	-	+3.80	+1.49	+16.25	-	+1.45	-4.61	+11.76	+.74
PEC(PM)	-	-1.50	-	+1.18	-	-	-1.85	+.48	-3.17		-	-	-2.93	-
PEC(FM1)	-	-	-	-	+1.41	-	-	-	-1.67	-	-	-	-.70	-
PEC(FM2)	+1.037	-.50	+1.29	-.60	1.56	-	+1.82	-	-	+1.01	+.83	+2.59	+1.41	+.58
PEC(Leg.)	-	2.02	-.40	-.75	-	-	-	-	-	-	-.36	+.63	-	-
R^2	.384	.88	.66	.59	.78	-	.53	.23	.78	.50	.38	.74	.83	.20
Normality	80%	80%	100%	80%	80%	-	80%	80%	88%	97%	99%	80%	88%	84%
Strategy&														
Constant	+4.796	+1.97	-	-	+3.0	-	+6.26	+4.36	+4.81	+5.58	+4.79	+4.47	+3.48	+6.60
PEC(PM)	+.579	-.32	+.73	-	-	-	-	+.52	-	-	+.59	+.54	-	-
PEC(FM1)	-1.727	-	-	-	-	-	-1.27	-1.21	-2.0	-1.08	-1.67	-1.29	-1.56	-1.92
PEC(FM2)	-	-.59	-	-	-	-	-	-	+2.35	-	-	-	+1.20	-
PEC(Leg.)	-	+.98	-	-	-	-	-.69	-	-	-.44	-	-	+.60	-
R^2	.475	.92	.19	-	.61	-	.69	.41	.98	.71	.44	.61	.83	.38
Normality	80%	80%	96%	-	80%	-	98%	80%	80%	80%	80%	88%	99%	97%

7.2 Tests and Results for the Non-linearity Hypothesis; H_2

Data was too sparse for non-linear regression analyses. Curve-Linear Regression tests were carried out to test this hypothesis. The results were that the relationship between managers' perceptions of competition intensity and unpredictability and using CMIS to achieve efficiency, optimisation and strategy purposes could be quadratic or Logarithm. Furthermore, the models did not meet the three indicators which were used to estimate the regression model in terms of value of R^2, significance level and normally distributed errors. Table 7.22 shows the results of curve-linear regression test in terms of quadratic and Logarithm relationship between managers' perceptions of environmental conditions (as independent variable) and using CMIS for each of efficiency, optimisation and strategy purposes (as dependent variables) for all data (the 88 Questionnaires).

Table 7.22 Curve-Linear Regression between PED(PM) and using of each efficiency, optimisation and strategy

	Efficiency		Optimisation		Strategy	
	Logarithm	**Quadratic**	**Logarithm**	**Quadratic**	**Logarithm**	**Quadratic**
Constant	+1.81	+6.09	+2.12	+3.81	+0.02	+5.66
PEC(PM)	+1.48	-2.49	.08	-1.18	+1.19	-2.60
R^2	0.13	0.24	0.00	0.00	0.00	.20
Sig. F	0.00	0.00	0.88	0.66	0.13	0.00
Normality	-	-	-	-	-	-

PED(PM) means the co efficient with managers' Perception of Environmental Conditions of Product Market

The results in Table 7.22 could not be trusted for the three indicators which were used to estimate the regression model, as they were stated in sub-section 7.1.2 since; (1) the values of R^2s is very small, it means these models can not explain the changing of the dependent variables more than this small amount %, (2) the significances of these models are not acceptable for efficiency and strategy and (3) the distributions of the errors are not normal. It does not mean the second hypothesis is refused, instead it means that to test this hypothesis, there is a need to bigger sample, as it will illustrated in Chapter Eight. The results of the non-curve regression for all data and for each group of the moderating variables are illustrated in Appendix 9.

7.3 Tests and Results for Existence of Intervening Variables Hypothesis; H_3

In the previous two sections, there were tests for the relationships between the dependent and independent variables whatever it was linear or non-linear. These tests were conditioned with the moderating variables. In this section, tests for existing intervening variables are presented. It should be observed here that these tests were conducted only for the purpose of testing the existence of effects of the intervening variables, rather than for studying their effects on the main relationships as in Shields et al. (2000), Van der Stede (2000), Chenhall and Brownell (1988) and Shields and Young (1993). Those researchers used causal paths to achieve their aims. Other researchers (e.g. Anderson & Young, 1999; Shields et al., 2000) used powerful structural equation models to identify, the effects of their intervening variables simultaneously on dependent variables. Furthermore, Scott and Tiessen (1999) combined moderating variables within an intervening model.

The tests for existing variables are similar to the tests for moderating variables. Both of them are additional to the original relationships between the dependent and independent variables. Bryman and Cramer (2001) identified an intervening variable as a variable that is both a product of the independent variable and a cause of the dependent variable. However, a moderated relationship occurs when a relationship is found to hold for some categories of a sample but not others.

As illustrated when testing the existing of moderating variables in Chapter Six, there are relatively large numbers of statistical tests to determine whether a difference between two or more groups is significant (this time to test the intervening variables). Moreover, Bryman and Cramer (2001) argued that the considerations to be borne in mind when testing for the existence of moderating variables are the same in the case of intervening variables. Therefore, in this research, the Kruskal- Wallis H test was used as a test suitable for non-categorical data, non-parametric data, unrelated groups and existences of two or more groups to compare between. In this test, the cases in the different samples are ranked together in one series and the chi-square statistic and its significance level corrected for rank ties. Therefore, if the differences between the groups are significant (less than 0.05), it means that these groups are significantly different. This means this variable is an intervening variable in the main relationship.

When designing the questionnaire, the researcher had some ideas about the existence of specific intervening variables. Therefore, questions about these variables were added. These variables were managers' education levels, location of authority, kinds of consultants, and size of organisation. The following section contains in brief the results of the Kruskal-Wallis tests for these variables. The complete tests of Kruskal-Wallis are in Appendix 8.

For managers' education level variable, there were three levels: 1- Higher education level, which contains managers who had obtained a postgraduate degree from a university. 2- Middle education level, which includes managers who had obtained an undergraduate degree from universities. 3- Low education level, which contains managers who had a qualification below an undergraduate degrees or without any education degree. Kruskal-Wallis H. test showed differences significant at less than 0.05 for all the variables related to using CMIS. This test was applied in the questionnaires database (where N=88) because it was related to managers' features (the respondents) and was not related to organisations features. Figure 7.1 shows the differences between means and standard deviation of using CMIS for efficiency, optimisation and strategy and managers' perceptions of product market, factor market and legislation as environmental conditions for each group classified by managers' education levels, using histograms.

For the location of authority variable, there were two groups: 1- Organisations under Egyptian authorities. 2- Organisations under foreign authorities. The differences between these groups were shown by the Kruskal-Wallis test to be significant at are less than 0.05 for all the variables related to using CMIS. This test was applied in the organisations database (where N=29) because it was related to organisations' features and was not related to the respondents themselves. Figure 7. 2 shows the differences between means and standard deviation for used of CMIS for efficiency, optimisation and strategy and managers' perceptions of product market, factor market and legislation as environmental conditions for each group, using histograms.

For the variable kinds of consultants, there were two groups: 1- Organisations that got external advice. 2- Organisations that got internal advice. The significance levels of the differences between these groups are less than 0.05 for all the variables related to using CMIS. This test was applied in the organisations database (where N=29) because it was

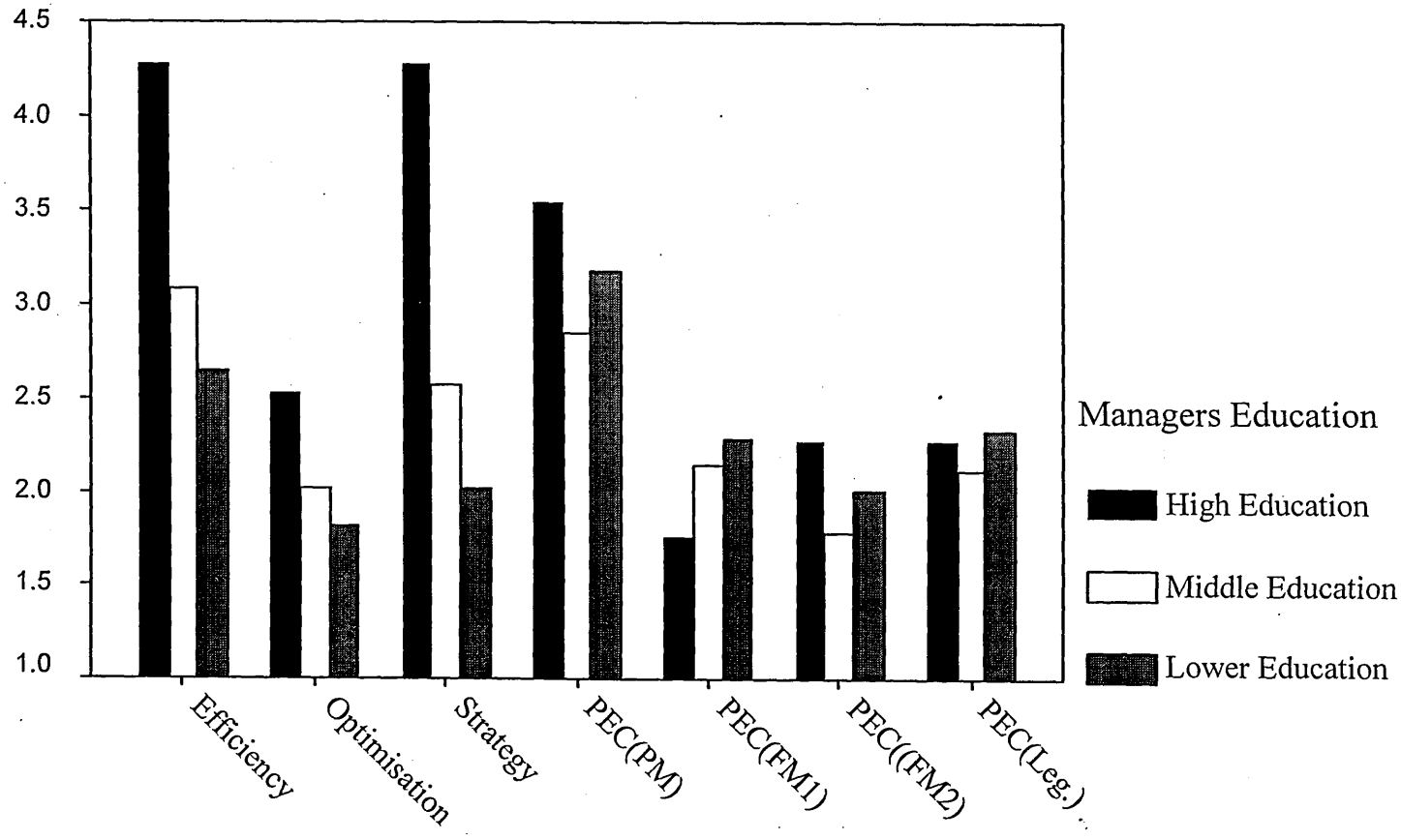
related to organisations' features and was not related to the respondents. Figure 7.3 shows the differences between means and standard deviation of using CMIS for efficiency, optimisation and strategy and managers' perceptions of product market, factor market and legislation as environmental conditions for each group, using histograms.

For size of organisations, there were two groups: 1- relatively large, which contains organisations with capital of more than one million Egyptian pounds; 2- relatively small, which contains organisations with capital of less than one million Egyptian pounds. The significance levels in the Kruskal-Wallis test between these groups are more than 0.05 for all the variables related to using CMIS. Therefore, the evidence did not indicate that the organisation's size is an intervening variable in the relationship between using CMIS and environmental conditions. This test was applied in the organisations database (where N=29) because it was related to organisations' features and was not related to the respondents themselves. Figure 7.4 illustrates that there are differences between means and standard deviation of using CMIS for efficiency, optimisation and strategy and managers' perceptions of product market, factor market and legislation as environmental conditions for each group.

The main conclusions from these tests are:

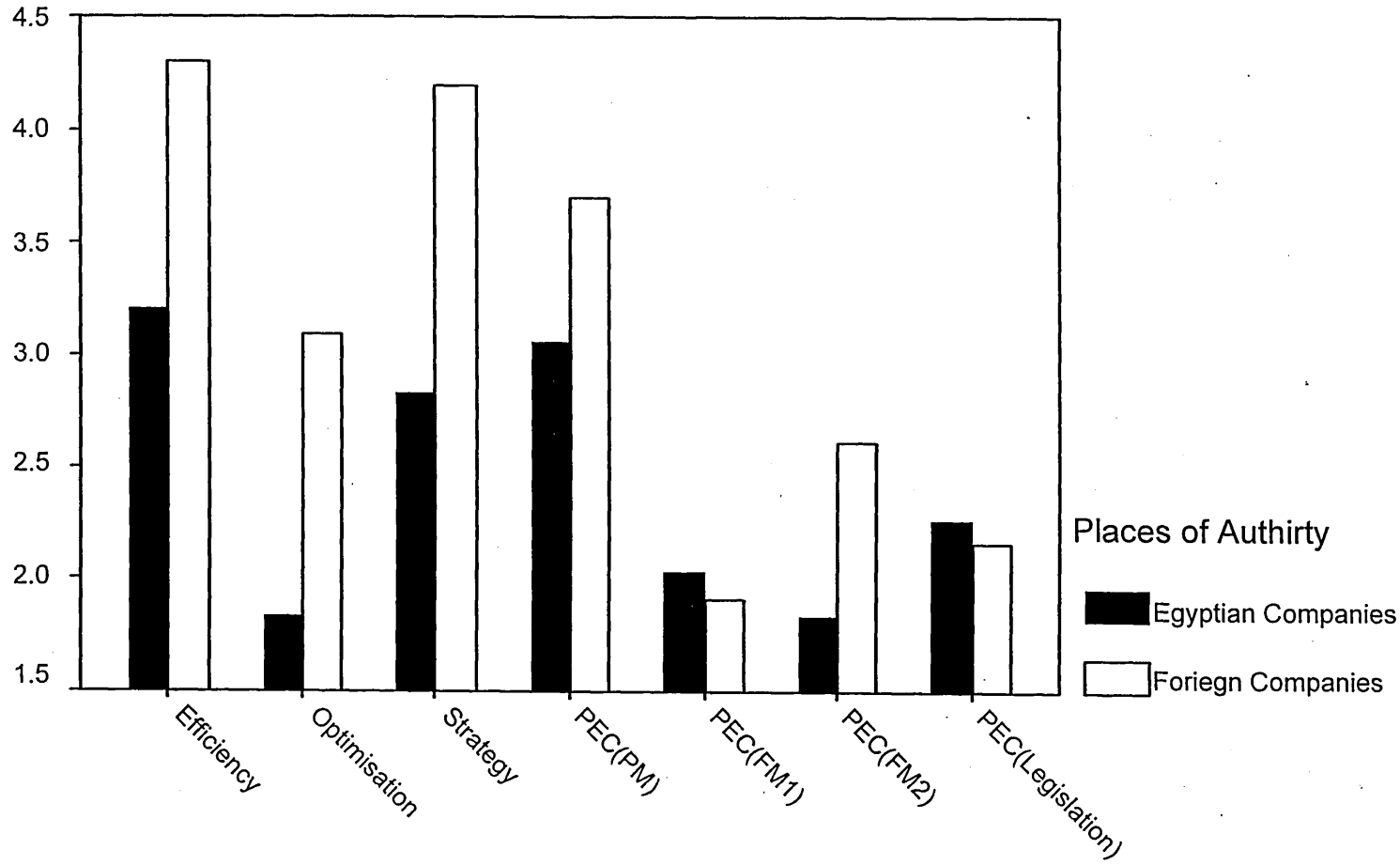
The empirical evidence supports the third hypothesis to varying degrees. For managers' education levels, kinds of consultants, location of authority variables and the size of organisation, the empirical evidence strongly support this hypothesis. However, for all the organisations, the empirical evidences show that there are big differences between the groups in relation to all the variables under comparison except legislation variable since there is no big difference between the groups. The main conclusion is that the four variables are intervening variables in the relationship between managers' perceptions of environmental conditions and the use of CMIS for efficiency, optimisation and strategy purposes and managers' perceptions of product market and factor market as environmental conditions.

Figure 7.1 Using CMIS Sorted out by Managers' Education Levels



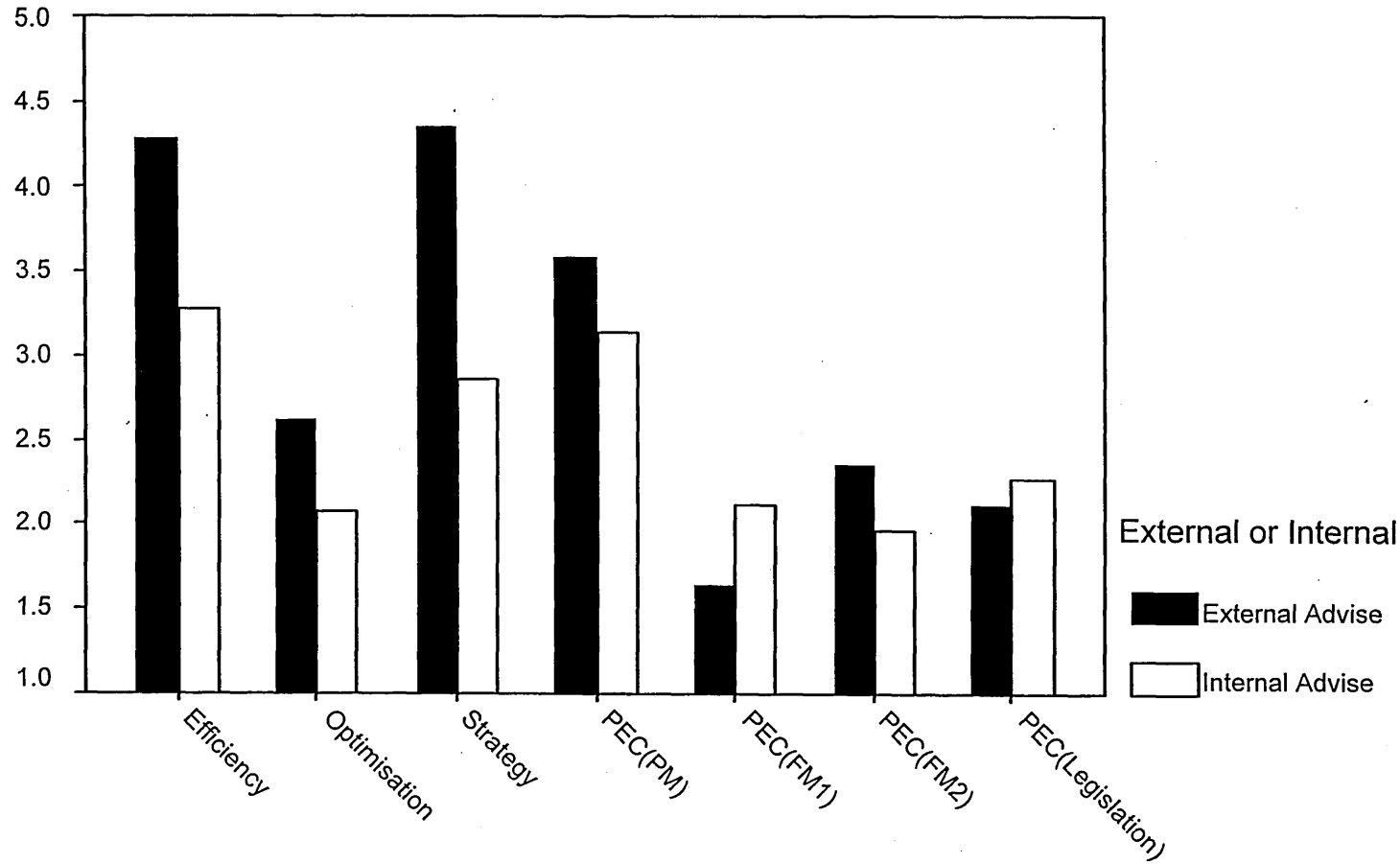
PEC(PM) means managers Perceptions of Environmental Conditions for Product Market
PEC(FM1) means managers perceptions of Environmental Conditions for Factor Market 1.
PEC(FM2) means managers perceptions of Environmental Conditions for Factor Market 2.
PEC(Leg) means managers perceptions of Environmental Conditions for Legislation.

Figure 7. 2 Using CMIS Sorted out by Location of Authority



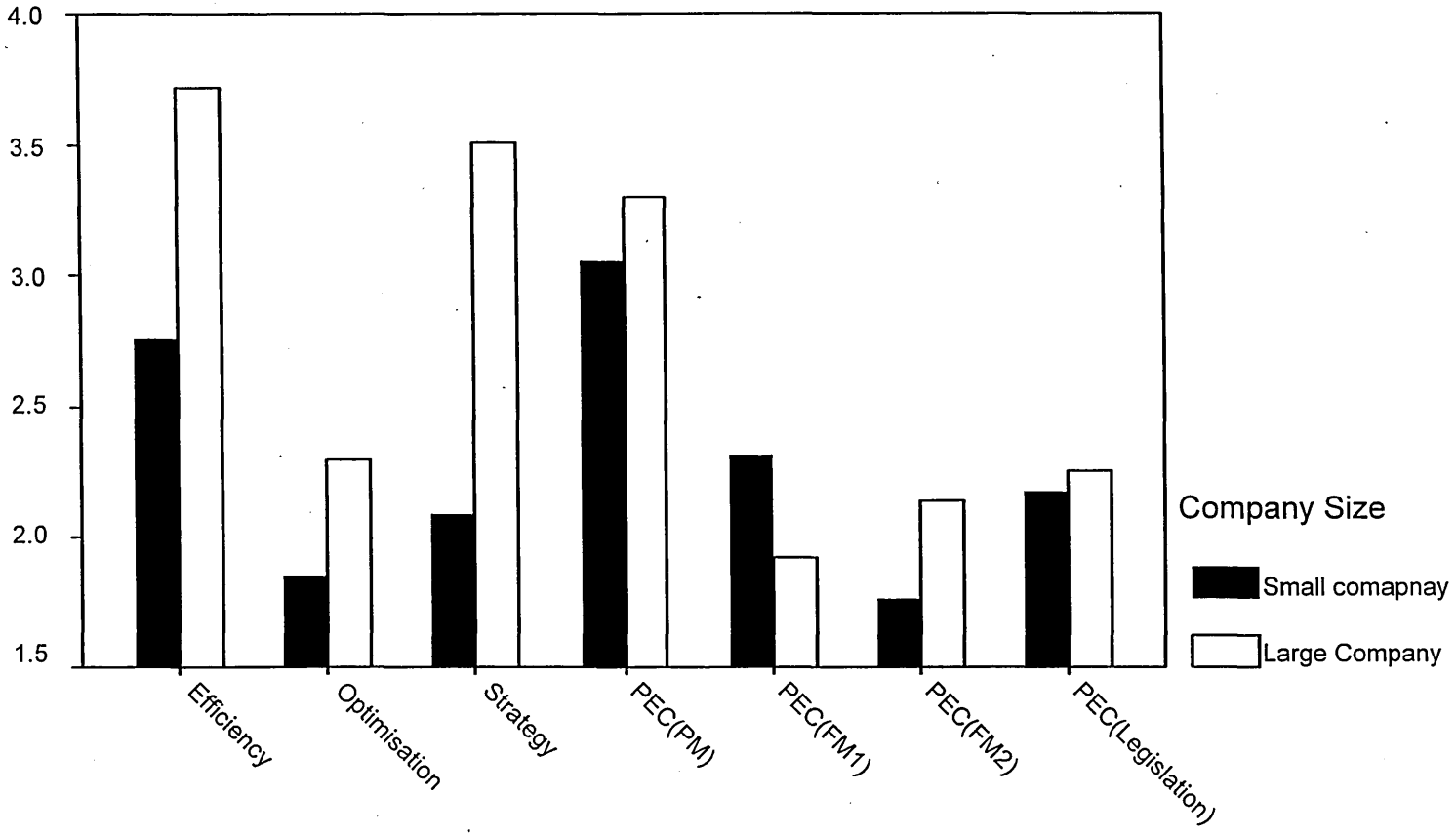
PEC(PM) means managers Perceptions of Environmental Conditions for Product Market
PEC(FM1) means managers Perceptions of Environmental Conditions for Factor Market 1.
PEC(FM2) means managers Perceptions of Environmental Conditions for Factor Market 2.
PEC(Leg) means managers Perceptions of Environmental Conditions for Legislation.

Figure 7.3 Using CMIS Sorted out by Kinds of Consultants



PEC(PM) means managers Perceptions of Environmental Conditions for Product Market
PEC(FM1) means managers Perceptions of Environmental Conditions for Factor Market 1.
PEC(FM2) means managers Perceptions of Environmental Conditions for Factor Market 2.
PEC(Leg) means managers Perceptions of Environmental Conditions for Legislation.

Figure 7.4 Using CMIS Sorted out by the Size of Organisations



PEC(PM) means managers Perceptions of Environmental Conditions for Product Market
PEC(FM1) means managers Perceptions of Environmental Conditions for Factor Market 1.
PEC(FM2) means managers Perceptions of Environmental Conditions for Factor Market 2.
PEC(Leg) means managers Perceptions of Environmental Conditions for Legislation.

7.4 Conclusions from this Chapter

The first hypothesis in this research is that there is a positive relationship between CMIS usage for achieving efficiency, optimisation and strategy and managers' perceptions of competition intensity and unpredictability for three divisions of environment: product market, factor market and legislation. Spearman's Rho correlation and multiple regression analyses were used to test this hypothesis. The results from both these analyses were mixed regarding support for this hypothesis. However, the most cleared results were that there was much support for choosing business sectors, ownership categories, transformation categories and strategic postures as moderating (conditional) variables in the main relationship in this research. The variations in the results between these groups are very clear. However, the significance of the results of the correlation and regression analyses should be viewed with caution due to the limited size of sub-samples when splitting the whole sample.

The second hypothesis in this research is that there is a non-linear relationship between CMIS usage for achieving efficiency, optimisation and strategy and managers' perceptions of competition intensity and unpredictability for three divisions of environment: product market, factor market and legislation. For testing this hypothesis, Non-linear regression should be used. However, this analysis needs a large sample. Therefore, the results from it were mess and not truth worthy. This issue will in therefore be investigated further future work.

The third hypothesis in this research is that there are intervening variables which affect the main relationship between CMIS usage for achieving efficiency, optimisation and strategy and managers' perceptions of competition intensity and unpredictability for three divisions of environment: product market, factor market and legislation. The assumed intervening variables in this research were managers' education levels, location of authority, kinds of consultants, and size of organisation. The Kruskal- Wallis H test was used firstly to test each variable as illustrated in Appendix 8. Then, Bar graphs were run to be sure of the differences between the groups of each variable. The results proved that the managers' education levels, kinds of consultants, location of authority and size of organisation variables are intervening variables in the main relationship. This means that the empirical evidence strongly supports this hypothesis.

The following tests were done in systematic ways as statistical writers suggested and the needs to each of them to achieve the objectives of the analytic process.

Firstly, Means and Standard Deviation were used to describe each dependent and independent variables.

Secondly, Cross Tabulation Tests were used to study the relationship between polices and practices of CMIS. The reason for choice this kind of test was, policy variables were nominal variables and practice variables were interval variables.

Thirdly, Correlation and Scatter plot were used to study the relationships between competition and unpredictability.

Fourthly, Kruskal Wallis H test was used to test the existence of effects of the moderating variables.

Fifthly, Spearman correlation and Multiple Regression were used to test the linearity and the non-linearity hypotheses.

Sixthly, Kruskal Wallis H test was use to test the third hypothesis which related to the existence of intervening variables. The intervening variables tested were managers' education levels (Higher, Medium and Low education levels), location of authority (Egyptian and Under Foreign Authority organisations), kinds of consultants (getting External and Internal consultants), and size of organisation (Large, Medium and Small organisations).

Having analysed the data collected and got the results, discussion of these results in relation to previous studies will be presented in Chapter Eight in this thesis.

Chapter Eight

Discussion of the Results

8.0 Introduction

Chapters Five, Six and Seven included analyses and commentary on the data obtained from eighty-eight questionnaires and eighty-eight semi-structured interviews in twenty-nine Egyptian organisations. This was done to fulfil the research aim of explaining the organisations' practices of CMIS through testing three hypotheses about the relationship between the degree of competition intensity and unpredictability of the environment, as perceived by managers, and practices of cost management information systems.

The research studied the effects of managers' perceptions of environmental conditions (concentrated on competition intensity and unpredictability) on managers' uses of information provided by CMIS. Therefore, the independent variables were managers' perceptions of competition intensity (the perceived state of the environment) and unpredictability (the degree to which managers believe themselves able to predict that state) and the dependent variable was managers' use of cost management information systems.

The research design was twenty nine case studies chosen according to the moderating variables which were four kinds of business sectors (Assembling, Constructions, Manufacturing, and Retailer), three transformation characteristics (Divergent, Multiple, and Convergent), two ownership categories (Public and Private) and four kinds of business strategic postures (Defenders, Prospectors, Analysers and Reactors). The research instruments used to collect the data were structured questionnaire, interview guide and internal documents (as detailed in Chapter Four). Chapter Five presented the details of the case studies. Furthermore, SPSS was used to analyse the data collected (as reported in Chapters Six and Seven).

This chapter discusses the results. The purpose of this discussion is to interpret and link the findings to the previous management accounting research. This chapter is divided into four sections. Section one discusses the theoretical arguments used. Section two contains a comparison between the results of this research and previous research.

Section three is a critical review of the research. The final section sums up the main conclusions and implications of the previous sections.

8.1 Research Arguments

The research arguments could be classified into two main groups. The first group is related to the theoretical arguments and the other one is related to the solutions adopted to deal with the limitations of contingency theory. Therefore, this section is divided into two sub-sections.

8.1.1 Theoretical Arguments

The Motivation:

Previous research was more concerned with developing cost management information models, and assumed that there is "one best model" to get maximum useful information to achieve efficiency, optimisation and strategy purposes. These models were very complex and they failed to recognise that information was a costly resource. Therefore, it is not surprising that the complex models developed by academics had little practical relevance (as detailed in Chapters Two and Three). Therefore, the debate about CMIS shifted from rational normative debate to the explanation of the organisational behaviour. Academic writers (e.g. Scapens, 1994; Kaplan, 1998) recognised that a gap existed between the theory and practices of CMIS. Kaplan (1984) and Johnson and Kaplan (1987) advocated that research should focus more closely on the study of management accounting practices. They encouraged researchers to look seriously at the nature of management accounting practices and not to dismiss those practices which do not conform to some theoretical ideal. This has created a need to look at and explain seriously the nature of cost management information systems practices.

The interview data has revealed that most of the complex models developed by academics had little practical relevance to these respondents. The interviewees reported that full absorption costing methods were used in their organisations. A small number of organisations (Al-Ahram Beverages, Glaxo Wellcome Egypt, Peugeot Egypt, Suzuki Egypt Companies) reported that they considered using ABC and standard costing a long time ago but they have not actually used them (as reported in Appendix 3). These results were consistent with many surveys of management accounting practices (For example, Drury et al., 1993; Ezzamel & Willmott, 1992). Furthermore, these results were in line

with the surveys (e.g. Innes and Mitchell, 1991; Cobb, Innes and Mitchell, 1992) about the low take-up of ABC.

The Model:

Thompson (1967) claimed that there are three major themes in the domain of CMIS; efficiency, optimisation and strategy. It could be argued that practices of CMIS concentrated on achieving these efficiency, optimisation and strategy purposes. Hence, the dependent variables were classified according to these three purposes. Furthermore, a distinction was made between the intended and realised uses of CMIS. Policies of CMIS referred to the intended uses of CMIS. However, practices of CMIS referred to the realised uses of CMIS.

This research followed Ibbotson (1976) and Al-Hazmi (1995) in focusing on managers' perceptions of competition intensity and unpredictability as factors of external environmental conditions, which affect organisational behaviour in the domain of CMIS as policies and practices. The independent variables, thus, were managers' perceptions of competition intensity and unpredictability in the domain of three divisions: product market, factor market (including raw material, labour, management, finance and technology) and legislation.

However, previous research in cost management literature (for example: Kaplan, 1983; 1988; 1995; Cooper & Kaplan, 1988; 1991a; 1992; Ittner & Larcker, 2001) concentrated on the product market division only. Three divisions of environment conditions were considered in this research. The justification for adopting these three divisions is that the research views on organisation as a system which has inputs (factor market: including raw material, labour, management, finance, and technology), outputs (products) and is working in legislative environment. The previous research took a narrow perspective of the environment (the product market division only); however, this research adopted a wider focus (the three divisions). The results revealed that managers consider each of these divisions to different degrees, in all the organisations of the sample. These results implied that all the three divisions of environment (Product Market, Factor Market and Legislations) are important, rather than the product market only, as previous writers suggested. Furthermore, these results supported the theoretical framework in terms of the perspective of the organisation as a system.

The Hypotheses:

Al-Hazmi (1995) supposed linear relationships in his research. Both linear and non linear relationships are hypothesised in this research. The linear hypothesis is the more managers perceive environmental conditions as characterised by competition intensity and unpredictability, the more likely they are to use CMIS. However, the non-linear hypothesis deals with the constraints and stimulus effects together. It hypothesised that where managers perceived severe, intense and highly unpredictable competition, managers begin to preclude any rational responses, become frustrated and withdraw. Thus, they cannot use CMIS more than that level, so either they sustain their use at this level or decrease their level of use. Then, a curvilinear relationship appears. This implies that the development in accounting practices is a rational response to environment conditions. Those were the first two hypotheses. The third hypothesis is the existence of intervening variables which could explain the relationship between using CMIS and managers' perceptions of environmental conditions. The intervening variables were adopted from the interview data where questions were formulated to explore the views of the managers towards the reasons for the accounting practices. Those were managers' education levels (Higher, Medium and Low education levels), location of authority (Egyptian and Under Foreign Authority organisations), kinds of consultants (getting External and Internal consultants), and size of organisation (Large and Small organisations).

The measures of construct:

The research measured the policies of CMIS, as people articulated them through the questionnaires. However, it dealt with practices as measures of use of CMIS for the three purposes in terms of efficiency, optimisation and strategy. Therefore, the policy variables were dealt as nominal variables, since the answers for these variables were "Yes" or "No". However, practice variables were dealt with as interval variables since they were measured using five-point scales, as explained in Chapter Six. The practices of CMIS (the dependent variable) was measured by counting the degree of use of the information (which resulted from CMIS) to achieve each of three purposes; efficiency, optimisation and strategy. These degrees of use for each dependent variable (using CMIS for each purpose) were calculated by adding the points, in the five-point scale, of the questions used to measure each variable. By doing this, the most uses of CMIS to achieve each purpose are the largest scores in the five-point scales for the questions measured each of these variables, the respondent has got, as illustrated in Chapter Four.

The environmental conditions (the independent variables) were measured as managers' perceptions of these environmental conditions. Five-point scales were used to identify the degree of the importance of each division or sub-division of the environment. Therefore, the most important division or sub-division is the one on which the respondent scored the largest number of points.

8.1.2 Solutions Chosen to Deal with limitations of the Contingency theory

The Theoretical Framework:

The attraction of the Contingency approach is that it provides a theoretical framework that might help to explain existing practices. Berry et al. (1995), Otley (1991), Kaplan (1998), Donaldson (2001), Khadwalla (1972), Al-Hazmi (1995) and others claimed that the environment has effects on CMIS as polices and practices. However, the contingency theory has limitations. Neo-contingency theory, which recognises those limitations, was used in the research as the theoretical framework (as detailed in Chapter Two). This sub-section contains a discussion of how the research dealt with those limitations.

The Model:

The research dealt with the limitation of the earliest version of contingency theory with regard to the construction of the research model as follows:

Firstly, the research extended Al-Hazmi's model by adding moderating and intervening variables. By this addition, the research attempted to fill a gap in the literature and dealt with one of the contingency theory limitations in previous research, since Child (1972), Otley (1980), Bourgeois (1984), Ezzamel and Hart (1987), Donaldson (2001) and others argued that the idea of contingency models is incomplete empirically. They added that contingency models have limited explanatory power since there are no moderating or intervening variables. Ezzamel & Hart (1987) and Bourgeois (1984) gave an explanation for that limitation. They argued that this limitation has happened because of the impact of the interaction between those variables on the model. Furthermore, Gordon and Miller (1976), Otley (1980) and Alum (1997) suggested that the effects of contingencies on the form of CMIS adopted within an organisation lead to distinct organisation types (depending on moderating and intervening variables). This research considered these arguments and chose four moderating and four intervening variables to

test and study their effects on the main relationship, as reported in Chapters Six and Seven. Statistical cluster analysis was used to test the existence of the moderating and intervening variables adopted. The analyses were able to deal with the moderating and the intervening variables and these results confirmed that these variables have effects on the main relationship. The results, thus, verify the assumption of neo-contingency theory related to the model variables.

In the research design stage, consideration was given to moderating variables which might affect the main relationship in this research. Therefore, when choosing the participating organisations, an attempt was made to choose organisations from in a variety of sectors, initially, from the four business sectors and the two ownership categories. The appropriateness of this approach was confirmed during the primary analytical stage since the analytical results for all the data (the 29 organisations or the 88 questionnaires) were not consistent. Therefore, the idea of classifying the organisations depending on the moderating variables was supported by the results of the primary analyses. The moderating variables were business sectors, ownership categories, transformation operations and strategic postures. The moderating variables were adopted from the management accounting literature and conventional thinking. For example, during the interviews, some issues arose. There were three kinds of perceptions of managers towards competition: (1) Managers do not understand the environment, so they do not adapt anything in their organisations. (2) Managers understand and want to adapt their CMIS but they cannot. This was observed in most of the public organisations. This observation supports Ali (2000) who argued that in the public organisations, there is a central authority in taking decisions and heavy governmental interference, and competition and creativity are not noticeable features. (3) Managers can understand and adapt their companies. This was observed in most of the private organisations. Thus, the ownership categories idea (public and private) emerged. Also, some management accounting literature (e.g. Ezzamel & Watson, 1993) showed interest in and encouraged the study of ownership as a moderating variable. Abernethy and Brownell (1997) and Chenhall (2003) stressed the importance of the effects of the kinds of transformation characteristics on management accounting systems in organisations.

Secondly, as discussed in Chapter Two, some writers (Child, 1972; Bourgeois, 1984; Hopper & Powell, 1985; Whittington, 1989; Schreyog, 1980; Whitley, 1977; Anderson

& Paine, 1975; Bourgeois, 1984; Weick, 1987; Bobbitt & Ford, 1980) criticised contingency theory for ignoring the importance of the decision-maker who serves as the link between the organisation and its environment. Donaldson (1985) claimed that contingency variables fail to explain much more than half of the variation in structure as a result of this neglect. Furthermore, Chenhall (2003) claimed that the role of strategy is important as it addresses the criticism that contingency-based research assumes that an organisation's CMIS is determined by context and that managers are constrained by their operating situation (as argued in Chapter Two). Therefore, the strategic postures (which were developed by Miles and Snow, 1978) were considered as a moderating variable. The results from this research supported this consideration and the arguments of the above writers who criticised the contingency theory. The results showed that there are differences (in both the dependent and independent variables) between the participating organisations depending on their strategic postures (defenders, prospectors, analysers and reactors), as reported in Chapter Six. In addition, differences were found in the relationship between managers' perceptions of competition intensity and unpredictability, and their use of CMIS, when the sample were classified according to this moderating variable, as reported in Chapter Seven. This supports one of the assumptions of neo-contingency theory related to the importance of strategic postures in the decision-making process.

Thirdly, as discussed in Chapter Two, contingency theory is based on the idea of equilibrium and suggests that managers should behave in a reactive way towards environmental conditions and other contingent variables. However, Bateman and Crant (1999), Crant (1996, 2000), Buss (1987), Diener et al. (1984) and Kelley (1998) classified behaviours of managers into reactive and pro-active, to varying degrees. Therefore, the assumption of contingency theory in relation to reaction is not realistic. Therefore, managers' responses for environmental conditions on a continuum between reactions and pro-action were studied by considering business strategic postures as a moderating variable. Thus, the research did not consider managers' behaviours as reactive only – as contingency theory suggests; rather it considered degrees between reaction and pro-action (Miles and Snow typology (1978) defenders, prospectors, analysers and reactors) – as neo-contingency theory suggests.

The research used the Kruskal-Wallis H test as a statistical cluster analysis since the data was non-categorical and non-parametric, the groups were unrelated and there were

two or more groups to be compared (Bryman & Cramer, 2001). The results introduced the kind of business sector, transformation characteristics, ownership category, and strategic postures as moderating variables in the relationships between perceived environmental conditions and policies and practices in relation to management cost information systems for efficiency, optimisation, and strategy purposes.

The Analytical Process:

Moreover, the research dealt with another problem in contingency theory related to studying multiple causes of variables and determining their overall effects on organisation. The research used multiple regression analysis to study the effects of multiple independent variables on using CMIS to achieve efficiency, optimisation and strategy purposes; rather than adding their effects together as contingency theory suggests, as illustrated in Chapter Seven.

8.2 Comparison with Previous Studies

This section provides a detailed comparison between the present research and previous research summarised in Table 3.1 in Chapter Three and other research cited in the rest of the chapters. This section divided into five sub-sections. The discussion in these sub-sections compares the model, the measures of construct, the research design, the analytical process and the testing of hypotheses with the previous research.

The Model:

The contingency approach relates the design of CMIS to the type of environment in which they operate, for example, the level of unpredictability and competition intensity and to organisational factors such as size, technology and management styles. These factors are likely to apply simultaneously and in combination to affect competition. Porter (1979), for example, suggested that the intensity or degree of competition in an industry depends on the collective strength of different factors in action within the industry. Anecdotal evidence, from the interview data, supported Porter's view as is illustrated in the following managers' responses:

The marketing manager in Savola Egypt Company for refining crude and semi-refined edible oil for the purpose of processing and packing different oil products said:

So many new products in the market plus the imported items from overseas are the real worries. We have to offer our big customers' deals like extended credit, supply products when ordered, and even better to try to match our competitors' price. The government is a big headache also as it is making the market more and more open to our overseas competitors. To survive, we have to be innovative, more cost effective, quality and price competitive and skilful in marketing.

The financial director in Suzuki Egypt Company for manufacturing and assembling of all the kinds of Suzuki cars said:

It would be unrealistic to consider market competition to be affected by a particular aspect, such as introducing of new products independently of everything else. An organisation would take multiple actions simultaneously to defend and increase its slice of the market. Look at the automobile market in the country. Through Egyptians people living abroad, a big number of imported cars in the market, which force the local companies to take actions like new products introduction, quality improvements, extensive warranty services and package deals.

The financial director in Peugeot Egypt Company for manufacturing and assembling of Peugeot 405 and 505 passengers' cars said:

There are so many competitors in the market offering cars with package deals that we cannot survive just by doing one or two things; we have to take a broad outlook of the situation. We offer our customers a combination of goodies like new models, competitive price, cheaper loan, and extended warranty. Furthermore, through reducing tariff policy for parts of cars, the Government encouraged businessmen to establish assembling factories. Therefore, the competition intensity is increasing by the time.

Thus, the findings from both interviews and questionnaires data were in line with Porter's (1979) view. However, these results are not consistent with Khandwalla (1972) who found that an organisation's competition may only be triggered by price, product, and marketing channel competition price. Furthermore, these results support the research model whereby different factors affect the CMIS in organisations. As reported in Chapters Six and Seven, there were differences between the categories of each moderating (Business Sectors, Ownership, Transformation operations and Strategies

Postures) and intervening (Managers' Education Level, Location of authority, Kinds of Consultants, and Size of Organisation) variable chosen. Furthermore, the independent variables (Managers' Perceptions of both Competition Intensity and Unpredictability for each of Product Market, Factor Market and Legislation) impacted on the dependent variables (Using Cost Management Information System for achieving each of these Purposes; Efficiency, Optimisation and Strategy). These results provide some evidence of the possibility of using the contingency approach as a theoretical framework in cost management studies. These results were in line with Berry et al. (1995), Otley (1980, 1991), Donaldson (1996, 2001), Kaplan (1998), Khadwalla (1972), Al-Hazmi (1995), Selto et al. (1995), Hoque and Hopper (1994) and Chenhall (2003). Ittner and Larcker (2001) added another related point to the above arguments. They claimed that environmental conditions themselves are likely to be influenced by many factors (e.g. technological changes and legislation conditions). The research model is in line with them, since technology was considered as a sub-section of the factor market division and legislation was considered as a division of environment.

The justification for choosing the interview method was to discover intervening variables which could explain the main relationship. For example, during the interviews, some implications arose. The larger organisations saw unpredictability as a challenge rather than a constraint. The greater the perception of competition intensity and unpredictability in the environment have, the greater the need for external, non financial and ex-ante information. The data suggested that some larger companies resorted to using market research companies to help them to get more information about their customers (satisfaction, needs, the best prices and new anticipated products), their competitors, and their suppliers, as illustrated in Appendix 3. Furthermore, some small individual companies face more competition intensity and they try hard to adapt their CMIS. Nevertheless, their cost management systems are very simple because they are small businesses and have limited ability to pay for complicated ones. As a result, size of organisation was considered as an intervening variable.

Another example of an implication rose during the interviews. The owners and their sons who are responsible for taking the strategic decisions in Toshiba Al-Arabi, Ragaegypt, Ragie Abdel Fatah, Abdel Kader El-Garahi for Constructions, Al-Maamar for Constructions, Al-Eaman for Constructions, and Al-Arabia for Manufacturing organisations have a low education level, as illustrated in Appendix 3. Furthermore,

they face high competitive intensity and unpredictability. At the same time, they hardly use CMIS for achieve efficiency, optimisation and strategy purposes. Therefore, managers' education level was considered, in this research as an intervening variable.

Moreover, the recognition of effects of some of these intervening variables emerged from the management accounting literature survey. For example, Jones (1985) emphasised the influence of the authority of the parent company (which the research studies as location of authority) in determining the form of the management accounting system. Ezzamel (1990) studied the effects of organisation size on budget characteristics. Reid and Smith (2000) recognised that there were differences between small and large organisations and they were concerned about the small ones.

The Measures of Construct:

The research used managers' perceptions of environment to measure environmental conditions. This way of measuring a construct was in line with some previous research (e.g. Mia and Clarke, 1999; Duncan, 1972; Chenhall & Morris, 1986; Govindarajan, 1984; Gul & Chia, 1994) as discussed in Chapter Four.

The Research Design:

The research design contained both interviews and questionnaires applied in the context of multiple case studies. These were selected carefully according to the moderating variables. The research followed Otley (1980) and Humphrey and Scapens (1996)'s recommendations, as discussed in Chapter Four. They suggested that research of the contingency approach should involve a small number of organisations carefully selected according to moderating variables.

The research design included semi-structured interviews using interview guide (as in Appendix 1 and by the end of each interview, the interviewee was asked to complete the structured questionnaire. The removal of the closed questions and the two long tables from the interview guide to the structured questionnaire was very useful to enable the interviews in a systematic and comprehensive fashion. Also the time allowed for interviews to be conducted was used efficiently to explain or exchange viewpoints on some of the questions in the questionnaire (as illustrated in Chapter Four).

Actually, the statistical results supported the research design adopted and carried out, since the results give evidence of existence of the intervening variables that emerged from the interviews, and that are claimed in the management accounting literature to be influential. This means that the research design chosen was more effective compared to Al-Hazmi's (1995) research design. Young and Selto (1993), Shields and Young (1993, Kalagnanan and Lindsay (1999) and Davila (2000) match up the approach of the research methods chosen, which includes the use of both interviews and questionnaires for managing case studies.

The Analytical Process:

The results of factor analysis and reliability tests which were undertaken supported the design of the research instruments. Cronbsch's Alpha was used to test the reliability (Sekaran, 2000), as reported in Chapter Four. Most of the Cronbach's Alpha values between questions, which measured each variable, were safely above the limit of acceptability; 0.6 or more. Thus, the result of the reliability test proved that the questions in the questionnaire (which were developed from Al-Hazmi, 1995) which were used to measure each variable were consistent. These results of testing for reliability refer to the consistency of results obtained in research. Gill and Johnson (2002) claimed that, to satisfy this criterion, it should be possible for another researcher to replicate the original research using the same subjects and the same research design under the same conditions.

Factor analysis was used to test the internal validity. Sekaran (2000) claimed that factor analysis could be used to test internal validity and the results of this test confirm whether the research findings are really about what they appear to be about. Saunders (1997) claimed that the results answer the question: is the relationship between the variables a causal relationship? The results of the factor analysis, in this research, supported the design of the questionnaire and referred to the relationships between the variables included, as reported in Chapter Four. However, regarding external validity, which refers to the ability to generalise the findings (Gill and Johnson, 2002), it is one of the research limitations, as noted in Chapter Nine, that generalisability cannot be claimed because of the use of multiple case studies and a small sample.

Writers in statistics (e.g. Sekaran, 2000) advised carrying out preliminary steps in the treatment of the data before using the SPSS statistical package. These preliminary steps

were undertaken and this helped to conduct the analysis smoothly. These steps were editing and coding data, classifying the variables depending on their method of measurement, and creating two databases; one for questionnaire data and the second one related to organisational data, which allowed the appropriate one to be used in each test. Furthermore, creating new variables for analysis purposes and identifying the appropriate kind of tests (non-parametric), helped in selection of the most appropriate tests from the range of tests available, so the results were meaningful. After testing the assumptions of the parametric data on the research data, the evidence proved that the research data is non-parametric.

Repeating the analysis five times (for all data and for each of the four moderating variables chosen; business sectors, ownership categories, transformation categories and business strategy postures) with each test helped in recognising the impact of the moderating variables. Furthermore, it allowed comparison between the categories in each of the moderating variables.

The research used cross tabulation analysis to test the associations between the policy and practice variables, since the policy variables were nominal variables and practice variables were interval variables. However, Bryman and Cramer (2001) claimed that although the use of cross tabulation analysis provides a powerful tool for exploring effects of moderating and intervening variables on the main relationship, it suffers from a limitation related to small samples, especially when the variables include a large number of categories. They prefer to use correlation and regression analysis, instead of cross tabulation analysis, to conduct multivariate analyses on fairly small samples. Furthermore, both correlation and regression provide easy to interpret indications of the relative strength of relationships. Cross-tabulation analysis was used to test the relationship between policies and practices. The evidence showed that there was no relationship between policies and practices for efficiency purposes (because policies and using CMIS for efficiency are universal in all the organisations), a strong relationship between policies and practices for optimisation purposes, and a very strong relationship between policies and practices for strategy purposes.

Testing the Hypotheses and the Results:

The main hypothesis of the research was that as competition intensity and unpredictability increase, managers' use of cost management information systems

increases. As managers' perceptions of the existence of these environmental conditions increased, managers' interests often focused on achieving efficiency, optimisation and strategy purposes. Therefore, their use of CMIS increased to deal with environmental conditions (Bromwich, 1990; Bromwich & Bhimani, 1994; Gordon & Narayanan, 1984; Chenhall & Morris, 1986; Mia, 1993; Mia & Clarke, 1999; Cunningham, 1992). The results from both analyses, correlation and multiple regression, produced mixed to support for the first hypothesis; linearity. However, the concluded results supported the choice of business sectors, ownership categories, transformation categories and strategic postures as moderating (conditional) variables in the main relationship of the research. Cluster analysis was used to assess control practices in management accounting literature (e.g. Chenhall and Langfield-Smith, 1998; Ittner et al., 1999). The differences in the results between cluster analysis groups were very clear. However, the importance of the results of the correlation and regression analyses should be observed with caution, due to the limited size of sub-samples when splitting the whole sample. However, there was found to be a positive and statistically significant relationship between managers' perceptions of product market and the use of CMIS for achieving efficiency, optimisation and strategy purposes. It was especially notable that the factor market cluster (finance and raw material) effects were negatively related to the use of CMIS for the three purposes. Whereas the other cluster (labour, management and technology) were positively related to the three purposes.

However, when testing the second hypothesis, related to the non-linearity relationship, the results were not consistent, due to the sample size. The curvilinear regression models were not trusted, since they did not meet the three criteria which were used to estimate the regression model in terms of value of R^2, significance level and normally distributed errors, as reported in Chapter Seven.

However, the analyses undertaken to test the third hypothesis (the existence of intervening variables in the main relationship) proved significant. The Kruskal- Wallis H test and Bar graphs proved that the managers' education levels, kinds of consultants, location of authority and size of organisation variables are intervening variables in the main relationship.

The evidence shows that all of the organisations in the sample had cost management policies and practices for efficiency as an obligation imposed by the Egyptian

Companies law. However, the results showed different degrees of significance of use of CMIS for the three purposes.

Bouwens and Abernethy (2000) found that there is no association between operational decision-making and broad scope information. Their study focused on importance for 'operational' decisions, which presumably excluded decisions concerning markets and customer requirements. As discussed in Chapter Three, Cooper and Slagmulder (1998b and 1998d) distinguished between operational (related to efficiency and optimisation) and strategic decisions. Chenhall (2003) argued that strategic decisions involve broad scope information. The evidence from this research was in line with these views. However, the results revealed that managers agreed on the order of the importance of using cost information for efficiency, strategy, and then optimisation purposes. The explanations for this finding are: a) it seemed that the most important use of CMIS is for efficiency purpose. However the real reason is that the Egyptian companies' law requires organisations to use CMIS for efficiency purposes. b) The results showed that the least important use of CMIS is for optimisation purposes, since managers use the latest market research information rather than CMIS for this purpose. This evidence related to the use of CMIS for optimisation is consistent with Foster and Gupta (1994) who document a gap between how managers (marketing) perceive the potential role of accounting information in supporting decision-making and how they actually use it.

The evidence suggested growing interest in using CMIS for strategic purposes during the interviews. This suggestion was consistent with management accounting literature (e.g. Bromwich, 1990; Coad, 1996; Lord, 1996; Tomkins and Carr, 1996; Guilding et al, 2000).

The results revealed, also, that the existence of policies and the importance of using CMIS for the three purposes; efficiency, optimisation and strategy varied from one category to another in each organisation. For example, on a business sector level, the assembling sector was most inclined to have cost management policies and practices for all purposes, followed by the manufacturing sector, then marketing and construction sectors. Meanwhile, the number of organisations having cost management policies and practices for all purposes was bigger in the private category than in the public category. Furthermore, using CMIS for all of the three purposes was more important for analyser and prospector organisations than for defender and reactor organisations. These last

results were in line with Abernethy and Brownell (1999), who found that hospitals undergoing strategic change (a more prospector type of strategy) used budgets – as a kind of control system, as CMIS – interactively. Furthermore, the results showed that prospector and analyser organisations were facing greater competition intensity and unpredictability than defender and reactor organisations. These results are in line with Fisher (1995) and Guilding (1999). Guilding (1999) found that prospector organisations make greater use of competitor assessment systems and perceived these systems to be more useful than do defender organisations.

Managers in the sample differentiated between the relative importance of the main environmental divisions (factor market, product market, and legislation). All the managers in the different categories of the moderating variables gave considerable importance to product market factors, with the lowest importance being accorded to legislation with different ratios. These results supported the argument of the importance of the effects of product market, since most of the emphasis in previous research (e.g. Kaplan and Cooper, 1991a; 1992) was on the product market division rather than in the factor market or legislations divisions. Furthermore, these results support Ittner and Larcker (2001) who found that the product market (which was represented in their study by importance of customers in the long-term organisational success) is more important than the factor market (which was represented in their study by employees, operational factors and financial). Furthermore, the managers differentiated between the importance of the sub-divisions of the factor market (Raw material, Labour, Management, Finance and technology) according to their business sector, their ownership categories and their transformation characteristics.

The evidence showed on the relationship between perceived competition intensity and perceived unpredictability indicated that, the more managers' perceptions of competition intensity existed, the more they would have perceptions of unpredictability. These results were consistent with Gupta and Wilemon (1990) and Gerwin and Tarodeau (1982), argued that unpredictability comes from increased domestic and global competition. Therefore, in most of the regression equations, one of these variables did not appear. However, the coefficients of the regression equations were changed depending on the variables entered in the model. The multiple regression equations provided the combination of multiple effects of the dependent variable (whatever they were, managers' use of CMIS for efficiency, optimisation, or strategy).

In these equations, the effect of multiple variables on the practice was not just the sum of the effect of each variable separately on the practice. Instead, there was some holistic property that is not captured by an atomistic analysis of each variable separately that then just combines them together. Therefore, it could be argued that the effect of multiple variables cannot be calculated by simply adding up the effect of each variable on the practices of cost management information systems. These results are in line with the arguments and findings of Van de Ven and Drazin (1985), Drazin and Van de Ven (1985) and Donaldson (2001). However, the results are not consistent with Randolph and Dess (1984) who argued that the effects of independent variables on the dependent variable are simply additive.

8.3 Critical Review of the Research

This section aims to critically review points related to the research design, the samples, the analysis and the respondent problem as follows:

The Research Model:

Business sector as one of the moderating variables was not clear for some organisations. It was difficult to identify their kind of business sectors since they were working in more than one business (such as manufacturing and assembling). However, the other moderating variables; ownership, transformation characteristics and business strategy postures were clear since the differences between the categories of these moderating variables were significant.

Shields et al. (2000), Van der Stede (2000), Chenhall and Brownell (1988) and Shields and Young (1993) used intervening models which involved the specification of causal paths between management control system, context and outcomes. They demonstrated how the relationships between management control systems are explained by intervening variables. However, the results of this research simply established that there are effects of these intervening variables on the main relationship. The research aims did not include specification of causal paths, and more data would be needed for this purpose. Furthermore, there are also some researchers (e.g. Anderson & Young, 1999; Shields et al., 2000) who used powerful structural equation models which enable latent variables to be constructed from multi-item questionnaires and to identify, simultaneously, statistical significance with multiple dependent variables. However,

these powerful models would require more access to the participating organisations to get more detailed data. Furthermore, Scott and Tiessen (1999) combined moderating variables within an intervening model by examining the extent to which a variable moderates the effects on one or more of the paths. This combination with the causal paths would require a larger sample and collection of more data.

Some commentators (e.g. Otley, 1980; Otley & Wilkinson, 1988; Donaldson, 2001) claimed that some dimensions of organisational and managerial performance should be included in contingency-based studies when examining CMIS. They justified that claim by arguing that the ultimate goal of CMIS is to provide information that assists managers to achieve their goals or the organisation's goals, which relate to organisational or managerial performance. Chenhall (2003) argued that if dis-equilibrium conditions are assumed, then it may be useful for contingency-based studies first to establish adoption, use and usefulness of CMIS, then to examine how they are used to enhance decision quality and finally investigate links with organisational performance. He added also that a particular CMIS may be perceived as not useful, and rate low in satisfaction or benefits but organisational performance may be high due to the supply of required information from other sources, either formal or informal. However, in this research, the access to organisations was highly problematic and little other financial information was forthcoming. Even financial performance data was unavailable.

The Measures of Construct:

The managers' perceptions of environmental conditions were used as surrogate measures for the real environmental conditions as following suggested by a range of academic writers (Duncan, 1972; Stacey, 1993; Coad, 1995; Macintosh, 1994; Rahman & McCosh, 1976; Boyd et al., 1993; Tymond et al., 1998; Downey & Slocum, 1975; Lawrence & Lorsch, 1967; Weick, 1979; 1983). The reason for this was that the managers are the links between the environment and the organisations. Their perceptions of this environment, then, are acceptable to measure the real environmental conditions. Furthermore, real measures in a developing country, like Egypt, are not available. Such a real measure could be used in future research.

The Research Method:

Otley (1980), Galunic and Eisenhardt (1994) and Donaldson (2001) argued that the use of cross-sectional methods in empirical studies that show correlations between contingency and structure is taken in some commentaries to imply that structural contingency theory is static. However, structural contingency theory deals with organisational change. It contains a theory that is dynamic, which is supported by studies of organisations changing over time. Therefore, they claimed that there is a need to study longitudinal effects of managers' perceptions of environmental conditions which remain unexplored. However, this study is a cross-sectional study. Further research could be done to fill this gap and any shortcoming.

Collecting Data Issues:

Access to the participating organisations was difficult because those organisations were going through a very significant period of change which was coupled with strategic repositioning and difficulties. Therefore, concern to confidentiality lead them to provide restricted access, as explained in Chapter Five. Furthermore, data was interpreted in the context of the particulars of the organisations, rather than in broad generalisations. Moreover, compared with the number of studied variables, is to the number of case studies available (29 cases) is small due to time and cost shortages. This produced a shortage of sampling points for identifying any statistical interaction effects, especially when the sample was split according to the moderating variables. Furthermore, it is noteworthy that to gain acceptable statistical power in more complex models, large sample sizes are required. Thus, the relatively small sample limited the statistical power of results. This occurred when the non-linear regression tests were used to test the non-linearity hypothesis. Most statistical writers anticipated this problem (e.g. Bryman and Cramer (2001) and Gupta (2000). The implementation of the proposed model required the full support of managers and employees.

Reliability and Validity:

This research classified each independent variable (competition intensity and unpredictability) for the three divisions of the environment as follows:

1. Competition intensity and unpredictability perceived for factor markets. Furthermore, inside each variables, there were five sub-divisions; raw material,

labour, management, finance and technology. Thus, ten variables were studied in this division.

2. Competition intensity and unpredictability perceived for product market. In this group there are two variables.

3. Competition intensity and unpredictability perceived for legislation. In this group are two variables.

Thus, there are fourteen independent variables in this study. However, the number of questions used to measure these independent variables in the questionnaire was forty three. Furthermore, the questionnaire contained forty one questions which were used to measure the three dependent variables (using CMIS for Efficiency, Optimisation and Strategy as a measure of enacted use rather than espoused use). The questionnaire was developed from a previous study of cost management in the milk industry in the UK by Al-Hazmi (1995). The original questionnaire was clarified, simplified and restructured as illustrated in Chapter Four. To use the questionnaire data efficiently, there was a need to aggregate these questions to represent one figure for each variable. Factor Analysis and Reliability tests were used to achieve this aim and also to test the reliability and the internal validity for the data. Questions which did not fulfil the conditions of those two tests were cancelled. Fortunately, those questions, which were cancelled, were very few, as reported in Chapter Four (Section 4.6). This work was done following statistical writers' recommendations (e.g. Field, 2000; Bryman and Cramer, 2001; Sekaran, 2000). These results are consistent with Lindsay (1995). He claimed that such confidence can be derived from replication studies which enhance the validity and reliability of findings and thereby provide a strong base to move forward by way of model development.

The Analytic Methods:

The research used a variety of bivariate analyses (e.g. Means Standard Deviations, Cross Tabulation, Correlation and Regression), in addition to a variety of Multivariate analyses (Kruskal Wallis H.). Moreover, the data analysis was carried out five times for each analysis done to fulfil the objectives: once for all of the data (29 organisations or 88 questionnaires; it depended on the aim from each test) and four times for the four moderating variables, to obtain the results for each kind of group of the moderating variables. Thus, a large amount of data analysis was done to achieve the aims of this research.

8.4 Conclusions from this Chapter

There are two kinds of arguments. The first one is related to the theoretical arguments which included building the research model and using the reliability and factor analyses. This research extended the previous research (Al-Hazmi, 1995) by adding moderating and intervening variables in the model related to the relationships between using CMIS and managers' perceptions of environmental conditions. Furthermore, factor analysis and reliability tests were used to aggregate the questions in the research instruments which were used to measure the variables.

The second arguments are related to the techniques used to deal with limitations of contingency theory. The first technique was adding moderating and intervening variables to Al-Hazmi (1995)'s simple contingent model. The second technique was to conceive supposing managers' behaviours as a continuum between reaction and pro-action, as suggested by Miles and Snow's (1976) typology (Defenders, Reactive, Analysers and Prospectors), through studying business strategies postures as a moderating variable. Thus, this research did not consider managers as always behaving in reactive manor, as contingency theory suggests; rather they could be behaving in a pro-active way as the neo-contingency theory supposes. The third technique was using multiple regression tests to study the effects of many independent variables on the dependent variable, rather than adding their effects together.

It is useful to link the theoretical framework, the research design, the sample, the analyses and testing the hypotheses with previous research. The theoretical framework was in line with the previous research which claimed that the possibility of using a contingency approach as a theoretical framework in cost management studies. Furthermore, it supports the idea that there are many different factors which affect the policies and practices of cost management information systems.

The research design which contained both interviews and questionnaires, achieved its aims. It proved the effect of the intervening variables (which is the third hypothesis that emerged from the interviews) on the main relationships, using statistical analysis. Furthermore, this research design helped to test the first two hypotheses.

On the other hand, the statistical data analyses helped to achieve many aims. The results of factor analysis and reliability tests supported the idea of effective design of the

research instruments (the Structured Questionnaire and the Interviews' Guide). The preliminary steps undertaken before the statistical analyses helped to carry out the analysis smoothly. Furthermore, repeating the analysis five times (for all data and for each of the four moderating variables chosen; business sectors, ownership categories, transformation categories and business strategy postures) for each test worked as a double check for the existence of the effects of the moderating variables. Furthermore, it allowed comparison between the categories in each moderating variables.

Three kinds of explanations were hypothesised in this research, linearity, non-linearity and existence of intervening variables which emerged from the interviews. However, previous research used the linearity explanation only.

There were some difficulties relating to access, due to the very significant period of changes which the Egyptian organisations faced in the time during which data was collected and due to the shortage of time and financial resources. The number of participating organisations was twenty nine and the data was eighty eight questionnaires and eighty eight interviews. This size of sample limited the analysis to test the non-linearity hypothesis and to generalise the results. The results should be considered with caution because of the small sample, especially when the sample was split according to the moderating variables.

However, the research aims did not include the specification of causal paths, which would need more data. It would be useful to study the effects of the moderating and intervening variables in the main relationships using the paths and the combination with the causal paths through further research.

However, considering the financial performance in this research is important. The access to the organisations was highly problematic and little other financial information was forthcoming. Even financial performance data was unavailable.

Having completed the discussion, the next chapter will present the conclusions from this thesis.

Chapter Nine

The Conclusions

9.0 Introduction

This chapter outlines the research and its results, and identifies its contribution to knowledge, limitations and future work. The chapter has four sections. Section One presents an outline of the thesis with focus on a brief background to the motivations of doing this research, the objectives, the theoretical framework, the research method, the data analyses process and the results. Section Two identifies the contributions to knowledge that this thesis makes to the literature. Section Three discusses the research limitations and how this work can be taken forward. Section Four concludes with comments on the research process and learning experience.

9.1 Outline

The Motivations for doing this Research:

The research was concerned with exploring and understanding the relationship between the degree of managers' perceptions of competition intensity and unpredictability of environmental conditions and the degree of policies and practices of cost management information systems. The motivation to perform this research was that the researcher has observed that there are a huge number of complex models and techniques in the management accounting literature. However, management academic writers (e.g. Scapens, 1991 & Horngren, 1995; Drury et al., 1993; Innes et al., 1999; Ezzamel et al., 1992; Otley, 1985; Scapens,1991; Drury, 2000) claimed that simple techniques are used in practice, which might be quite rational, and not an irrational rejection of techniques suggested in the academic management accounting literature. The academic writers (e.g. Kaplan, 1998; Johnson & Kaplan, 1987; Johnson, 1992) recognised that there is a gap between theory and practice, which impact on efficiency, optimisation and strategy (as discussed in Chapter Three). This observation encouraged the researcher to undertake this research especially to explain the practices in a developing country such as Egypt. The Egyptian economy is facing a very important period of time involving a shift to privatisation to deal with the severe problems with its public sector and undertaking the Open Market Scheme, where international competition intensity and unpredictability will become severe (as reported in Chapter Five).

The Objectives and Research Hypotheses:

This research studied managers' perceptions of competition intensity and unpredictability as independent variables which included three divisions of environment; Factor Market (including five sub-divisions; Raw Material, Labour, Management, Finance, and Technology), Product Market and Legislation. Furthermore, it studied Policies and Practices of cost management information system to achieve the three purposes: Efficiency, Optimisation and Strategy as dependent variables. This is the simple model which Al-Hazmi (1995) used. This research extends this model (as discussed in Chapter Three) by adding four moderating variables; Business Sectors, Ownership Categories, Strategic Postures and Transformation Operations. The justifications for choosing these moderating (conditioning) variables stemmed from the management accounting literature and the observations undertaken during the interviews, as reported in Chapter Eight and Appendix 3.

The Theoretical Framework:

Neo-contingency theory was adopted as a framework for explaining the policies and practices of CMIS through testing the three hypotheses. Neo-Contingency theory is one of the contingency approaches, which deals with the limitations of earlier version of contingency theory (as discussed in Chapters Two and Eight). The theoretical framework is based on sociological functionalism, together with recognition of the growing pluralism in the study of organisations, and offers a new paradigm to explain organisational development additional to those available through contingency theory, as illustrated in Chapter Two. This choice of the theoretical framework offers a useful alternative to situational determinism (i.e. contingency causes CMIS).

The Research Method:

This research represents a deductive study, since three hypotheses were tested. Multiple case studies, 29 Egyptian organisations, were used to test these three hypotheses. This comparative methodology led to investigation and testing of the hypotheses via the neo-contingency model. These participating organisations were chosen according to the four moderating variables. Eighty-eight semi-structured interviews and Eighty-eight questionnaires were administered during the interviews to collect the data. Furthermore, the relevant documents were collected from each organisation. The main aim for the interviews was to explore the interviewees' opinions about the intervening variables, which might interfere with the relationship between environmental conditions and

CMIS as policies and practices. The research instruments were an Interview Guide and Structured Questionnaire. Factor Analysis and Reliability tests were used to test the reliability and validity of the collected data. The results, as shown in Chapter Four, suggested that the data is reliable and valid to use in the rest of analytical process.

The Data Analysis:

This research followed the statistical literature recommendations (e.g. Sekaran, 2000; Bryman & Cramer, 2001; Labovitz, 1970; Field, 2000; Lewis & Beck, 1993; Howell, 1997; Wright, 1997) to undertake the analytical processes, as reported in Chapters Four, Six and Seven.

The Research Results:

Three hypotheses were formulated related to the relationship between managers' perception of competition intensity and unpredictability and use of CMIS to achieve efficiency, optimisation and strategy, as discussed in Chapter Three. The results of testing these hypotheses are:

Hypothesis H_1: There is a linear relationship between the managers' perceptions of environmental conditions and CMIS as policies and practices. The results (as reported in Chapter Seven) provided mixed support for this hypothesis, as a result of the small sample. Generally, the product market division was linked with the using of CMIS for strategy and the factor market division was linked with the uses for efficiency. The most consistent results are that the choice of business sectors, ownership categories, transformation categories and strategic postures as moderating (conditional) variables in the main relationship of the research (as shown in Chapters Six and Seven) are reasonable.

Hypothesis H_2: There is a non-linear relationship between the managers' perceptions of environmental conditions and CMIS as policies and practices. This hypothesis included both stimulus and constraint effects of environmental conditions, since it is supposed that when an organisation faces severe environmental conditions, it cannot increase its use of CMIS beyond a given level. Thus, the use will stay at the same level or will decrease. The data was sparse, due to the sample size, for testing this hypothesis since the curve linear regression models were not trusted (as reported in Chapter Seven). There is a need to collect data from a big sample to test this hypothesis.

Hypothesis H_3: There exist of intervening variables, which might interfere with this relationship. The results addressed Managers' Education Levels, Location of authority, Kinds of Consultants, and Size of Organisation as intervening variables in the relationship between managers' perceptions of environmental conditions and use of CMIS to achieve the three purposes: efficiency, optimisation and strategy (as reported in Chapter Seven).

9.2 Research Contributions to Knowledge

This thesis gave an insight into management accounting literature, the contingency approach and management accounting practices in the Egyptian organisations in a variety of sectors.

9.2.1 Contributions to Management Accounting Literature

Firstly, the research represents a replication of Al-Hazmi (1995) as the research used data from a large sample of and a variety of kinds of Egyptian organisations, as discussed in Chapter Three. This enhances the internal validity and reliability of findings and thereby provides a strong base to move forward by way of model development (Lindsay, 1995). To test the internal validity, factor analysis was used and to test the reliability, Cronbach's Alpha was used.

Secondly, this research is based upon a model of cost management, developed by Thompson (1967) to achieve these purposes, as discussed in Chapter Three. Few studies have discussed these three purposes (e.g. Al-Hazmi, 1995 explained CMIS as policies and practices in UK manufacturing industries).

Thirdly, this thesis has provided empirical evidences of cost management information systems in terms of policies and practices in twenty-nine Egyptian organisations in different sectors. There is no research in this area in Egypt up to date.

Fourthly, the research findings support work in the literature (e.g. Kaplan, 1983; 1988; 1995; Cooper & Kaplan, 1988; 1991a; 1992; Ittner & Larcker, 2001), which emphasises the importance of the effects of product market, as discussed in Chapter Eight. Furthermore, the research took a wider view of the environment than previous research

encompassing as three divisions of the environment: Product Market, Factor Market and Legislation.

Fifthly, the interview data supports Porter (1979) who claimed that there are different factors in action within the industry, that act simultaneously and in combination to affect competition, as discussed in Chapter Eight. The results showed that there were differences between the categories of each moderating (Business Sectors, Ownership, Transformation operations and Strategies Postures) and intervening (Managers' Education Level, Location of authority, Kinds of Consultants, and Size of Organisation) variables chosen.

Sixthly, the research addressed three hypotheses (linearity, non-linearity and existence of the intervening variables), as considered in Chapters Three and Seven and Eight. The research offers a rich explanation for the practices of CMIS. No previous research has considered those three hypotheses together.

9.2.2 Contributions to Neo-Contingency Theory and Multiple Case Studies

Firstly, the research fulfilled the call from academic writers (e.g. Scapens, 1994; Kaplan, 1998; 1984; Johnson & Kaplan, 1987) to study CMIS practices rather than develop theoretical costing models. This research used a multiple case studies approach (29 case studies) and collected data from managers who were directly involved in taking the decisions, through administering interviews and questionnaires, in order to study and explain the practices of CMIS in these organisations. Actually, it is a survey using interviews and questionnaires. It is multiple case studies, as it is discussed in Chapter Four.

Secondly, the discussion in this research and the evidence supported the relevance of neo-contingency theory as a theoretical framework for the research arguments. Contingency approach was used as a bridge for the case studies and provided a meaningful explanation of the research model, as discussed in Chapters Two, Three and Eight. The research results add some evidence for potential of the contingency approach as a theoretical framework in cost management studies (Berry et al., 1995; Otley, 1980; 1991; Donaldson, 1996; 2001; Kaplan, 1998; Khadwalla, 1972; Al-Hazmi, 1995; Selto et al., 1995; Hoque & Hopper, 1994; Chenhall, 2003; Ittner & Larcker, 2001). Furthermore, this research adds valid empirical evidence of the use of neo-contingency

theory (as an adjusted version of contingency theory) as a theoretical framework in cost management studies. This research has contributed to the knowledge of management accounting literature the possibility and validity of using neo-contingency as a theoretical framework in cost management studies.

Thirdly, the research dealt with the limitation related to incomplete empirically (e.g. Child, 1972; Otley, 1980; Bourgeois, 1984; Ezzamel & Hart, 1987), through adding moderating and intervening variables to the simple model, as explained in Chapter Two. The research then fills this gap in the contingency approach. There are few studies that have considered moderating and intervening variables in the cost management area. Even the few studies which did so were concerned with management control systems generally (e.g. Shields et al., 2000; Van der Stede, 2000; Chenhall & Brownell, 1988; Shields & Young, 1993; Scott & Tiessen, 1999) rather than cost management specifically, as this research was.

Fourthly, the research addressed the importance of the decision-maker who serves as the link between the organisation and its environment (e.g. Child, 1972; Bourgeois, 1984; Hopper & Powell, 1985; Whittington, 1989; Schreyogg, 1980; Whitley, 1977; Anderson & Paine, 1975; Bourgeois, 1984; Weick, 1987; Bobbitt & Ford, 1980). The research considered the strategic posture as a moderating variable in order to test its effects on the relationship between the environment conditions and CMIS as policies and practices, as discussed in Chapter Three. The research contributed by overcoming this limitation of the contingency approach in management accounting studies.

Fifthly: contingency theory is based on equilibrium idea and assumes that managers should behave in reactive way towards environmental conditions and other contingent variables (Donaldson, 2001). However, this view is not realistic, as discussed in Chapter Two. This research studied the managers' behaviours ranging from reactions to pro-actions (Reactors, Defenders, Prospectors and Analysers) using Miles and Snow (1978)'s typology, as indicated in Chapters Three and Six. The thesis has contributed to knowledge a complete outline for managers' behaviours.

Sixthly: contingency theory has been criticised (e.g. Van de Ven & Drazin, 1985; Donaldson, 2001) for determining the overall effects of the many contingent variables on organisation by just adding their effects, as discussed in Chapter Two. The research used multiple regression analysis to study the overall effects of those multiple

independent variables on using CMIS to achieve efficiency, optimisation and strategy purposes; rather than adding their effects together as contingency theory suggests as reported in Chapter Seven. This analytical process dealt with this limitation of the contingency theory. Few studies have recognised this limitation and dealt with it.

9.3 Research Limitations and Future Work

9.3.1 Research Limitations

The findings of this research should be interpreted within the following limitations: **Firstly,** the use of contingency theory as a framework could draw some limitations on the research and its outcomes, given that the contingency framework has been criticised because the conceptualisation and measurements of the key variables need great theoretical and empirical attention. It might also lack precision in defining contingent factors. There may be mis-specification of parameters, and problems related to the number of variables included, the interaction between these variables and difficulty in collecting the amount of data required to measure these variables. However, the research used neo-contingency theory, which deals with some of these criticisms, as argued in Chapters Two and Eight.

Secondly, the research has not filled the gap in management accounting research using contingency approach related to organisation performance variable. The reason for this limitation in this research is the restricted access to the participating organisations, which refused to give me any information about their performance.

Thirdly, as findings refer to specific context of a small sample of organisations in Egypt, data was interpreted ideo-graphically in the context of the particulars of the organisations, rather than in broad generalisations. Therefore, there is no claim by the researcher that the findings are a universal truth that can be generalised to all organisations. In terms of the external validity, the research has a problem. Furthermore, a caveat should be stated here. While the sample for all data (n=88) is large enough to trust the results, the sub-samples after splitting into either the four kinds of business sectors, three kinds of transformation operations, two ownership categories or four kinds of business strategy postures become quite small. Therefore, the results should be viewed with caution due to the small samples, especially in the assembly sector sample (number of Questionnaires = 11 only). While the evidence from these small samples is

inconclusive, the evidence provides a good approximation of the correlation, as it was reported in Chapter Seven. This limitation leads to the difficulty of generalising the results and prevents the ability of the regression model data to predict. However, the analyses done using this data are adequate to achieve the aims of the empirical work, which were to study, explore and explain the relationship between environmental conditions and CMIS.

Fourthly: the research method includes multiple case studies that are not deep cases. However, they achieve their aims, which were to study, explore and explain the relationship between managers' perceptions of environmental conditions and CMIS as policies and practices to achieve efficiency, optimisation and strategy.

Fifthly, this study did not consider individual differences. However, it was related to study managers' perceptions and organisational behaviours rather than managers' behaviours.

9.3.2 Future Work

There are many opportunities for extending this study. **Firstly,** this research was across-sectional study. The longitudinal effects of managers' perceptions of environmental conditions remain unexplored. A longitudinal case study could examine the behaviour of the firms. Further research could be done to study in depth the longitudinal effects of managers' perceptions of environmental conditions and CMIS as policies and practices, which remain unexplored.

Secondly, as reported in Chapter Five, the Egyptian economy was in the privatisation stage when collecting data. An interesting extension of this research would be directly and purposefully to examine the same hypotheses in the same participating organisations after settling in the "privatisation project" stage will be interested. The results during and before this stage could be compared.

Thirdly, an extension of this research could be to focus on different kinds of business sectors (such as services). This research could be incorporated into the model in an effort to understand more completely the relationships between environmental conditions and CMIS.

Fourthly, in this research, the results showed that there are distinctive differences in CMIS in the organisations when classified by type of ownership; public and private. However, the interview data of Glaxo Wellcome, Lever, Peugeot, and Suzuki organisations in Egypt suggests that the joint venture type of business could have specific effects on CMIS, which it would be useful to examine in more detail. The interviewees' data related to those organisations highlighted that the foreign partners in the joint venture businesses cause some very recognisable features in the work systems, culture and outcomes. Studying the influences of joint ventures on the main relationship in the research, managers' perceptions of environmental conditions on CMIS as policies and practices would be an interesting piece of work and particularly useful to Egypt, which is hosting joint ventures with partners from different countries. Especially, when studying location of authority (Egyptian and Under Foreign Authority organisations) as an intervening variable, the evidence showed that the dependent variables (use of CMIS for the three purposes) were significantly different.

Fifthly, studying national cultural issues explicitly was beyond the limits of this study for many reasons, because the construct of culture is complicated and an in-depth case study would be needed to examine it properly. It was believed that gaining access for data to do such a study would not be possible. This suggests the need for further research, which would include substantial examination of culture issues with regard to control (Anderson and Young, 1999, emphasised national culture as having a major effect on the management accounting). Furthermore, the implications of culture for control were more complicated than anticipated. An observation related to this point come from the data is the culture in Suzuki organisation. Being a joint venture with Japanese partners, Suzuki organisation was planting and encouraging many elements of the Japanese working culture such as more collectivism, more risk taking and more creativity compared to the other Egyptian companies in the study, as illustrated in Appendix 3. This example raises a question as to whether or not national culture is something changeable, and suggests that in the one country; there could be many work cultures. This suggests that a further study should be done to examine these issues.

Sixthly, future research efforts may wish to focus on differences between marketing and accounting managers' perceptions to test the main hypotheses. This kind of research would need a big sample chosen according to this new variable.

Seventhly, measurement of variables remains an area worthy of further research attention. This research used managers' perceptions of environmental conditions and no hard measures of environment. The justification for choosing perceptions was discussed in Chapter Four. Further research with chosen hard measures of environment might be worthwhile. However, Ibbotson (1976) found that there were no differences between those measurements when he studied the effects of environment conditions on investment.

Eighthly: this research was not able to collect data about managerial performance. Some commentators (e.g. Otley, 1980; Otley & Wilkinson, 1988; Donaldson, 2001) claimed that this is an important variable to include in contingency-based studies when examining CMIS. Further research could be worth considering this variable.

9.4 Reflections on the Learning Process:

I undertook my MPhil during 1989 and 1993 in Egypt. It was in Cost Accounting. Its aim was planning and controlling costs of maintenance of the equipment through creating Mont-Carlo simulation model in Nasr Organisation for manufacturing cars in Egypt. It contained excellent empirical work (a case study technique). I was awarded my MPhil degree with the examiners' recommendation to publish that thesis to the other Universities and to the other manufacturing organisations in the same industry in Egypt.

Moreover, I have studied many courses in a variety of subjects (e.g. Financial Accounting, Management Accounting, Statistical Techniques, Research Methodology, Company Egyptian Law and Economics) after and before the MPhil in the University of Cairo. This was the previous experience and knowledge with which I started my study at Sheffield Hallam University (SHU).

The research process was a learning exercise in a different language environment (the research first language is Arabic), a different system of supervision and a different academic culture. In addition to attending seminars and workshops in my school (Financial Studies and Law, and Business Schools at SHU), and the joint seminars with The University of Sheffield, work was undertaken during 1997 and 1998 on a methodological literature review to design an appropriate research plan to carry out the research activities. Another source of academic training has been the participation in the "Research Students' forum" in the Financial Studies and Law School at SHU, where

different academic aspects of doing research and all related aspects are open to discussion among the research students and with some senior academics. These discussions opened up my mind to different theoretical framework, different aspects of empirical work and research methods which should be combined together to achieve research aims.

Furthermore, participation in CIMA conferences which were held in Aston University provided very valuable practical research experiences. Attending these academic activities enabled me to gain more practical research experience, including academic reading and writing, employing different databases, usage and dealing with SPSS as a statistical package (I learnt how to use this package by myself, with some limited help from other colleagues and members of staff in SHU) to interpret the data and generally carrying out research in a systematic way. Furthermore, I struggled to teach myself about statistical processes and to handle the kinds of tests appropriate to apply on the research data to achieve the desired aims. This stage in the learning process was really painful, but it added statistical experience to my knowledge, which is important for doing further research.

Moreover, the empirical work added practical experience through administration of multiple case studies in 29 organisations in a variety of sectors. These were 88 interviews and 88 questionnaires during a three month period in different cities and areas in Egypt (all my relatives and friends in Egypt helped me to achieve this). Most of this period of time was spent on building personal networks and contacts to encourage the organisations to participate and arrange interview times. The empirical work represents a survey using case studies. The biggest problem was how to encourage these organisations to participate in this research. Letters of support from SHU, the University of Cairo and Egyptian embassy facilitated the process. However, secrecy and concerns about confidentiality were still problems. Interviews were begun with clear explanations of the type of information required, focusing on the anticipated uses being for research purposes only. Interviewees were worried about giving the information, especially when they knew that this research was being published in a western country, England, rather than Egypt. Most of the participants refused to allow the interviews to be recorded. Again, this collection of data was hard to achieve, but it gave me practical experience in dealing with people and encouraging them to participate in research.

There were also problems with interviewees' understanding of some the expressions and terms used. This was particularly a problem with managers who have a low level education. Indeed, the same problem was faced when conducting my MPhil in Egypt. I tried to solve these problems by explaining these expressions, mainly through examples. Some interviewees also responded in unfamiliar terminology, some of which was industry-specific. This problem could have been avoided by familiarising myself with such terms, before embarking on the fieldwork or during the interviews.

Generally, the completion of this research added to my experience knowledge and experiences to enable me to do further and better research in the future.

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Appendix 1: The Interview Guide and Questionnaire:

The Interview Guide

Introduction:

This is an investigation for the Ph.D. research which I am currently preparing at Sheffield Hallam University. The research is about effects of unpredictability of the market and competition (as perceptions on cost management system, policies and practices). The study try to discover and explore differences that exist between the companies' policies and practices (about 24 Egyptian companies). Therefore, I am interested to understand something of your company history. Moreover, the study will consider effects other variables (e.g. Size of Company, Production Techniques, Production System Demands, Complexity (Scope; diversity variability between units, and Variety; product range), and Role of Consultants). I would like to be appraised of the influence of such factors in the development of cost policies and practices.

The data will be collected through:

1- Reading and analysing relevant documents: annual reports, financial plans and budgets, progress reports, description of and instruction for cost accounting systems, industry data, government rules, 5 years financial statements and any other suitable available documents.

2- Personal interviews will be conducted during an on site-visit with relevant persons at various levels of management (financial directors / controllers, accounting staff, general marketing managers and general production managers). In the beginning of the interview, I will discuss the concluded points from analysing relevant documents. Then, an interview's guide will be used as a basic guideline during the interview to make sure that all relevant topics were covered and to help the researcher conduct the interviews in a systematic and comprehensive fashion. Interviewing will be supported by tape-recording will capture much more than my memory. I will use tape-recording as possible as you accept. Tape-recording interviews allow that are said to be recorded and permit the interviewer to be more attentive to the interviewee. It may also increase rapport between interviewer and interviewee.

3- Questionnaire: In the end of the interview, I will ask you to fill a questionnaire.

I should emphasise here that the data will be used for academic purposes only and will not be released- under any circumstances- for any other use. Confidentiality will be secured.

I appreciate that there are many demands on your time, but the more complete response I get, the better I will be able to draw a picture of these schemes.

If you have any queries, please do not hesitate to tell me. I do thank you in advance for your concern.

Section 1: General Background

About The Interviewee:

(1) Name of interviewee:----------
(2) Job Title:----------
(3) Job Description: ----------
(4) Length of time with company:----------
(5) Length of time with company at the present job:----------
(6) Education Level: ----------

About the company:

Could you please provide a profile of the company's foundation date, capital, ownership, geographical location/s, organisational structural structure, activities and products?

Section 2: Some of Moderating Variables

(a) Complexity:

(1) What are the main differences between the production units?

(2) In your opinion, how do you describe the strategy of your company toward each of the group of product?
I aim to know from this question categories of your main product orientation in relation to three types of strategy:

1-Building Strategy, i.e.; to increase certain business activities by adding product lines or acquisition of entire business

2- Holding Strategy, i.e.; to maintain certain business activities by keeping existing capacity and market share

3- Divesting strategy, i.e.; to eliminate certain business activities by deleting a product line or selling an entire business

(b) Technology:

(1) How can you describe the production process?
(Production Process: e.g. Hand Work, Medium Tools, Computer Integrated Manufacturing, Automated Process, Lean Production).

(2) Is there a need to change your production system to another more complex or simple system?

(3) Is there a need to change the production system to Lean Production system as an example of Advanced Manufacturing Technology?

(4) who can decide to implement an Advanced Manufacturing Technology system?
(e.g. Management, Production Engineers.)

(5) Could you please tell me about transformation processing (Divergent or Convergent) for every main product?

Section 3: Dependent Variables

(1) Could you please tell me about the methods are used in your company for measuring product cost?
(Product Cost Measurement Practice: Full Absorption Costing Model, Activity Based Costing Model, Direct Costing Model, Variable Costing Model, Marginal costing model, Target Costing, Throughput Costing.)

(2) Were there any significant changes in the cost measurement practice system used in your company over the last five years? For example; a shift from FAC to ABC.

If yes:
Please tell me about the details;
When did it happen? What was each change? Who was its champion? What is your opinion about each change? And what are others' opinions about?

If no:
Are there any plans to change the cost measurement practice? Please, describe them.

(3) In your view, how do you find your present method of estimation and measuring the product cost?

(e.g. Straightforward and simple, Seems a reasonable compromise, Needs radical change, Needs simplifying).

(4) If you consider that changes are needed with the methodology of costing utilised in your company for product costing, please tell me what they are?

(5) Is there any role for consultants who designed your cost management system in:

- maintaining it by reviewing over a specific period of time?
- the day to day managing it? .
- proposing changes on it which may be:
  - simple changes? .
  - radical changes? .
  - complete change of it?.

(6) For each change happened over the last five years, who was proposing?

(7) I am interested to know the amount of Capital Investment Expenditure that was spent by your company over the last 5 years. Could you please tell me how can I access to the figure (amount) of Capital Investment Expenditure (if it is available, otherwise the percentage) that has been spent during the last 5 years? In addition, I want to know their effects on cost reduction, increasing profits and cost management system.

(8) I have to open a discussion related to the strategic postures (according to Miles and Snow's typology (1987) adopted in his/her organisation.

(9) I am interested in cost management policies in your company. The literature classifies these policies into three categories:

1- The Strategic Cost Management Policy is a systemic view that refers to the way in which the company "cost structured" is positioned in terms of markets and competition. This is partly explored in terms of cost structured and partly in terms of estimates of long run marginal cost and whether long run marginal cost can be affected by the logistic system, organisational, technological and market arrangements; e.g. understanding of marginal costs imposed by particular strategic moves.

Does your company have strategic cost management policies?

If yes:

Could you please describe these policies?
How did your company develop these policies?

2- The Economic Optimisation Cost Management Policy refers to the way of optimising the activity or product mix to ensure an optimal short term performance of the company. This would be based upon attention to marginal revenues and marginal costs over the relevant time period.

Does your company have an economic optimisation cost management policies?

If yes:

Could you please describe these policies?
How did your company develop these policies?

3- The Accounting and Control Cost Management Policy is the loop of accounting control, process of budgeting and reporting. The cost here would probably be either full absorption costing based on the traditional methods or based on activity-based costing.

Does your company have an accounting and control cost management policies?

If yes:

Could you please describe these policies?
How did your company develop these policies?

(10) Cost management systems provide a series of data relating to cost information. Could you please tell me about the different uses of cost information? Please indicate the role cost information plays in your company.
(e.g. for Efficiency, Targets, Performance Management, Planning, Control, Optimisation, Strategy Management.)

Section 4: Independent Variables

I am interested in your company's relationship with various sectors of the external environment. Specially I would like to elicit the degree of "Competition Intensity" and "Unpredictability" that you see facing your company that are related to three areas of external environment: Product market, factor market and legislation..

I can define competition intensity and unpredictability as follow:
1- ***Competition Intensity:*** The general level of market conditions that makes profitability difficult (e.g., intensive competition).
2- ***Unpredictability:*** The overall degree of variability from period to period that makes forecasting and planning difficult.

(1) Could you please tell me about the degree of :

(A) Competition Intensity facing your company that are related to three areas of external environment: Product market, factor market (Raw material and supply, Labour, management, capital and financing, and technology) and legislation.

(B) Unpredictability facing your company that are related to three areas of external environment: Product market, factor market (Raw material and supply, Labour, management, capital and financing, and technology) and legislation.

In the end of interviewee's answer, I will ask him to fill in Question 1 in Section 2 in the Semi Structured Questionnaire.

(2) How would you rank the significance of these three sectors of external environment relative to your company in order to express their importance? then please identify percentage weights to each sector.

In the end of interviewee's answer, I will ask him to fill in Question 2 in Section 2 in the Semi Structured Questionnaire.

(3) Could you please give the market factor sub-sectors, how would you rank the 5 sub-sectors within the factor market in order to express their priority and significance? then please identify percentage weights to each sub- sector.

In the end of interviewee's answer, I will ask him to fill in the Semi Structured Questionnaire.

In the end of this interview, I should say thank you very much for your help and your time. Can I ask you to permit for me to come back if I need to more information?

Structured Questionnaire

Section 1: General Background

(1) Which of the following kinds of ownership can you describe your company?

- Public ☐
- Private ☐

(2) Which of the following Business Activities can you describe its in your company?

- Manufacturing ☐
- Assembler ☐
- Marketing ☐
- Construction. ☐
- Others, please specify.-------

(3)Which nature of business have you used in your company?

Nature of Business:

- - Unique (Single Product) Yes ☐ No ☐
- - Batch Yes ☐ No ☐
- - Process (Continues Production) Yes ☐ No ☐
- - Lean Production Yes ☐ No ☐
- Others, please specify----------.

(4) Who are your customers? Please, describe the company sales to each customer:

	Company Sales					
Category Of Customer	80 - 100%	80 - 60%	40 - 60%	20 - 40%	10 - 20%	Less than 10%
Domestic Companies.						
International Companies						
Public Companies.						
Private Companies						
Import Companies						
Others, please specify: - -						

Section 2: Dependent Variables

(1) Cost management systems provide a series of data relating to cost information. The following table describe different uses of cost information. Please indicate the role cost information plays in your company. Please, tick the most appropriate answer in this table:

Cost Information Role	Degree Of Cost Information Use At Your Company					
	Extremely Important	Very Important	Important	Not So Important	Not Important	I Do Not Know
Using Cost Information For Efficiency:						
- Importance as scorekeeping of historical data.						
- Measuring efficiency of production performance						
- To provide a means of communication						
- To enhance cost reduction programmes.						
- Measuring of efficiency and capacity utilisation						
- Motivating efficiency improvements						
- To enhance labour productivity.						
- To enhance equipment productivity.						
Using Cost Information For Targets						
- To achieve target profit .						
- To achieve target of production						
- To maintain certain profit margins						
Using Cost Information For Performance Management:						
- Role of standard cost in assessing performance						
- Performance evaluation of management						
Using Cost Information For Planning						
- Planning of budgeting .						
- Planned and actual product cost.						

Cost Information Role	Degree Of Cost Information Use At Your Company					
	Extremely Important	Very Important	Important	Not So Important	Not Important	I Do Not Know
Using Cost Information For Control						
- Management and control of period costs						
- Identification of necessary corrective measures						
- Importance of flexible budget for manufacturing cost control						
- Variance analysis and exception reporting.						
- To stimulate control of conversion cost						
- To comply with procedures of reporting						
Using Cost Information For Optimisation:						
- Importance of product cost as an input to pricing decision						
- Product mix decisions						
- Transfer prices for internal services						
- Make or buy decisions.						
- Determination of economic lot size						
- To emphasis throughput rate						
Using Cost Information For Strategy Management:						
- Development of better manufacturing methods						
- To manage long run cost structure.						
- Evaluation of investment projects.						
- Decisions of company strategy.						
- Planned and actual customer profitability.						
- Improvement of product characteristics.						
-Importance of competitor cost analysis.						
- To forecast the future.						
- Importance of technology configuration						
- Importance of product configuration						

Cost Information Role	Degree Of Cost Information Use At Your Company					
	Extremely Important	Very Important	Important	Not So Important	Not Important	I Do Not Know
- Product quality analysis.						
- Market share analysis.						
- Market growth analysis						
- New product development.						
- Market development.						
- Market and competition details						

Section 3: Independent Variables

(1)Please tick the appropriate answers in the following table to indicate the degree of *Competition Intensity* and *Unpredictability* facing your company over the last five years. In the case if you do not know, please tick the appropriate column.

Market Conditions	*Competition Intensity*								*Unpredictability*					
	Low	1	2	3	4	5	High	I do not know	Very Predictability	Predictability	Little	Unpredictability	Very unpredictability	I do not know
Product Market:														
1- Market Changes(Sales)	Expanding Market						Declining							
Competition tensity	Low						High							
3- Customers variety	large Variety						One Customer.							
4- Profit margins	High						Narrow							
5- product innovation	Well Established						Always new products							
6- Nature of competition	Well Established Competitors						always New Competitor							
7- Prices of products	Stable						Fluctuate Prices							
Factor Market														
a- Raw Material And Supply														
1- Supply	Oversupply						Shortage of Supply							
2- Sources of raw material	Plenty of sources						One major source							
3- Competition between suppliers	No competition						Intensive competition							
4-Cost of raw material	Low						high							
5- Delivery time	Short						Long							
6- Nature of suppliers	Always new suppliers						well established							
7- Prices of raw material	Stable prices						Fluctuate prices							

Market Conditions	*Competition Intensity*								*Unpredictability*					
	Low	1	2	3	4	5	High	I do not know	Very Predictability	Predictability	Little	Unpredictability	Very unpredictability	I do not know
b- Labour														
1- availability of skilled labour	Stable						shortage							
2- Competing employers	few						many							
3- wage rates	low						high							
4- target union	not militant						militant							
5- labour turnover	low						high							
6- Labour dependency	high						low							
7- Industrial relation	good						poor							
c- Management														
1- Availability of qualified managers	Stable						shortage							
2- Salary of management	low						high							
3- competition for good managers	low						high							
4- staff turnover	low						high							
d- Capital and Financing														
1 availability of finance	easy to option finance						hard to obtain finance							
2- sources of finance	many sources						one major source							
3- cost of finance	low						high							
4- staff turnover	always new sources						well established							
e- Technology														
1- availability of equipment	stable						shortage							
2-equipment suppliers	many						one major suppliers							

Market Conditions	*Competition Intensity*								*Unpredictability*					
	Low	1	2	3	4	5	High	I do not know	Very Predictability	Predictability	Little	Unpredictability	Very unpredictability	I do not know
3- competition for equipment	no competition						keen competition							
4- delivery of equipment	short						long							
5- equipment failure	usual failure						frequent failure							
6- nature of manufacturing technology	simple						complex							
7- nature of system technology	simple						complex							
8- technological development	negligible changes						common changes							
9- equipment obsolescence	long life						short life							
10- capital labour substitution	slow						fast							
Legislation														
1- regulators in the industry	one major regulator						many regulators							
2- number of legislation	small						large							
3- nature of legislation	well established						frequent changes							
4- effect of legislation	negligible						heavy							
Overall Assessment														

(2) How would you rank the significance of these three sectors of external environment relative to your company in order to express their importance? then please attach percentage weights to each sector.

Environmental sectors	Rank			Percentage Weighting (%)
	1	2	3	
1- Product Market				
2- Factor Market				
3- Legislation				
Total	1, 2, or 3			**100%**

(3) Given the market factor sub-sectors, how would you rank the 5 sub-sectors within the factor market in order to express their priority and significance? then please attach percentage weights to each sub- sector.

Factor Market	Rank					Percentage Weighting (%)
	1	2	3	4	5	
1- Raw material and supply						
2- Labour						
3- Management						
4- Capital and Financing						
5- Technology						
Total	1,2,3,4 or 5					100%

(4) What types of cost information generated by the formal reporting system in your company helps in making decisions? Please, tick the most appropriate answer in this table:

Degree Of Importance	Extremely Important	Very Important	Important	Not So Important	Not Important
Quantitative Data					
Qualitative Data					

(5) How often is the formal reporting system for decision making in your company?

- - Daily ☐
- - Weekly ☐
- - Monthly ☐
- - Yearly ☐
- Others, please specify.----------

Appendix 2: The Egypt Map

Appendix 3: Some Companies' Profiles:

The Name of Company: Savola Egypt Company.

Location of Head Office: Holioupolis, Cairo.

Telephone: 002022994083

002022994082

The Factory: In 6th of October Industrial City near Cairo (the capital of Egypt).

Type of Ownership: Private, Shareholders in Egyptian Securities Exchange.

Foundation Year: May 1992, starting production May 1994.

Capital: LE 20 millions in the beginning of foundation year and it is raised to LE 50 500 000 in the end of 1995. Most of its shares are owned by Savola Company-Saudi Arabia.

Activity: Refining crude and sime refined edible oil for the purpose of processing and packing different oil products.

Collected Data:

About the background: For this point, I collected data mainly from a report, which an auditor company prepared to ----------

Interviews Guide and Questionnaires: I met the financial director for about one hour and half in his office in the main office. Furthermore I met the managing director for about one hour in his office. In the same day, I made an appointment with the general marketing manager and I met him in the next day for about one-hour in on his office in the head office. I tried hard many times to meet the senior cost accounting. In the end, I succeeded to get an appointment with him and I met him for about one hour. After each meeting I asked the interviewees to fill in the questionnaire and they did. Furthermore some of them discussed and gave his comments about it. Therefore, I managed four interviews and got four filling questionnaires.

The Name of Company: Egyptian Constructions Company

Location Of Headquarters: Agouza, Giza.

Telephone: 002023471509 ten lines

Location Of Head offices at working Zones In Egypt: In Cairo (the capital of Egypt), Alexandria, Tanta Demietta, Ismaillia, Suez, Ras Ghareb, Hawamdia, Menia, Sohag, Kena, and Asswan.

Location of Head offices at working Zones Abroad: Kingdom of Saudia Arabia, Algeria, State of Kuwait, and State of United Arab Emirates.

Type of Ownership: Public and it is in a way to be Private in 1998 .

Foundation Year: 1936.

Capital: LE 30 millions in 1997.

Activity: waste water disposal, potable water, factories, public buildings, roads, bridges, land reclamation, electric power, tourist villages, and housing in Egypt, as well as in each of Kingdom of Saudi Arabia, Republic of Algeria, Libyan Arab Jamahiriya and state of Kuwait.

Collected Data:

About the background: For this point, I collected data mainly from the annual reports for five years and the general booklet about the company.

Interviews Guide and Questionnaires: I met the managing director for about one hour and half in his office. In the same day, I met the financial director for about another one hour and half in his office in the main office. In the same day, I made an appointment with the Production Engineer and I met him two days after for about one hour and half in on his office in the head office. After each meeting I asked the interviewees to fill in the questionnaire and they did. Furthermore some of them discussed and gave his comments about it. Therefore, I managed three interviews and got three filling questionnaires.

The Name of Company: Suzuki Egypt Company.

Location of Head Office: In 6th of October Industrial City near Cairo (the capital of Egypt).

Telephone: 002011330350
002011330351
002011330499

The Factory: In 6th of October Industrial City near Cairo (the capital of Egypt).

Type of Ownership: Private, Shareholders but closed one.

Foundation Year: 1989.

Capital: I do not know. All the shares are owned by some Arabian, Egyptian, and Japanese people.

Activity: Manufacturing and assembling of all kinds of Suzuki cars.

Collected Data:

The interviews refused to give me any documents. The company data is very secretly. The interviewees refused completely to give me any figures about the capital, the number of workers, the profit, etc. Actually, I spent a lot of time and efforts to get those appointments.

Interviews Guide and Questionnaires: I met the senior cost accountant in a meeting room in the factory for about tow hours, and the financial director for about one hour in his office in the main office. After each meeting I asked the interviewees to fill in the questionnaire and they did. Furthermore some of them discussed and gave his comments about it. Therefore, I managed two interviews and got two filling questionnaires.

Notes from the Interview with the Senior Cost Accountant:

Implications: before I met him in a meeting room in the factory, his secretary asked us about our drinks. Actually this was happened in each company which I visited (Egyptian people are very kind) but the strange thing is his inquiry about it before an interviewee's coming. However, I knew the reason when this interviewee came, he always kept his time and my time. Therefore, his secretary asked us about our drinks before his coming! Furthermore, he was very precious and his words very definite meaning. He can understand all the expressions, which I used in the questionnaire. Actually I enjoyed his

interview. Here are the notes, which I got because he refused to use a tape recorder as following:

- Our production strategy is to increase our product number. It was two products on 1993. Now there are three products.
- The company is not a branch of Suzuki Japan Company. It has the know-how of Suzuki Japan cars. The company has just got a technical assistance to be assuring high quality products.
- The company assembles local and exported car parts. Therefore, it has tax-free for 10 years (the Egyptian Company).
- The production process is hand works, medium tools and automated process. The products are under supervision from Japanese company from time to time because of being Suzuki mark.
- The measuring product cost method is full absorption costing method. There is a distingishing between direct costs (car parts costs + manufacturing wages + power costs + ---------) and indirect costs (warehouse costs + marketing costs +---------). There are standard costs for each item and they do variance analysis. There is a responsibility costing. Each worker has to suggest two ideas to reduce costs and if he does, he will be rewarded to encourage him.
- There are three factors to make pricing decisions:

  1- Product costs.

  2- Competitors' prices.

  3- Market studies.

- The production budget base is built on sales forecasts. This budget is completely flexible. Therefore it could be changed during a year depending on:

  1- New economic regulations.

  2- Update marketing studies.

  3- Current information about the sales from company's agencies.

The difference between the budgeted and actual production is usually about 15-20%.

Tractors and Engineering Organisation

Tractors and Engineering organisation is a subsidiary retailer belonging to the public sector and its transformation characteristics were multiple. It was founded in 1927. It is 100% owned by the state and operates through branches all over the country but it is run by a corporate office in Cairo. The capital in 1996 was £80m and the number of employees was 2,440.

The organisation was established originally to provide tractors and other farming machines to local customers. Its activities were expanded over the decades from importing farming machine to importing and exporting variety of mechanical and electric machine (e.g. construction machine, house appliances,...etc). In parallel to that, the organisation works in the repair and maintenance services and engineering construction. Among the increasing operations, the firm are distributing the products of local factories. The organisation also supplies plants' machinery, air-conditioning and cooling appliances, irrigation and drainage stations and public utilities. Furthermore, the organisation operates nation- wide and exports the industrial products of local manufacturers to some Arab countries as well. At some time in the past, it not only dominated the national market but was monopolising the market of supplying some for these products. Recently, the organisation adopted a policy of diversifying activities and started to operate in reclaiming the desert.

Current Financial Difficulties:

In the financial reports of the organisation for the financial years 1995/1996, 1996/1997, and 1997/1998, the organisation reported achieving losses and accompanied this by some potential reasons for this negative financial performance, these factors are summarised below:

1- Difficulties emerge from several current governmental policies:

- The change in the economic policies in recent years from adopting a centrally planned economy to a free market economy led to a contract in imports for other governmental sectors during 1996 and 1997.
- After liberating external trade, some international suppliers have cancelled their contracts with the public agents and moved to private organisations to be their agents.

- Deflation, stagnation and the current shrinking policies, which dominate the local market negatively, impacted on the activities of the firm.
- Another aspect of deflation is the failure to launch new projects/ factories by the state and leaving that mission to the private sector. This has decreased the organisation's share in the foreign trade's market.
- The flexibility which the private sector's work environment enjoys comparing to the restricting commitments of the public sector especially in compiling to the rules and regulations.

2- The report also included the following issues as problems relate to the organisation itself:

- Dependence on external sources of finance and huge interests have raised the costs in spite of the decrease in profitability rates because of deflation.
- Over-employment in the organisation due to the merging and take-over processes that have happened in the recent decades.
- Despite these difficulties, the organisation has managed to increase export operations on behalf of other public units, especially to Saudi Arabia.

The CMIS & the Perceived Environment Conditions:

The organisation is public utility. Therefore, full absorption costing was used by law. It was intended to use CMIS for all the purposes; efficiency, optimisation and strategy. However, practically, the interviewees reported that they used CMIS for efficiency purposes only. They had just followed the instructions and regulations. However, they faced a high intensity competition and unpredictability. They could not do anything because of being a public organisation. The three interviewees highlighted some implications of the organisation being owned by the state. For example, the state interfered in: setting targets, and monitoring reports to various supervisory bodies and using the unified accounting system. The Managing Director argued that:

"My organisation (due to some importing transactions with Eastern European countries) has suffered losses and we are not responsible for the reasons or strategies neither medium nor long term which led to these losses. The losses have been occurring for 4 years. If the impact of these decisions which are imposed on us had been removed, we would be doing well.

Introduction for Al-Maamar and Al-Eaman Companies:

The main owner in each of Al-Maamar and Al-Eaman Companies was a computer engineer in the Egyptian army forces. After their retiring, they preferred to start business to be benefit from their specialist as engineers and their personal relationships with people who are working in Egyptian army forces. Therefore, each one established an individual company. The main objective of each company is using its owner time and his relationships, and his specialist in a useful work to get profits.

The Company's profile:

The Name of Company: Al-Maamar for Constructions Company

Location of Head offices: In Cairo (the capital of Egypt)

Tel: 00202613767

Type of Ownership: Individual.

Foundation Year: 1992.

Capital as in Financial statements which introduce to Tax Authority: LE 600 000 in 1997.

Activity: Constructing and developing private and public housing in Egypt, and marketing mechanical machines and all equipment related to computers.

Collected Data:

Interviews Guide and Questionnaires: I met the General Manager (the main owner) for about one hour in his office. In the same day, I met the financial director for about another one-hour in his office. In the same day, I made appointments with the Production Engineer and the Accountant. I met them two days after for about one hour with each one in on his office. After each meeting I asked the interviewees to fill in the questionnaire and they did. Furthermore some of them discussed and gave his comments about it. Therefore, I managed four interviews and got four filling questionnaires.

The interviewees refused to use a tape recorder. Therefore, here are the notes, which I got from each interviewee as following:

I- Notes from the Interview with the General Manager (the main owner):

- The main company customer is Egyptian army force for both constructions and marketing activities.

- The main owner prefers to choose individual company as a type of ownership. He put one of his family as a general (guarantor) partner another two of them as limited (recommended) partners to reduce paid tax (the profit will divided into four instead of one person)

- The company offers any products which anybody asks them about (e.g. computers, technical machines, mechanical machines, computerised products...etc.)

- The main job of the accounting firm which they deal with is preparing financial statements to introduce them to tax authority (and pay less tax, therefore, their statements are not real and the owner do not interesting to know the real figures. They can easily know profits or losses from each transaction and they satisfy from that.)

II- Notes from the Interview with the financial director:

- The company borrows sometimes money from banks and pays debit interests, and then the customers pay credit interests because of delaying paying their accounts.

- There are no strategic cost management policies.

- There is no optimisation cost management policies.

- The company has accounting and control cost management policies. They use accounting control, and reporting quarterly and yearly.

III Notes from the Interview with the Production Engineer:

- The company faces intense competition from other constructions in Egypt.

IV Notes from the Accountant Interview:

- The measuring product costs method used is full absorption costing method. Actually they use Financial Accounting System as Costing Accounting Systems.

- For constructions activities: profit or loss = Income from instalments (income from sub-contracts during carrying up the work) - all the direct costs - part of all the indirect costs depending on value transaction (tax + administrative expenses + depreciation).

- The main jobs of accountants in the (two accountants only):
  - Recording all the money in and out.
  - Following up the company accounts in banks.
  - Writing customers bills and instalments (sub-contracts certificates).
  - Following up National Insurance.
  - Offering all information which Chartered accountant asks for.
  - Dealing with tax authority.
  - Preparing letters of guarantee.
  - Dealing with banks to open letters of credit.

- **General manager asks accountants information about:**
  - Company account balances in banks.
  - Letters of guarantee. (Their values, paying renew fees).
  - Following up contracts with customers.
  - Collecting cheques.

The Company's profile:

The Name of Company: Al-Eaman for Constructions Company

Location of Head offices: In Cairo (the capital of Egypt)

Tel: 002022426582

Type of Ownership: Individual.

Foundation Year: 1981.

Capital as in Financial statements which introduce to Tax Authority: LE 600 000 in 1997.

Activity: Constructing and developing private and public housing in Egypt, and marketing mechanical machines and all equipment related to computers.

Collected Data:

Interviews Guide and Questionnaires: I met the General Manager (the main owner) for about one hour in his office. In the same day, I met the Production Engineer for about another one-hour in his office. In the same day, I made appointments with the financial director and the Accountant. I met them three days after for about one hour with each one in on his office. After each meeting I asked the interviewees to fill in the questionnaire and they did. Furthermore some of them discussed and gave his comments about it. Therefore, I managed four interviews and got four filling questionnaires.

The interviewees refused to use a tape recorder. Therefore, here are the notes, which I got from each interviewee as following:

I- Notes from the Interview with the General Manager (the main owner):

- The main company customer is Egyptian army force for both constructions and marketing activities.

- The main owner prefers to choose individual company as a type of ownership. He put one of his family as a general (guarantor) partner another two of them as limited (recommended) partners to reduce paid tax (the profit will divided into four instead of one person)

- The company offers any products which anybody asks them about (e.g. computers, technical machines, mechanical machines, computerised products...etc.)

- The main job of the accounting firm which they deal with is preparing financial statements to introduce them to tax authority (and pay less tax, therefore, their statements are not real and the owner do not interesting to know the real figures. They can easily know profits or losses from each transaction and they satisfy from that.)

II Notes from the Interview with Production Engineer:

- The measuring product costs method used is full absorption costing method. Actually they use Financial Accounting System as Costing Accounting Systems.
- For constructions activities: profit or loss = Income from instalments (income from sub-contracts during carrying up the work) - all the direct costs - part of all the indirect costs depending on value transaction (tax + administrative expenses + depreciation).
- The company faces intense competition from other constructions in Egypt.
- If an Organisation (as a customer) needs to make a specific project, It will make an advertisement about asking companies in charge to carry up this project with specific prices or without. Then constructions companies make bidding prices. Then organisation will accept the lowest price with the suitable quality. Therefore, it is very important that Constructions Company introduce the lowest prices as they can to get this transaction.
- The company introduces sometimes-bidding prices without adding any profits if the company expects that they will get more transactions as a result of that in the future.

III- Notes from the Interview with the financial director:

- The company borrows sometimes money from banks and pays debit interests, and then the customers pay credit interests because of delaying paying their accounts.
- There are no strategic cost management policies.
- There are no optimisation cost management policies.
- The company has accounting and control cost management policies. They use accounting control, and reporting quarterly and yearly.

IV Notes from an Accountant Interview:

- The measuring product costs method used is full absorption costing method. Actually they use Financial Accounting System as Costing Accounting Systems.
- For constructions activities: profit or loss = Income from instalments (paying for sub-contracts during carrying up the work) - all the direct costs - part of all the indirect costs depending on value transaction (tax + administrative expenses + depreciation).

The Name of Company: Abdel Kader El Garhi for Constructions Company

Location of Head offices: In Cairo (the capital of Egypt)

Tel: 002023872942

Type of Ownership: Individual.

Foundation Year: 1993.

Capital as in Financial statements which introduce to Tax Authority: LE 250 000 in 1997.

Activity: Constructing and developing private and public housing in Egypt, and marketing iron bars which used in constructing buildings.

Collected Data:

Introduction:

The main owner is an engineer. His father owned this company for a long time. After his death, he left this company with its good reputation and good relationships with many customers to his son who learned a lot from his father.

Interviews Guide and Questionnaires: I met the General Manager (the main owner) for about one hour in his office. In the same day, I met the Accountant for about another one-hour in his office. In the same day, I made appointments with the Production Engineer and the financial director. I met them two days after for about one hour with each one in on their offices. After each meeting I asked the interviewees to fill in the questionnaire and they did. Furthermore some of them discussed and gave his comments about it. Therefore, I managed four interviews and got four filling questionnaires.

The interviewees refused to use a tape recorder. Therefore, here are the notes, which I got from each interviewee as following:

I- Notes from the Interview with the General Manager (the main owner):

- The main owner prefers to choose individual company as a type of ownership. He put one of his family as a general (guarantor) partnership another two of them as limited (recommended) partners to reduce paid tax (the profit will divide into four instead of one person).

- The General Manager is the main owner and he sometimes works as a production engineer.
- Pricing decisions (including bidding prices) are made by the main owner using his experiences in similar transactions taking care the other factors, e.g. costs, expected profits, prices raising up during carrying up the works...etc.
- The main problem which he faces is identifying bidding prices because if they are high, the company will loss transaction and if they are low, the company will loss profits.
- The company faces intense competition to get skilled labour. Therefore they pay costs to keep employees especially engineers. Moreover, they pay high wage rates because they face high labour turnover.
- There are two laws affect on the company. The first one is VAT law. On each transaction, they add VAT on the transaction value, and then they pay this amount to tax authority. Therefore, the company works as a mediator between customers and tax authority. However, Egyptian economic activities in all fields are affected from this law. Economic activities have become less due to high prices. Therefore this law affected negatively on the company profits. The second law is Egyptian Union Law. This law affected on the company positively. According to this law, all constructions companies are divided into groups depending on their activity volumes. Then it is permits constructions companies to get available transactions according their activities volume groups. Therefore, competition intensity becomes limited between little numbers of companies.
- There is no unpredictability for most factors in the questionnaire because of the main owner's personal experiences for a long time in constructions sector.

II Notes from an Accountant Interview:

- The measuring product costs method used is full absorption costing method.
- They use a computerised program for costing each transaction. It collects all direct costs, depreciation machines that use for this transaction according to cost-of-service principal and administrative expenses according to transaction value. They have used this computerised program since 1995. They are happy from its results.

- For constructions activities: profit or loss = Earnings - all the direct costs - part of all the indirect costs depending on value transaction (tax + administrative expenses)

III- Notes from the Interview with the financial director:

- The company borrows sometimes money from banks and pay debit interests, and then the customers pay credit interests because of delaying pay their accounts.

- The main job of its accounting firm is preparing financial statements to introduce them to tax authority (and pay less tax, therefore, their statements are not real and the owners can know the real figures and profits or losses from each transaction from the computerised program).

- The most important costing figures are costs of each transaction to be able to continuously control on it and to make correct actions. Therefore they review these figures every weeks or every two weeks.

- There are accounting and control cost management policies. They use accounting control, and reporting quarterly and yearly. However there have no idea about optimisation cost management policies or strategic cost management policies.

IV Notes from the Interview with the Production Engineer:

- The company faces intense competition from other constructions in Egypt.

- The main factor in this company is the long-term experience in constructions sector. The main owner has good relationships with persons in charge in companies. Therefore, he can get many transactions.

- There is no problem to get raw materials especially iron bars because the company is working as a supplier for them.

The Name of Company: Egyptian Constructions Company (Moukhtar Ibrahim Company)

Location Of Headquarters: Agouza, Giza.

Telephone: 002 023 471 509 ten lines

Location Of Head offices at working Zones In Egypt: In Cairo (the capital of Egypt), Alexandria, Tanta Demietta, Ismaillia, Suez, Ras Ghareb, Hawamdia, Menia, Sohag, Kena, and Asswan.

Location of Head offices at working Zones Abroad: Kingdom of Saudia Arabia, Algeria, State of Kuwait, and State of United Arab Emirates.

Type of Ownership: Public and it is in a way to be Private in 1998

Foundation Year: 1936.

Capital: LE 30 millions in 1997.

Activity: constructing waste water disposal, potable water, factories, public buildings, roads, bridges, land reclamation, electric power, tourist villages, and housing in Egypt, as well as in each of Kingdom of Saudi Arabia, Republic of Algeria, Libyan Arab Jamahiriya and state of Kuwait.

Collected Data:

About the background: For this point, I collected data mainly from the annual reports for five years and the general booklet about the company.

Interviews Guide and Questionnaires: I met the managing director for about one hour and half in his office. In the same day, I met the financial director for about another one hour and half in his office in the main office. In the same day, I made an appointment with the Production Engineer and I met him two days after for about one hour and half in on his office in the head office. After each meeting I asked the interviewees to fill in the questionnaire and they did. Furthermore some of them discussed and gave his comments about it. Therefore, I managed three interviews and got three filling questionnaires.

Background about the Company:

Engineer Moukhtar Bey Ibrahim who is one of the pioneers in the sector of engineering and constructing in Egypt founded Egyptian Constructions Company (Moukhtar Ibrahim Company) in 1936. He laid the foundations of the company before nationalisation, supported its expansion and development after nationalisation and gained the confidence of all clients, corporations and banks with whom he dealt. Engineer Moukhtar Ibrahim was a true leader in the contracting sector, starting from absolutely precise preparing tenders daily following-up work sites and strict adherence to performance schedules. And amongst the works he executed were the very famous buildings in Cairo as follows:

- Cairo University Dome.
- The Supreme Court of Justice.
- Cairo Governorate (formerly the Royal Guard Building in Abdin).
- The Old Ramsis Telephone Exchange Building.

Since then, the company has managed to gain clients' confidence and a reputation for meeting its deadlines, trust worthiness and seriousness of work. Hence not only has the company flourished year after year, but it has also established itself as a leader in the industry because of several gigantic projects during years of continuous work.

The company was converted into an Egyptian joint stock company by the royal decree issued on 18-2-1952. Later on, the company was partially nationalised in 1961; subsequently it has been fully nationalised in 1964.

According to regulations of law no. 139 for 1964 the company was directly supervised by the Minster of development and state for housing and land reclamation. Afterwards, it became one of the companies under the Authority of Public Sector for Development.

In consequence of the law of public works sector no.203 for 1991, the company became a subsidiary company to the National Company for Constructions and Development (Egyptian holding Joint Stock Company).

The interviewees refused to use a tape recorder. Therefore, here are the notes, which I got from each interviewee as following:

I- Notes from the Interview with the Managing Director:

- The company aims at participating in the development of the National Economy within the framework of the State's general policy. Especially in the fields of constructions and all activities relate to such as; trade, industry, export and import.

- **Company's Activities:**

Company's Activities in Egypt:

The company has executed major projects in Egypt in each sector as follows:

Waste Water Disposal (w): It includes wastewater treatment plants, pump station, pipelines, and pipe networks. It was 35% to gross work volumes in 1995. The finished projects and projects under execution totalled L.E.1560 million between the period 1965 - 1995. This huge number of total projects indicates the extent of growth of this sector and hence boosting the company ahead of all Egyptian companies in this field.

Potable Water (p): It includes potable water pipe networks, pipelines, tanks, and purification plants and pumps stations. It was 30% to gross work volumes in 1995. The company was ambitious since its formation, as the company commenced its works with such major projects as execution of Lower Egypt potable water network. Thereafter the company has gained long years of experience which qualified it to be an outstanding company in its field. The finished projects and projects under execution totalled L.E.745 million between the period 1965 and 1995. Moreover the company has successfully built several potable water purification plants and pump stations on different sites all

over Egypt. The capacity of some of these plants reach 12 000 litres/second. The finished projects and projects under execution totalled L.E.600 million between the period 1965 and 1995.

Industry and Public Buildings (i): It includes factories, petroleum refineries and tanks. The finished projects and projects under execution totalled L.E.225 million between the period 1965 and 1995. Moreover it includes public buildings. The finished projects and projects under execution totalled L.E.385 million between the period 1965 and 1995. It was 14% to gross work volumes in 1995.

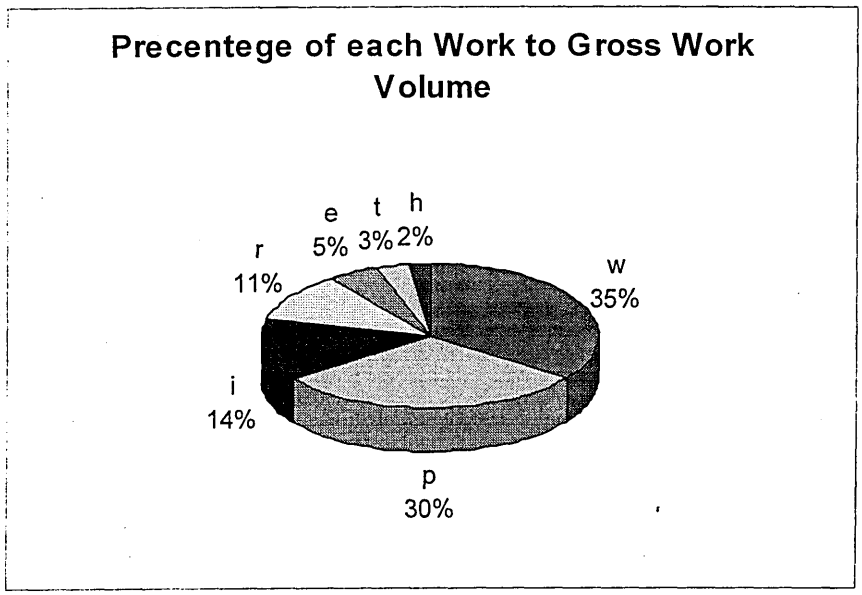
Roads, Bridges, and Land Reclamation (r): The finished projects and projects under execution totalled L.E.495 million between the period 1965 and 1995. It was 11% to gross work volumes in 1995.

Electric Power (e): It includes power plants, transformer stations, underground cables and overhead transmission lines. The finished projects and projects under execution totalled L.E.215 million between the period 1965 and 1995. It was 5% to gross work volumes in 1995.

Tourist Villages and Their Utilities (t): The finished projects and projects under execution totalled L.E.115 million between the period 1965 and 1995. It was 3% to gross work volumes in 1995.

Housing (h): The finished projects and projects under execution totalled L.E.90 million between the period 1965 and 1995. It was 2% to gross work volumes in 1995. Figure (1) indicates percentage of each work.

Figure 1 The Percentage of each work



Company's Activities Abroad:

The company is always endeavouring to enlarge its activities in the neighbouring Arab Countries. The gross value of both the finished projects and the others still in progress is estimated at what is equivalent to about L.E.2500 million. It has accomplished diverse projects in several countries as follows:

Kingdom of Saudi Arabia: major projects have been executed including dams, potable water networks, reservoirs and purification plants as well as sewage pipe networks, residential structures and public buildings.

Republic of Algeria: The Company has shared in executing the iron and steel compound in Ennaba Region as well as electric power works in Wahran Region.

Libyan Arab Jamahiriya: Residential buildings and infrastructure works have been executed in Chop City.

State of Kuwait: Soon after the end of the Kuwait liberation war, the company was one on leading companies, which participated in various projects for rehabilitation and competition of schools, public structures, administrative buildings and residential houses in addition to constructions of new projects.

United Arab Emirates: The Company was lately granted the tender for the gigantic project of Al Taweala-Al Ain pair of potable water pipelines, 126 km in length and 1200 mm in diameter for each line-ductile iron.

II- Notes from the Interview with the financial director:

- The most important two factors in this company are manpower and equipment. Therefore the company has paid a big attention to those factors. It strengthens the spirit of affiliation of its employees through surrounding them with all possible means of care, in order to get the extreme extent of productivity. The company is supporting various activities; amongst their most important fields are medical and social care, insurance and reservation fund, summer resorts, training and self education, syndicate committee, sports committee, and other miscellaneous activities. The company is considered one of the leading economic units, which use technological advanced mechanisation for executing projects. Furthermore, using computer in work has facilitated accessing information related to various fields. In scope of developing the man-power and improving performance, the company provides specialised training courses for employees to match the most sophisticated international systems in the field of technology, in addition to paying more attention to study the science of computer as well as foreign languages to realise the goals of exporting the constructions industry abroad.

- **Company's Equipment:**

The equipment of any constructions company is considered the real and effective capital of that company, as the capability of the company to accomplish its works satisfactorily on time is directly influenced by quality, number, capacity and efficiency of equipment. Therefore, one of the main reasons, which influenced the clients to place much reliance on the company, is the existence of a fleet of sophisticated and varied equipment.

- There is a main warehouse and vehicles workshop in the way between Cairo and Alexandria (please see the map of Egypt) Furthermore, there are scrap warehouses and equipment & tubular scaffolding workshops in a new city (6 of October City). In

addition to the headquarters, which located in Giza, there are many head offices at working zones in most of Egyptian cities.

- There are many head offices at working zones abroad in Kingdom of Saudia Arabia, Algeria, State of Kuwait, and State of United Arab Emirates.
- In view of realising the governmental programme of enlarging the private possession as well as reorganisation, the company has declared the rules for establishing the employees for holding the exhibited shares. The company has sold 20% of capital figure as shares to employees. The company is on a way to be private company.
- The measuring product costs method used is full absorption costing method. It is very similar to financial accounting systems.
- The Company is the second biggest Constructions Company in Egypt. The first one is Arab Constructors Company. However, the company profits are more than Arab Constructors company profits.
- The work volume is increased after starting executed work because of their good quality work.
- The Company imported raw materials. Therefore, if there is no national problem, there will be no problem at all because they choose their suppliers.

In 1997, there are many kinds of financing re-sourcing;

1. The investment capital 430 684 million L.E
2. Provisions 355 960 million L.E
3. Long - term loans 151 398 million L.E
4. Banks overdraft 153 576 million L.E (including the debit interests 44 258 million)

There is a debit interests 44 258million L.E. However the customers paid credit interests 43 038 million L.E. Therefore, the net debit interests paid by the company is 1 220 million L. E. only. It means that the company borrows money from banks and pay debit interests, and then the customers pay credit interests because of delaying pay their accounts. Therefore, capital and financing factor (in the questionnaire) is the second most important factor in the factor market factors. The first one is management.

- The company faces intense competition from other constructions in Egypt and abroad.
- There are no strategic cost management policies.
- There is no optimisation cost management policies.
- The company has accounting and control cost management policies. They use accounting control, process of budgeting and reporting quarterly and yearly.

Notes from Production Engineer Interview:

- The Follow up Department: The mangers in this department follow up regularly each project (in Egypt and abroad) separately from starting to finish according to timing, costing, and quality programmes monthly. Then they offer a report to the general production managers. Then they pass this report to the production engineers in charge and ask them about any variances to make any correct actions.

- A monthly meeting for general mangers, production mangers in charge for each project, follow up managers, and all managers in charge in all departments in the company is held to discuss all positive and negative variances in each project. Then they discus ways to solve these problems and to be benefit from positive variances in future.

- The follow up department does an annual report for all the projects during every year.

The Company's profile:

The Name of Company: Naser City Contractors Company

Location of Headquarters: Cairo

Telephone: 002 026 9562

002 026 9560

002 026 9565

Location Of Head offices: In Cairo (the capital of Egypt)

Type of Ownership: Public up to May 1996, and then it became private. The shareholders are the employees

Foundation Year: 1996

Capital: 20 LE millions in 1996, it is increased to 40 LE millions in 1997.

Activity: Administrative Projects, Sports, Tourism, Hospitals and Medical care, Educational, Mosques, Monument Renovation, Water and Sewage, Transportation, Bridges and Tunnels, Roads, Highways, Flyovers and underpasses, Airports and harbours, Industrial, Quarries and Ready Mix Concrete, Housing, Power stations and Transmission Lines, Ancillary Services, and Agriculture, Irrigation and Land Reclamation Projects in Egypt, as well as in 29 countries including Africa, Asia and Europe.

Collected Data:

About the background: For this point, I collected data mainly from the annual reports for five years and their web site (http://www.arabcont.com/).

Interviews Guide and Questionnaires: I met the financial director for about one hour in his office in the main office. In the same day, I made an appointment with the Production Engineer and I met him two days after for about one hour and half in on his office in the head office. In the same day I met the Accountant senior for about one hour and half. After each meeting I asked the interviewees to fill in the questionnaire and they did. Furthermore some of them discussed and gave his comments about it. Therefore, I managed three interviews and got three filling questionnaires.

Background About the Company:

Engineer Moukhtar Bey Ibrahim who is one of the pioneers in the sector of engineering and constructing in Egypt founded Egyptian Constructions Company (Moukhtar Ibrahim Company) in 1936. He laid the foundations of the company before nationalisation, supported its expansion and development after nationalisation and gained the confidence of all clients, corporations and banks with whom he dealt. Engineer Moukhtar Ibrahim was a true leader in the contracting sector, starting from absolutely precise preparing tenders daily following-up work sites and strict adherence to performance schedules. And amongst the works he executed were the very famous buildings in Cairo as follows:

- Cairo University Dome.
- The Supreme Court of Justice.
- Cairo Governorate (formerly the Royal Guard Building in Abdin).
- The Old Ramsis Telephone Exchange Building.

Since then, the company has managed to gain clients' confidence and a reputation for meeting its deadlines, trust worthiness and seriousness of work. Hence not only has the company flourished year after year, but it has also established itself as a leader in the industry because of several gigantic projects during years of continuous work.

The company was converted into an Egyptian joint stock company by the royal decree issued on 18-2-1952. Later on, the company was partially nationalised in 1961; subsequently it has been fully nationalised in 1964.

According to regulations of law no. 139 for 1964 the company was directly supervised by the Minster of development and state for housing and land reclamation. Afterwards, it became one of the companies under the Authority of Public Sector for Development.

In consequence of the law of public works sector no.203 for 1991, the company became a subsidiary company to the National Company for Constructions and Development (Egyptian holding Joint Stock Company).

The interviewees refused to use a tape recorder. Therefore, here are the notes, which I got from each interviewee as following:

I- Notes from the Interview with the Managing Director:

The company aims at participating in the development of the National Economy within the framework of the State's general policy. Especially in the fields of constructions and all activities relate to such as; trade, industry, export and import.

Company's Activities:

Company's Activities in Egypt:

The company has executed major projects in Egypt in each sector as follows:

Waste Water Disposal (w): It includes wastewater treatment plants, pump station, pipelines, and pipe networks. It was 35% to gross work volumes in 1995. The finished projects and projects under execution totalled L.E.1560 million between the period 1965 and 1995. This huge number of total projects indicates the extent of growth of this sector and hence boosting the company ahead of all Egyptian companies in this field.

Potable Water (p): It includes potable water pipe networks, pipelines, tanks, and purification plants and pumps stations. It was 30% to gross work volumes in 1995. The company was ambitious since its formation, as the company commenced its works with such major projects as execution of Lower Egypt potable water network. Thereafter the company has gained long years of experience which qualified it to be an outstanding company in its field. The finished projects and projects under execution totalled L.E.745 million between the period 1965 and 1995. Moreover the company has successfully built several potable water purification plants and pump stations on different sites all over Egypt. The capacity of some of these plants reaches 12 000 litres/second. The finished projects and projects under execution totalled L.E.600 million between the period 1965 and 1995.

Industry and Public Buildings (i): It includes factories, petroleum refineries and tanks. The finished projects and projects under execution totalled L.E.225 million the period

1965 between 1995. Moreover it includes public buildings. The finished projects and projects under execution totalled L.E.385 million between the period 1965 and 1995. It was 14% to gross work volumes in 1995.

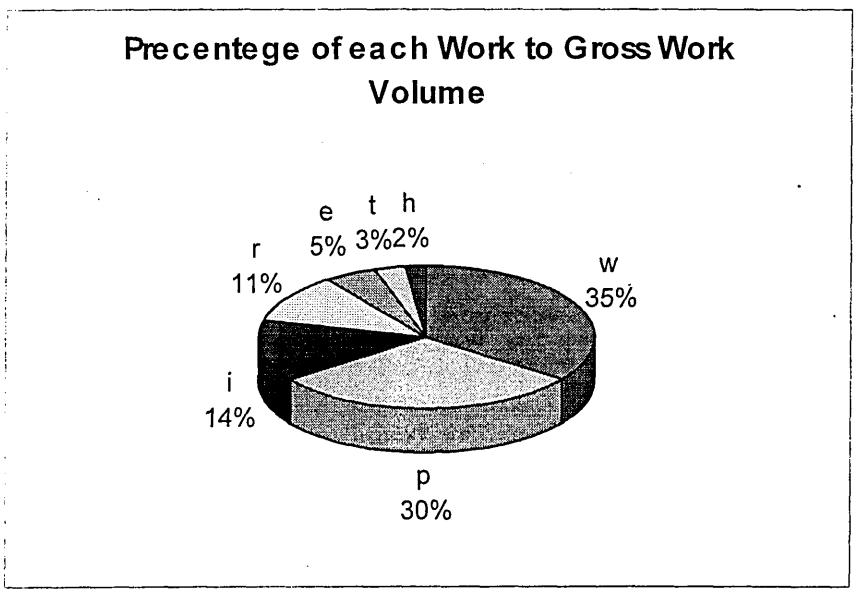
Roads, Bridges, and Land Reclamation (r): The finished projects and projects under execution totalled L.E.495 million between the period 1965 and 1995. It was 11% to gross work volumes in 1995.

Electric Power (e): It includes power plants, transformer stations, underground cables and overhead transmission lines. The finished projects and projects under execution totalled L.E.215 million between the period 1965 and 1995. It was 5% to gross work volumes in 1995.

Tourist Villages and Their Utilities (t): The finished projects and projects under execution totalled L.E.115 million between the period 1965 and 1995. It was 3% to gross work volumes in 1995.

Housing (h): The finished projects and projects under execution totalled L.E.90 million between the period 1965 and 1995. It was 2% to gross work volumes in 1995. Figure 1 indicates percentage of each work.

Figure 1. The Percentage of Each Work



Company's Activities Abroad:

The company is always endeavouring to enlarge its activities in the neighbouring Arab Countries. The gross value of both the finished projects and the others still in progress is estimated at what is equivalent to about L.E.2500 million. It has accomplished diverse projects in several countries as follows:

Kingdom of Saudi Arabia: major projects have been executed including dams, potable water networks, reservoirs and purification plants as well as sewage pipe networks, residential structures and public buildings.

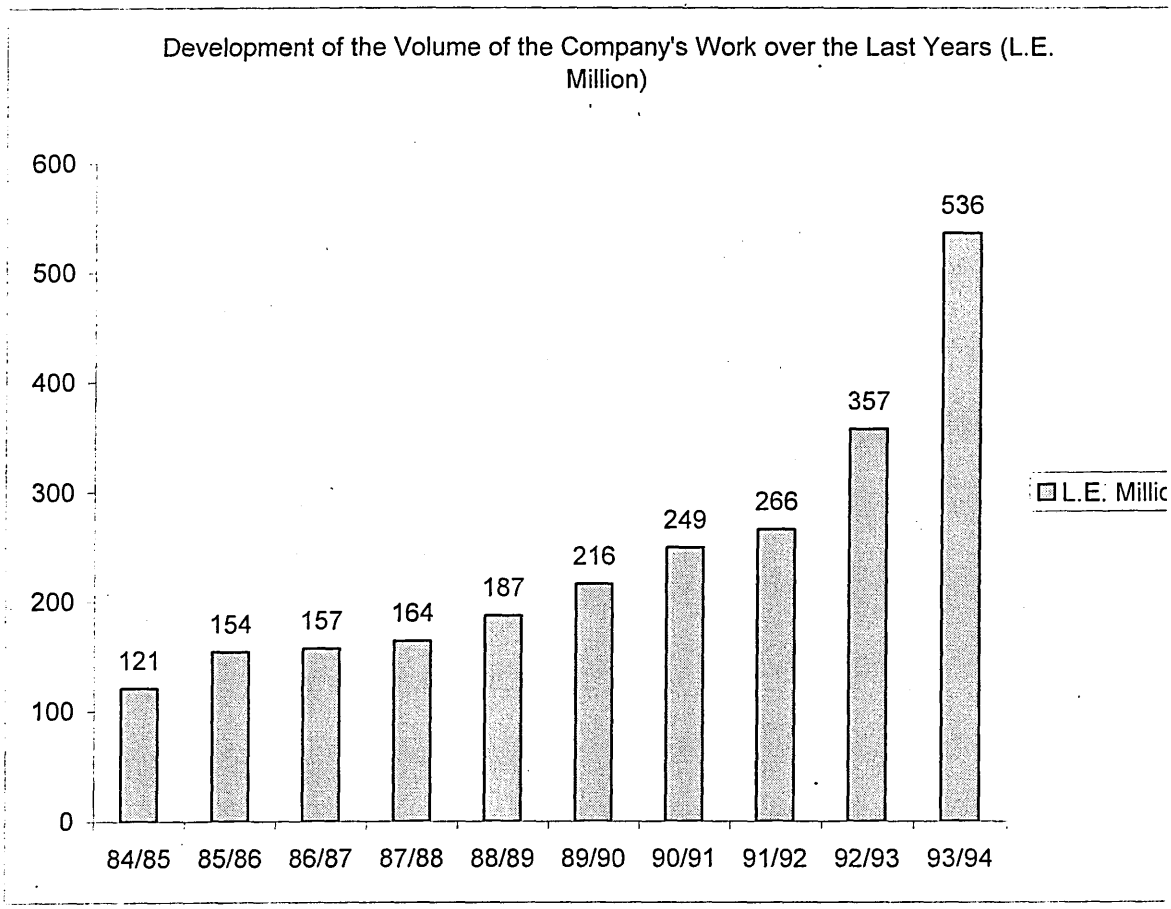
Republic of Algeria: The Company has shared in executing the iron and steel compound in Ennaba Region as well as electric power works in wahran Region.

Libyan Arab Jamahiriya: Residential buildings and infrastructure works have been executed in Chop City.

State of Kuwait: Soon after the end of the Kuwait liberation war, the company was one on leading companies, which participated in various projects for rehabilitation and competition of schools, public structures, administrative buildings and residential houses in addition to constructions of new projects.

United Arab Emirates: The Company was lately granted the tender for the gigantic project of Al Taweala-Al Ain pair of potable water pipelines, 126 km in length and 1200 mm in diameter for each line-ductile iron.. Figure 2 indicates development of the company's work over the years 1983/1984 – 1993/199

Figure 2The Development of the Company's Work over the Years 1983/1984 – 1993/1994

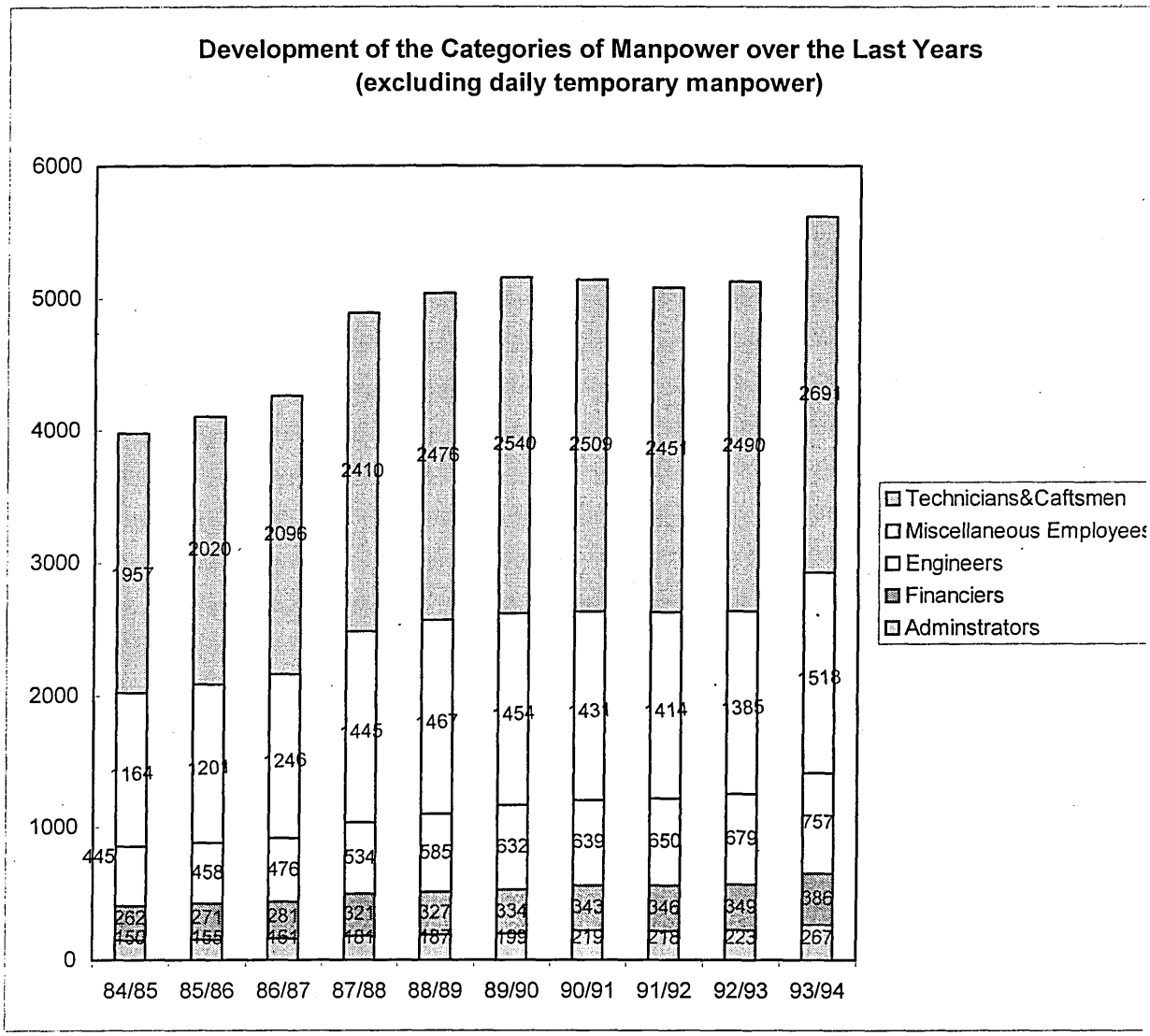


II- Notes from the Interview with the financial director:

- The most important two factors in this company are manpower and equipment. Therefore the company has paid a big attention to those factors. It strengthen the spirit of affiliation of its employees through surrounding them with all possible means of care, in order to get the extreme extent of productivity. The company is supporting various activities, amongst their most important fields are medical and social care, insurance and reservation fund, summer resorts, training and self education, syndicate committee, sports committee, and other miscellaneous activities. The company is considered one of the leading economic units, which use technological advanced mechanisation for executing projects. Furthermore, using computer in work has facilitated accessing information related to various fields. In scope of developing the man-power and improving performance, the company provides specialised training courses for employees to match the most sophisticated international systems in the field of technology, in addition to paying more attention to study the science of computer as well as foreign languages to realise the goals of

exporting the constructions industry abroad. Figure (3) indicates development of the categories of man-power over the years 84/85 – 93/94.

Figure 3 The Development of the Categories of Manpower over the Last Years



Company's Equipment:

The equipment of any constructions company is considered the real and effective capital of that company, as the capability of the company to accomplish its works satisfactorily on time is directly influenced by quality, number, capacity and efficiency of equipment. Therefore, one of the main reasons, which influenced the clients to place much reliance on the company, is the existence of a fleet of sophisticated and varied equipment. Figure 4 indicates development of the value of equipment, transportation, means, and tools, supplements and furniture owned by the company over the last years (in L.E. Million).

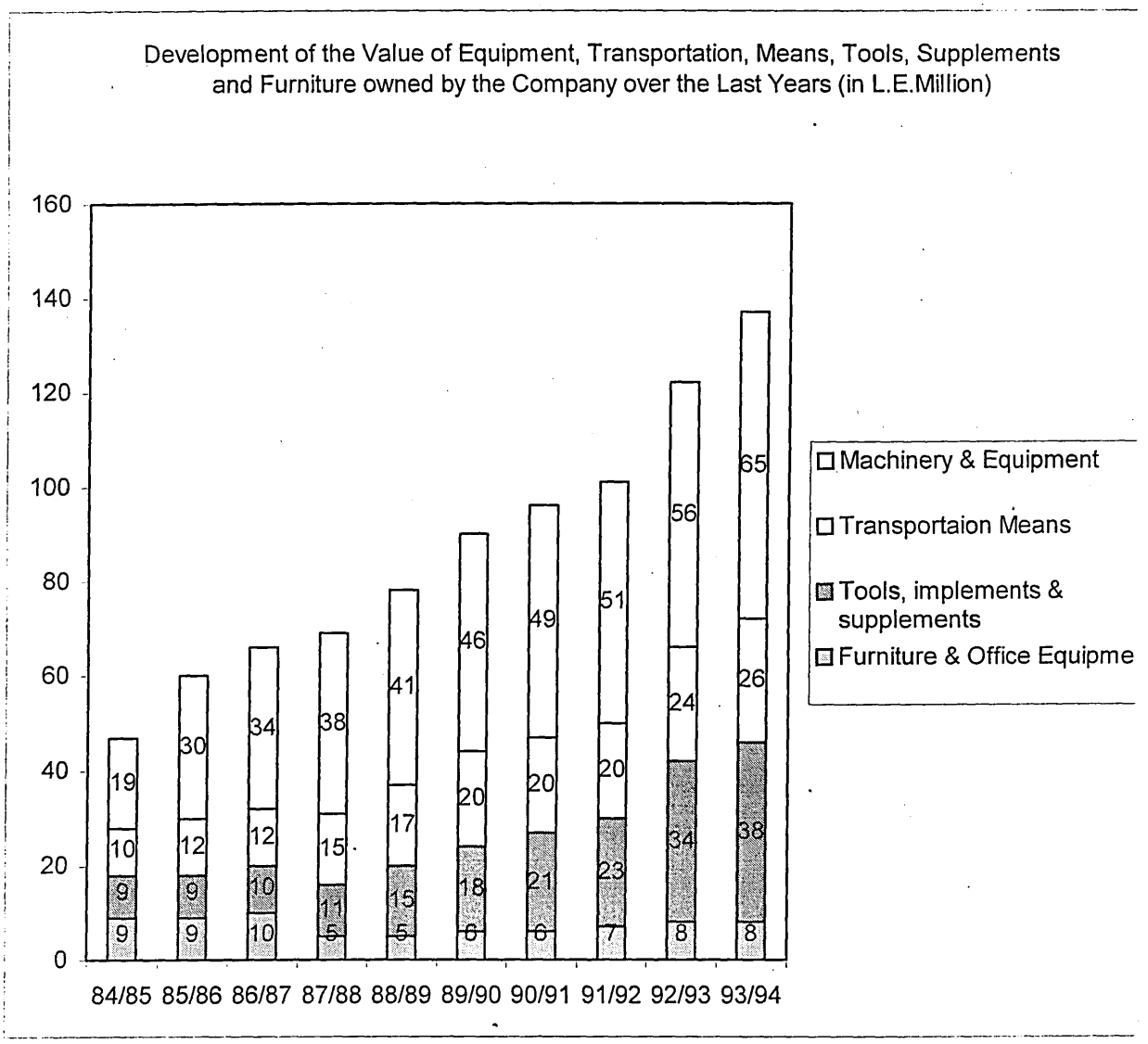


Figure 4: The Developments

- There is a main warehouse and vehicles workshop in the way between Cairo and Alexandria (please see the map of Egypt) Furthermore, there are scrap warehouses and equipment & tubular scaffolding workshops in a new city (6 of October City). In addition to the headquarters, which located in Giza, there are many head offices at working zones in most of Egyptian cities.
- There are many headoffices at working zones abroad in Kingdom of Saudia Arabia, Algeria, State of Kuwait, and State of United Arab Emirates.
- In view of realising the governmental programme of enlarging the private possession as well as reorganisation, the company has declared the rules for establishing the employees for holding the exhibited shares. The company has sold 20% of capital figure as shares to employees. The company is on a way to be private company.

- The measuring product costs method used is full absorption costing method. It is very similar to financial accounting systems.
- The company is the second biggest Constructions Company in Egypt. The first one is Arab Constructors Company. However, the company profits is more than Arab Constructors company profits.
- The work volume is increased after starting executed work because of their good quality work.
- The company imported raw materials. Therefore, If there is no national problem, there will be no problem at all because they choose their suppliers.
- In 1997, there are many kinds of financing re-sourcing;
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- The follow up department does an annual report for all the projects during every year.

Appendix 4

Reliability

Method 1 (space saver) will be used for this analysis (Scale Alpha)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
USHISTOR	62.3182	281.3229	.0474	.9577
USEFFICI	63.0000	263.3103	.7025	.9526
USCOMMUN	62.9432	264.1921	.6031	.9535
USREDUC	63.4432	262.4335	.6366	.9531
USMEASCA	63.8182	243.5298	.8617	.9493
USMOTIVA	63.7955	249.7738	.8456	.9499
USLABPRO	63.6364	252.0961	.7768	.9509
USEQUPPR	64.6932	251.5025	.4726	.9589
TARGSPPR	63.7841	242.2632	.8846	.9489
TARGPROD	63.9205	243.9591	.8638	.9493
TARGEPRF	63.9886	242.0803	.8593	.9494
USSCASSE	63.6364	253.2226	.7979	.9507
USEVAMAN	63.8182	249.3229	.7175	.9519
USPLNBUD	63.1136	263.8720	.5870	.9536
USPLNCOS	63.6818	254.8631	.7340	.9516
USMCONPR	63.8864	247.6881	.8172	.9501
USCORREC	63.6705	255.4879	.7080	.9519
USFLEXBU	63.5795	252.4764	.7595	.9511
USVARANL	63.5227	250.7121	.7581	.9511

Reliability Coefficients

N of Cases = 88.0 N of Items = 19

Alpha = .9543

Reliability

Method 1 (space saver) will be used for this analysis (Scale Alpha)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
USPRICE	9.9886	7.9884	-.0780	.4891
USMIXDEC	11.1477	5.6446	.2593	.2521
USMAKBUY	11.4432	4.0657	.1496	.4566
USECOSIZ	10.6818	4.5413	.5496	-.0680

Reliability Coefficients

N of Cases = 88.0 N of Items =4

Alpha = .3738

Reliability

Method 1 (space saver) will be used for this analysis (Scale Alpha)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
BETMETHO	38.7955	203.1991	.7542	.9716
USINVEST	38.5114	197.0573	.8550	.9695
USCOMSTR	38.0909	202.1296	.6938	.9725
USCUSPRO	38.6136	195.8950	.8558	.9694
USFUTURE	38.8295	193.0626	.8509	.9693
USTECHNO	39.1477	193.4377	.8703	.9690
USPRODCO	38.8636	191.1536	.7778	.9713
USQUALIT	38.7955	194.9232	.8624	.9692
USMSHARE	38.6818	191.1850	.8880	.9685
USMGROWT	38.8750	189.1451	.9051	.9681
USNEWPRO	39.0341	193.1138	.8382	.9696
USMARDEV	39.1023	184.3228	.9147	.9680
USMCOMPE	39.0682	181.7654	.9136	.9683

Reliability Coefficients

N of Cases = 88.0 N of Items = 13

Alpha = .9719

Reliability

Method 1 (space saver) will be used for this analysis (Scale Alpha)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
CSALES	21.3636	17.8892	.8039	.8381
CCOMPETI	21.2045	18.1876	.7263	.8506
CCUSTVAR	21.6023	22.0354	.5069	.8765
CPROFITM	21.3977	20.2423	.7827	.8467
CPRODINN	21.4432	19.8588	.6131	.8656
CNATUREC	21.3295	19.8097	.7450	.8487
CPRICES	21.9318	21.9263	.4737	.8807

Reliability Coefficients

N of Cases = 88.0 N of Items = 7

Alpha = .8767

Reliability

Method 1 (space saver) will be used for this analysis

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
USALES	17.4886	11.7930	.6986	.7903
UCOMPETI	17.5114	11.9769	.7096	.7874
UCUSTVAR	17.6250	14.7888	.5356	.8184
UPROFITM	17.6364	14.3720	.6584	.8042
UPRODINN	17.7045	14.1186	.4678	.8286
UNATUREC	17.4545	13.9289	.5305	.8181
UPRICES	17.7159	14.4126	.5334	.8177

Reliability Coefficients

N of Cases = 88.0 N of Items = 7

Alpha = .8328

Reliability

Method 1 (space saver) will be used for this analysis (Scale Alpha)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
CSUPPLY	8.5909	6.2215	.5167	.5175
CSOURCES	8.5795	6.6143	.3053	.6237
CDELIVER	8.8636	7.1306	.3373	.6023
CNSUPPLI	8.5000	6.8506	.2576	.6477
CPRICEMA	7.9659	5.8954	.5607	.4902

Reliability Coefficients

N of Cases = 88.0 N of Items = 5

Alpha = .6330

Reliability

Method 1 (space saver) will be used for this analysis (Scale Alpha)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
USUPPLY	7.8409	5.8135	.4518	.5813
USOURCES	7.9545	6.2508	.3632	.6202
UDELIVER	7.9659	5.7115	.2720	.6836
UNSUPPLI	8.0000	5.5862	.5403	.5429
UPRICEMA	7.5114	5.5401	.4615	.5740

Reliability Coefficients

N of Cases = 88.0 N of Items = 5

Alpha = .6532

Reliability

Method 1 (space saver) will be used for this analysis (Scale Alpha)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
CSKILLED	14.3977	8.8860	.3926	.6034
CCOMPLOY	14.0227	8.4363	.3992	.6000
CWAGERAT	12.9318	8.6850	.3995	.6004
CTARGETU	14.6818	8.7022	.5281	.5707
CLABTURN	14.1364	7.5904	.5088	.5588
CLABDEND	14.1250	9.4899	.2498	.6443
CINDUSRE	14.0227	10.4592	.0687	.6897

Reliability Coefficients

N of Cases = 88.0 N of Items = 7

Alpha = .6491

Reliability

Method 1 (space saver) will be used for this analysis (Scale Alpha)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
USKILLED	12.7955	5.7738	.1277	.5270
UCEMPLOY	12.8295	5.4304	.3271	.4515
UWAGERAT	12.3864	5.2973	.2106	.4967
UTARGETU	13.1023	5.0584	.4420	.4044
ULABTURN	12.7614	5.0114	.3375	.4377
ULABDEPE	12.6364	5.0846	.3245	.4443
UINDUSRE	12.3977	5.8515	.0672	.5583

Reliability Coefficients

N of Cases = 88.0 N of Items = 7

Alpha = .5155

Reliability

Method 1 (space saver) will be used for this analysis (Scale Alpha)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
CQUALMAN	6.2159	1.0908	.1979	.3880
CSALMAN	6.0455	.8715	.4122	-.1073
CCOMPGMA	6.6932	1.5485	.1191	.4771

Reliability Coefficients

N of Cases = 88.0 N of Items = 3

Alpha = .3962

Reliability

Method 1 (space saver) will be used for this analysis (Scale Alpha)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
UQUALMAN	4.8636	1.1536	.2610	.6069
USALMANG	4.3977	1.3687	.2707	.5489
UCOMPGMA	4.6705	1.1200	.5625	.1185

Reliability Coefficients

N of Cases = 88.0 N of Items = 3

Alpha = .5358

Reliability

Method 1 (space saver) will be used for this analysis (Scale Alpha)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
CFINANAC	6.6023	6.3113	.4523	.5979
CSOUFINA	6.5114	5.0114	.5691	.5015
CCFINANC	5.9545	3.7910	.6898	.3791
CSTTURN	5.8523	7.2998	.1356	.7661

Reliability Coefficients

N of Cases = 88.0 N of Items = 4

Alpha = .6612

Reliability

Method 1 (space saver) will be used for this analysis

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
UFINANAC	5.5455	3.8140	.6175	.5725
USOUFINA	5.3636	3.5904	.6916	.5147
UCFINANC	5.4773	4.0914	.7016	.5245
USTTURNO	5.2273	7.0972	.0246	.8368

Reliability Coefficients

N of Cases = 88.0 N of Items = 4

Alpha = .7138

Reliability

Method 1 (space saver) will be used for this analysis (Scale Alpha)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
CAVEQUIP	17.1818	134.2424	.5333	.9490
CEQUIPSU	17.2159	130.3322	.5840	.9471
CCOMPEQU	15.8409	109.2847	.8647	.9357
CDELIVEQ	17.4318	133.8574	.7431	.9457
CEQUFAIL	17.1477	132.5182	.6131	.9468
CNAMANFA	15.8523	106.2193	.9313	.9320
CNASYSTE	16.1023	108.6446	.9028	.9333
CTECHDEV	15.8977	107.3113	.9421	.9311
CEQUPOBS	16.3409	109.9054	.9038	.9331
CCAPILAB	16.7727	118.5455	.8716	.9355

Reliability Coefficients

N of Cases = 88.0 N of Items = 10

Alpha = .9453

Reliability

Method 1 (space saver) will be used for this analysis (Scale Alpha)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
UAVEQUIP	15.6136	105.3892	.7049	.9522
UEQUPMS	15.4091	100.9801	.6960	.9498
UCOMPEQU	14.3523	86.0469	.8641	.9427
UDELIVEQ	15.5455	104.5956	.7008	.9516
UEQUFAIL	15.1023	100.3687	.7273	.9488
UNAMANUF	14.5000	87.5862	.8809	.9413
UNASYSTE	14.4886	85.7700	.8672	.9426
UTECHDEV	14.3864	85.9180	.9227	.9391
UEQUOBSO	14.6023	84.8630	.9255	.9392
UCAPLABO	15.0114	92.1723	.8642	.9421

Reliability Coefficients

N of Cases = 88.0 N of Items = 10

Alpha = .9505

Reliability

Method 1 (space saver) will be used for this analysis (Scale Alpha)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
CREGINDU	7.1250	6.5934	.6711	.9205
CNOLEGIS	6.8864	4.8375	.8374	.8642
CNATLEGI	6.8182	5.9206	.8235	.8738
CEFFLEGI	6.8864	4.5157	.8958	.8418

Reliability Coefficients

N of Cases = 88.0 N of Items = 4

Alpha = .9066

Reliability

Method 1 (space saver) will be used for this analysis (Scale Alpha)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
UREGUIND	6.5795	5.8557	.7298	.9447
UNOLEGIS	6.4205	5.2120	.8317	.9133
UNATLEGI	6.4773	4.5052	.9119	.8872
UEFFLEGI	6.5341	4.7804	.9040	.8887

Reliability Coefficients

N of Cases = 88.0 N of Items = 4

Alpha = .9316

Factor Analysis

Component Matrix[a]

	Component		
	1	2	3
Using Cost Information for Efficiency: Impotrance as scorekeeping of historical data	6.673E-02	.457	.651
Using Cost information for efficiency: Measuring efficiency of production performance	.753	.396	-.184
Using Cost information for efficiency: to provide a means of communication	.664	.589	-.181
using cost information for effciciency: to enhance cost reduction programmes	.686	.472	-.214
using cost information for efficiency: measuring of effieciency and capacity utilisation	.892	.160	-2.17E-03
using cost information for efficiency: motivating efficiency improvements	.864	-4.04E-02	-5.58E-02
using cost information for efficiency: to enhance labour productivity	.799	-.112	.206
using cost information for efficiency: to enhance equipment productivity.	.508	-.556	-.231
using cost information for targets: to achieve target profit	.894	-.259	6.463E-02
using cost information for targets: to achieve target of production	.878	-.248	-4.03E-02
using cost information for targets:to maintain certain profit margins	.872	-.228	-4.42E-02
using cost information for performance management: Role of standard cost in assessing performance	.824	-4.07E-02	-7.78E-02
using cost information for performance management: Performance evaluation of management	.755	1.805E-02	.386
using cost information for planning: planning of budgeting	.637	.301	-.383
using cost infomation for planning: planned and actual product cost	.761	-7.15E-02	-5.08E-02
using cost information for control: management and control of period costs	.846	-8.50E-02	-.292
using cost information for control: Indentification of encessary corrective measures	.738	8.148E-02	.336
using cost information for control: importance of flexible budget for manufacturing cost control	.787	-.185	.203
using cost information for control: variance analysis and excption reporting	.787	-.117	.348

Extraction Method: Principal Component Analysis.

a. 3 components extracted.

Factor Analysis

Component Matrix[a]

	Component	
	1	2
using cost information for optimisation: importance of product as an input to pricing decision	-.425	.548
using cost information for optimisation: product mix decision	.742	.456
using cost information for: transefer prices for internal services	.665	-.314
using cost information for optimisation: make or buy decisions	.573	-.631
using cost information for optimisation: Determinaion of economic lot size	.907	.172
using cost information for optimisation: to emphasis throughput rate	.846	.365

Extraction Method: Principal Component Analysis.

a. 2 components extracted.

Factor Analysis

Component Matrix[a]

	Componen t
	1
using cost information for strategy management: development of better manufacturing methods	.791
using cost information for strategy management: Evaluation of Investment Projects	.879
using cost information for strategy management: Decisions of Company Strategy.	.740
using cost information for strategy management: Planned and actual customer profitibility	.882
using cost information for strategy management: To forcast the future	.877
using cost information for strategy management: importance of technology configuration	.892
using cost information for strategy management: importance of product configuration	.807
using cost information for strategy management: product quality analysis	.880
using cost informationfor strategy management: Market share analysis	.904
using cost information for strategy: market groth analysis	.919
using cost information for strategy: new product development	.862
using cost information for strategy management: market development	.928
Using cost information for strategy management: market and competition details	.928

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Factor Analysis

Component Matrix[a]

	Component	
	1	2
Competition Intensity: Product Market: market changes (Sales)	.870	8.862E-02
Compeition intensity: Product market: competition intensity	.816	.272
Competition Intensity: Product Market: 3-Customer Variaty	.629	-.525
Competition Intensity: product market: profit margins	.855	2.494E-02
competition Intensity: product market: product innovation	.728	-.456
Competition Intensity: Product Market: Nature of competition	.822	-7.89E-02
Competition Intensity: Product market: prices Of products	.590	.689

Extraction Method: Principal Component Analysis.

a. 2 components extracted.

Factor Analysis

Component Matrix[a]

	Component
	1
Unpredictability: Product market: Market changes (salea)	.805
unpredictability: product market: Competition Intensity	.806
unpredictability: product market: costumer variety	.665
Unpredictability: Product margins	.775
Unpredictability: product market: Product innovation	.604
Unpredictability: Product market: Nature Of competition	.660
Unpredictability: Product market: Prices of products	.659

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Factor Analysis

Component Matrix[a]

	Component	
	1	2
Competition Intensity: a- Raw material and Supply: 1- Supply	.788	-.362
Competition Intensity: a- Raw material and supply: 2- sources of raw material	.590	-.533
competition Intensity: a- Raw material and supply: 5- Delivery Time	.530	.549
competition Intensity : a- Raw material and Supply: 6- Nature of Suppliers.	.458	.700
Competition Intensity: a- Raw material and Supply: 7- Prices of Raw material	.808	-1.52E-02

Extraction Method: Principal Component Analysis.

a. 2 components extracted.

Factor Analysis

Component Matrix[a]

	Component		
	1	2	3
Unpredictability: Product market: Prices of products	.547	-.166	-.616
Unpredictability: a- Rew material and Supply: 1- Supply	.604	.676	6.057E-02
unpredictability: a- raw material and Supply: 2- Sources of raw material	.593	.674	-.198
unpredictability: a Raw material and Supply: 5- Delivery Time.	.361	7.995E-02	.818
Unpredictability: a- raw material and supply: 6- Nature of Suppliers	.808	-.452	6.675E-02
Unpredictability: a- Raw material and Supply: 7- Prices of Raw material	.763	-.500	8.945E-02

Extraction Method: Principal Component Analysis.

a. 3 components extracted.

Factor Analysis

Component Matrix[a]

	Component	
	1	2
Competition intensity: b- Labour: 1- Availability of skilled Labour	.567	-.105
Competition intensity : b- Labour: 2- Competiting Employers.	.714	-.471
Competition Intensity: b- Labour: 3- wage Rates	.645	-7.90E-02
Competition Intensity: b- L:abour: 4- target union	.690	.353
competition Intensity: b- Labour: 5- labour Turnover	.769	-8.55E-02
Competition: factor Market: b- Labour: 6- labour dependency	.330	.643
competition Intensity: Factor Market: b- Labour: 7- Industrial relation	6.979E-02	.820

Extraction Method: Principal Component Analysis.

a. 2 components extracted.

Factor Analysis

Component Matrix[a]

	Component		
	1	2	3
Unpredictability: b- labour: 1- Availability of skilled labour	.631	-.609	-1.98E-02
Unpredictability: b- Labour: 2- Competing Employers	.630	-.112	.537
Unpredictability: b-Labour: 3- wage rates	.303	.456	.587
Unpredictability: b-Labour: 4- target union	.579	.505	5.523E-02
Unpredactibility: b- Labour: 5- labour turnover	.742	-.166	-.354
Unpredictability: Factor market: b- Labour: 6- Labour depender	.438	.345	-.625
Unpredictability: Factor Market: b- Labour: 7- Industrial relation	-3.78E-03	.852	-.107

Extraction Method: Principal Component Analysis.

a. 3 components extracted.

Factor Analysis

Component Matrix[a]

	Component	
	1	2
Copmetition Intensy: Factor Market: C- Management: 1- availbility of Qualified managers	.643	-.639
Competition Intensity: Factor Market: c- Management: 2- salary Of Management	.856	3.054E-02
Competition Intensuty: Factor Market: c- Management: 3- Competition For good managers	.480	.802

Extraction Method: Principal Component Analysis.

a. 2 components extracted.

Factor Analysis

Component Matrix[a]

	Component
	1
Unpredictability: Factor Market: c- Management: 1- availability of qualified managers	.623
Unpredictability: Factor Market: c- Mangagement 2- Salary of management	.682
Unpredictability: Factor Market: c- Management: 3- Competition For Good managers	.875

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Factor Analysis

Component Matrix[a]

	Component	
	1	2
Competition Intensity: Factor Market: d- Capital and Financing: 1- Availability of Finanace	.807	-.417
Competition Intensity: Factor Market: d- Capital and Finance: 2- Sources of Finanace	.848	-9.17E-02
Competition Intensity: d- Capital and Financing 3- Cost of Finance	.842	.284
Competition Intensity: Factor Market: D- Capital and Financing: 4- Staff turnover	.185	.950

Extraction Method: Principal Component Analysis.

a. 2 components extracted.

Factor Analysis

Component Matrix[a]

	Component	
	1	2
Unpredictability: Factor Market: d- Capital and Financing: 1- Availability of Finance	.845	-7.30E-02
Unpredictability: Factor Market: d- Captial and Financeing: 2- Sources of Finance	.877	5.269E-02
Unpredictability: Factor Market: d- Capital and financing: 3- Cost of Finanace	.891	-3.11E-02
Unpredictability: Factor Market: d- capital and Financing: 4- staff turnover	4.330E-02	.997

Extraction Method: Principal Component Analysis.

a. 2 components extracted.

Factor Analysis

Component Matrix[a]

	Component	
	1	2
Competition Intensity: Factor Market: e- Technology: 1- Availability Of Equipment	.614	.568
Competition Intensity: Factor Market; e- Technology: 2- equipment Suppliers	.655	.556
Competition Intensity: factor market: e- Technology: 3- Competition for Equipment	.891	-5.47E-02
competition Intensity: Factor Market: e- Technology: 4- Delivery of Equipment	.793	.438
Competition Intensity: Factor Market: e- Technology: 5- Equipment failure	.672	-.194
Competition intensity: Factor Market: e- technology: 6- Nature of manufacturing technology	.940	-.124
Competition Intensity: Factor Market: e- Technology: 7- Nature of System Technology	.920	-.198
Competition Intensity: Factor Market: e- technology: 8- technological development	.954	-.139
Competition Intensity: Factor Market: e- Technology: 9- equipment obsolescence	.921	-.167
Competition Intensity: Factor Market: e- Technology: 10- Capital labour substitution	.888	-.333

Extraction Method: Principal Component Analysis.

a. 2 components extracted.

Factor Analysis

Component Matrix[a]

	Component	
	1	2
Unpredictability: Factor Market: e- Technology: 1- availability of Equipment	.782	.507
Unpredictability: Factor Market: e- Technology: 2- Equipment Suppliers	.763	.331
unpredactability: Factor market: e- Technology: 3- competition for equipment	.892	-7.00E-02
Unpredactibility: Factor Market: e- Technonlogy: 4- delivery of Equipment	.783	.549
Unpredactibility: factor market: e- Technology: 5- Equipment Failure	.791	.165
Unpredactibility: factor market: e- Technology: 6- Nature of manufacturing technology	.891	-.210
Unpredictability: Factor Market: e- technology: 7- nature of system technology	.876	-.349
Unpredactibility: Factor Market: e- Technology: 8- Technological development	.930	-.208
Unpredactibility: Factor Market: e- Technology: 9- Equipment obsolescence	.924	-.291
unpredactibility: factor market: e- Technology: 10- Capital Labour Substitution	.882	-.216

Extraction Method: Principal Component Analysis.

a. 2 components extracted.

Factor Analysis

Component Matrix[a]

	Component
	1
Competition Intensity: Legislation: 1- regulators in the industry	.801
Competition Intensity: Legislation: 2- Number of legislation	.907
Competition Intensity: Legislation: 3- Nature of Legislation	.904
Competition Intensity: legislation: 4- Effect of legislation	.943

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Factor Analysis

Component Matrix[a]

	Component
	1
unpredictability: Legislation: 1- regulators in the industry	.836
Unpredactibility: Legislation: 2- number of legislation	.905
unpredactibility: Legislation: 3- nature of Legislation	.953
Unpredactibility: Legislation: 4- effect of Legislation	.948

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Appendix 5

Tests of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
COMPUTE effecinc = (ushistor + useffici + uscommun + usreduc + usmeasca + usmotiva + uslabpro + usequppr ... (COMPUTE)	.085	88	.153
COMPUTE optimisa = usmixdec + ustransf + usmakbuy + usecosiz + usthrrat (COMPUTE)	.100	88	.029
COMPUTE strategy = (betmetho + usinvest + uscomstr + uscuspro + usfuture + ustechno + usprodco + usqualit... (COMPUTE)	.178	88	.000
COMPUTE cprodmar = (csales + ccompeti + ccustvar + cprofitm + cprodinn + cnaturec + cprices) / 7 (COMPUTE)	.148	88	.000
COMPUTE uprodmar = (usales + ucompeti + ucustvar + uprofitm + uprodinn + unaturec + uprices) / 7 (COMPUTE)	.099	88	.034
COMPUTE cfmraw = (csupply + csources + cdeliver + cnsuppli + cpricema) / 5 (COMPUTE)	.092	88	.062
COMPUTE ufmraw = (usupply + usources + udeliver + unsuppli + upricema) / 5 (COMPUTE)	.105	88	.019
COMPUTE cfmlabou = (cskilled + ccomploy + cwagerat + ctargetu + clabturn + clabdend) / 6 (COMPUTE)	.088	88	.088
COMPUTE ufmlabou = (uskilled + ucemploy + uwagerat + utargetu + clabturn + clabdend) / 6 (COMPUTE)	.134	88	.000
COMPUTE cfmmanag = (cqualman + csalman) / 2 (COMPUTE)	.186	88	.000
COMPUTE ufmmanag = (usalmang + ucompgma) / 2 (COMPUTE)	.196	88	.000
COMPUTE cfmfinan = (cfinanac + csoufina + ccfinanc) / 3 (COMPUTE)	.171	88	.000
COMPUTE ufmfinan = (ufinanac + usoufina + ucfinanc) / 3 (COMPUTE)	.227	88	.000
COMPUTE cfmtechn = (cavequip + cequipsu + ccompequ + cdeliveq + cequfail + cnamanfa + cnasyste + ctechdev... (COMPUTE)	.152	88	.000
COMPUTE ufmtechn = (uavequip + uequpms + ucompequ + udeliveq + uequfail + unamanuf + unasyste + utechdev ... (COMPUTE)	.155	88	.000
COMPUTE cfmarket = cfmraw + cfmlabou + cfmmanag + cfmfinan + cfmtechn (COMPUTE)	.078	88	.200*
COMPUTE ufmarket = ufmraw + ufmlabou + ufmmanag + ufmfinan + ufmtechn (COMPUTE)	.067	88	.200*
COMPUTE clegisla = (cregindu + cnolegis + cnatlegi + cefflegi) / 4 (COMPUTE)	.214	88	.000
COMPUTE ulegisla = ureguind + unolegis + unatlegi + uefflegi (COMPUTE)	.170	88	.000

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Appendix 6: Have the Moderating Variables Adopted Effects?

1- Kruskal Wallis H. for Business Sectors

Ranks

	business sector	N	Mean Rank
COMPUTE effecinc = (ushistor + useffici + uscommun + usreduc + usmeasca + usmotiva + uslabpro + usequppr ... (COMPUTE)	1.00	11	67.32
	2.00	29	24.38
	3.00	29	54.10
	4.00	19	47.34
	Total	88	
COMPUTE optimisa = usmixdec + ustransf + usmakbuy + usecosiz + usthrrat (COMPUTE)	1.00	11	57.86
	2.00	29	32.53
	3.00	29	62.97
	4.00	19	26.84
	Total	88	
COMPUTE strategy = (betmetho + usinvest + uscomstr + uscuspro + usfuture + ustechno + usprodco + usqualit... (COMPUTE)	1.00	11	56.00
	2.00	29	25.50
	3.00	29	54.48
	4.00	19	51.61
	Total	88	
COMPUTE cupmar = (cprodmar + uprodmar) / 2 (COMPUTE)	1.00	11	68.32
	2.00	29	24.86
	3.00	29	45.19
	4.00	19	59.63
	Total	88	
COMPUTE cufm1 = (uncntcmn + uncuman) / 2 (COMPUTE)	1.00	11	31.95
	2.00	29	49.79
	3.00	29	43.31
	4.00	19	45.50
	Total	88	
COMPUTE cufm2 = (contcman + contuman) / 2 (COMPUTE)	1.00	11	73.50
	2.00	29	34.14
	3.00	29	66.47
	4.00	19	10.00
	Total	88	
COMPUTE culegisl = (clegisla + ulegisla) / 2 (COMPUTE)	1.00	11	69.73
	2.00	29	31.50
	3.00	29	32.24
	4.00	19	68.45
	Total	88	

Test Statistics[a,b]

	COMPUTE effecinc = (ushistor + useffici + uscommun + usreduc + usmeasca + usmotiva + uslabpro + usequppr ... (COMPUTE)	COMPUTE optimisa = usmixdec + ustransf + usmakbuy + usecosiz + usthrrat (COMPUTE)	COMPUTE strategy = (betmetho + usinvest + uscomstr + uscuspro + usfuture + ustechno + usprodco + usqualit... (COMPUTE)	COMPUTE cupmar = (cprodmar + uprodmar) / 2 (COMPUTE)	COMPUTE cufm1 = (uncntcmn + uncuman) / 2 (COMPUTE)	COMPUTE cufm2 = (contcman + contuman) / 2 (COMPUTE)	COMPUTE culegisl = (clegisla + ulegisla) / 2 (COMPUTE)
Chi-Square	31.153	33.732	24.209	33.484	4.002	75.113	42.607
df	3	3	3	3	3	3	3
Asymp. Sig.	.000	.000	.000	.000	.261	.000	.000

a. Kruskal Wallis Test

b. Grouping Variable: business sector

2- Kruskal Wallis H. for Ownership Categories

Ranks

	Ownership	N	Mean Rank
COMPUTE effecinc = (ushistor + useffici + uscommun + usreduc + usmeasca + usmotiva + uslabpro + usequppr ... (COMPUTE)	public	23	27.41
	Private	65	50.55
	Total	88	
COMPUTE optimisa = usmixdec + ustransf + usmakbuy + usecosiz + usthrrat (COMPUTE)	public	23	31.17
	Private	65	49.22
	Total	88	
COMPUTE strategy = (betmetho + usinvest + uscomstr + uscuspro + usfuture + ustechno + usprodco + usqualit... (COMPUTE)	public	23	29.91
	Private	65	49.66
	Total	88	
COMPUTE cupmar = (cprodmar + uprodmar) / 2 (COMPUTE)	public	23	25.37
	Private	65	51.27
	Total	88	
COMPUTE cufm1 = (uncntcmn + uncuman) / 2 (COMPUTE)	public	23	51.26
	Private	65	42.11
	Total	88	
COMPUTE cufm2 = (contcman + contuman) / 2 (COMPUTE)	public	23	32.57
	Private	65	48.72
	Total	88	
COMPUTE culegisl = (clegisla + ulegisla) / 2 (COMPUTE)	public	23	31.67
	Private	65	49.04
	Total	88	

Test Statistics[a,b]

	COMPUTE effecinc = (ushistor + useffici + uscommun + usreduc + usmeasca + usmotiva + uslabpro + usequppr ... (COMPUTE)	COMPUTE optimisa = usmixdec + ustransf + usmakbuy + usecosiz + usthrrat (COMPUTE)	COMPUTE strategy = (betmetho + usinvest + uscomstr + uscuspro + usfuture + ustechno + usprodco + usqualit... (COMPUTE)	COMPUTE cupmar = (cprodmar + uprodmar) / 2 (COMPUTE)	COMPUTE cufm1 = (uncntcmn + uncuman) / 2 (COMPUTE)	COMPUTE cufm2 = (contcman + contuman) / 2 (COMPUTE)	COMPUTE culegisl = (clegisla + ulegisla) / 2 (COMPUTE)
Chi-Square	13.955	8.506	10.169	17.513	2.188	6.803	8.037
df	1	1	1	1	1	1	1
Asymp. Sig.	.000	.004	.001	.000	.139	.009	.005

a. Kruskal Wallis Test

b. Grouping Variable: Ownership

3- Kruskal Wallis H. for Transformation Categories

Ranks

	Divergent, Same, or	N	Mean Rank
COMPUTE effecinc = (ushistor + useffici + uscommun + usreduc + usmeasca + usmotiva + uslabpro + usequppr ... (COMPUTE)	Divergent	21	51.40
	same	25	54.86
	Convergent	42	34.88
	Total	88	
COMPUTE optimisa = usmixdec + ustransf + usmakbuy + usecosiz + usthrrat (COMPUTE)	Divergent	21	60.76
	same	25	40.20
	Convergent	42	38.93
	Total	88	
COMPUTE strategy = (betmetho + usinvest + uscomstr + uscuspro + usfuture + ustechno + usprodco + usqualit... (COMPUTE)	Divergent	21	53.43
	same	25	56.64
	Convergent	42	32.81
	Total	88	
COMPUTE cupmar = (cprodmar + uprodmar) / 2 (COMPUTE)	Divergent	21	39.12
	same	25	59.70
	Convergent	42	38.14
	Total	88	
COMPUTE cufm1 = (uncntcmn + uncuman) / 2 (COMPUTE)	Divergent	21	41.10
	same	25	45.84
	Convergent	42	45.40
	Total	88	
COMPUTE cufm2 = (contcman + contuman) / 2 (COMPUTE)	Divergent	21	61.02
	same	25	26.66
	Convergent	42	46.86
	Total	88	
COMPUTE culegisl = (clegisla + ulegisla) / 2 (COMPUTE)	Divergent	21	35.88
	same	25	53.56
	Convergent	42	43.42
	Total	88	

Test Statistics[a,b]

	COMPUTE effecinc = (ushistor + useffici + uscommun + usreduc + usmeasca + usmotiva + uslabpro + usequppr ... (COMPUTE)	COMPUTE optimisa = usmixdec + ustransf + usmakbuy + usecosiz + usthrrat (COMPUTE)	COMPUTE strategy = (betmetho + usinvest + uscomstr + uscuspro + usfuture + ustechno + usprodco + usqualit... (COMPUTE)	COMPUTE cupmar = (cprodmar + uprodmar) / 2 (COMPUTE)	COMPUTE cufm1 = (uncntcmn + uncuman) / 2 (COMPUTE)	COMPUTE cufm2 = (contcman + contuman) / 2 (COMPUTE)	COMPUTE culegisl = (clegisla + ulegisla) / 2 (COMPUTE)
Chi-Square	11.620	11.259	17.035	12.419	.496	21.356	5.745
df	2	2	2	2	2	2	2
Asymp. Sig.	.003	.004	.000	.002	.780	.000	.057

a. Kruskal Wallis Test

b. Grouping Variable: Divergent, Same, or Convergent

4- Kruskal Wallis H. for Strategic Postures:

Ranks

	MILES	N	Mean Rank
COMPUTE effecinc = (ushistor + useffici + uscommun + usreduc + usmeasca + usmotiva + uslabpro + usequppr ... (COMPUTE)	1.00	17	22.79
	2.00	36	55.13
	3.00	19	63.21
	4.00	16	21.44
	Total	88	
COMPUTE optimisa = usmixdec + ustransf + usmakbuy + usecosiz + usthrrat (COMPUTE)	1.00	17	35.97
	2.00	36	43.18
	3.00	19	63.74
	4.00	16	33.69
	Total	88	
COMPUTE strategy = (betmetho + usinvest + uscomstr + uscuspro + usfuture + ustechno + usprodco + usqualit... (COMPUTE)	1.00	17	19.65
	2.00	36	54.50
	3.00	19	67.61
	4.00	16	20.97
	Total	88	
COMPUTE cupmar = (cprodmar + uprodmar) / 2 (COMPUTE)	1.00	17	32.88
	2.00	36	57.53
	3.00	19	47.68
	4.00	16	23.75
	Total	88	
COMPUTE cufm1 = (uncntcmn + uncuman) / 2 (COMPUTE)	1.00	17	67.38
	2.00	36	28.39
	3.00	19	34.63
	4.00	16	68.16
	Total	88	
COMPUTE cufm2 = (contcman + contuman) / 2 (COMPUTE)	1.00	17	31.41
	2.00	36	46.43
	3.00	19	58.08
	4.00	16	37.94
	Total	88	
COMPUTE culegisl = (clegisla + ulegisla) / 2 (COMPUTE)	1.00	17	45.94
	2.00	36	49.67
	3.00	19	40.47
	4.00	16	36.13
	Total	88	

Test Statistics[a,b]

	COMPUTE effecinc = (ushistor + useffici + uscommun + usreduc + usmeasca + usmotiva + uslabpro + usequppr ... (COMPUTE)	COMPUTE optimisa = usmixdec + ustransf + usmakbuy + usecosiz + usthrrat (COMPUTE)	COMPUTE strategy = (betmetho + usinvest + uscomstr + uscuspro + usfuture + ustechno + usprodco + usqualit... (COMPUTE)	COMPUTE cupmar = (cprodmar + uprodmar) / 2 (COMPUTE)	COMPUTE cufm1 = (uncntcmn + uncuman) / 2 (COMPUTE)	COMPUTE cufm2 = (contcman + contuman) / 2 (COMPUTE)	COMPUTE culegisl = (clegisla + ulegisla) / 2 (COMPUTE)
Chi-Square	41.805	15.692	50.808	23.799	44.653	11.103	3.807
df	3	3	3	3	3	3	3
Asymp. Sig	.000	.001	.000	.000	.000	.011	.283

a. Kruskal Wallis Test

b. Grouping Variable: MILES

Appendix 7: Regression Equations:

Regression Equations in All the Data for Relationship between:

First: Efficiency & CI, U (Pro. M.) and & All the Variables :

1- Linear Relationship:

- Efficiency = 1.466 + .578 C(P.M.)
  R2 = .223 F is significance Residuals distribution is Not Normal.

- Efficiency = 1.806 + .456 C(Management) + .681 PC(P.M.) - .623 PU(P.M.) - .587 PU(Labour) + .123 PC(Technology)
  R2 = .639 F is significance Residuals distribution is Normal.

Second: Optimisation & CI, U (P. M.) and All the Variables:

1- Linear Relationship:

- Optimisation = 2.119 + .904PC(P.M.) – 1.073 PU(P.M.)
  R2 = .223 F is significance Residuals distribution is Normal.

- Optimisation = .479 PC(Technology) + .442 PC(Management)
  R2 = .853 F is significance Residuals distribution is Normal.

Third: Strategy & CI, U (P. M.) and All the Variables:

1- Linear Relationship:

- Strategy = .944 + 1.078 PC(P.M.) – .535 PU(P.M.)
  R2 = .272 F is significance Residuals distribution is Normal.

- Strategy = 1.472 + .639 PC(Management) + 1.031 PC(P.M.) – 1.085 PU(Raw) - .730 PU(Labour) - .831 PU(Legislation) + .611 PC(Legislation)
  R2 = .720 F is significance Residuals distribution is Normal.

Regression Equations in the Business Sectors for Relationship between:

First: Efficiency & CI, U (Pro. M.) And & All the Variables:

Linear Relationship:

Assembling Sector:

The sample is small, so there is no regression model for product market only.

Efficiency = 24.486 – 2.432 PU(Management) – 4.865 PU(Legislation)

R2 = .776 F is significance Residuals distribution is Not Normal.

Constructing Sector:

Efficiency = 5.048 - .804 PU(P.M.)

R2 = .376 F is significance Residuals distribution is Normal.

Efficiency = 6.391 + 1.190 PC(Technology) - .564 PU(P.M.) – 1.224 PC(P.M)

R2 = .816 F is significance Residuals distribution is Normal.

Manufacturing Sector:

Efficiency = 2.468 + .510 PU(P.M.)

R2 = .232 F is significance Residuals distribution is Normal.

Efficiency = .822 PC(Management)

R2 = .373 F is significance Residuals distribution is Normal.

Retailer Sector:

Efficiency = .871 PC(P.M.)

R2 = .947 F is significance Residuals distribution is Not Normal.

Efficiency = 3.647 + .422 PU(Management) - .905 PC(Raw Material) + .279 PC(Legislation)

R2 = .966 F is significance Residuals distribution is Normal.

Second: Optimisation & CI, U (Pro. M.):

Linear Relationship:

Assembling Sector:

The sample is small, so there is no regression model for product market only.

Optimisation = 12.583 – 3.00 PC(Legislation) - .833 PC(Finance)

R2 = .644 F is significance Residuals distribution is Not Normal.

Constructing Sector:

Optimisation = 4.191 - .886 PU(P.M.)

R2 = .412 F is significance Residuals distribution is Normal.

Optimisation = 4.191 - .886 PU(P.M.)

R2 = .412 F is significance Residuals distribution is Normal.

Manufacturing Sector:

Optimisation = 1.535 + .415 PC(P.M.)

R2 = .241 F is significance Residuals distribution is Normal.

Optimisation = 1.535 + .415 PC(P.M.)

R2 = .241 F is significance Residuals distribution is Normal.

Retailer Sector:

Optimisation = 9.210 – 2.368 PU(P.M.)

R2 = .740 F is significance Residuals distribution is Normal.

Optimisation = 9.761 - 1.882 C(Legislation) - .840 PU(P.M.) – 1.790 PU(Finance) + .261PU(Management) + 1.158 PU(Labour)

R2 = .968 F is significance Residuals distribution is Normal.

Third: Strategy & CI, U (Pro. M.):

Linear Relationship:

Assembling Sector:

The sample is small, so there is no regression model for product market only.

Strategy = -4.480 PU(Labour) + 4.115 PC(Labour)+ .981 PC(Raw)

R2 = .954 F is significance Residuals distribution is Normal.

Constructing Sector:

Strategy = 7.533 – 1.655 PC(P.M.)

R2 = .151 F is significance Residuals distribution is Not Normal.

Strategy = 2.858 - .655 PU(Raw) + .625 PU(Labour) - .531 PU(Legislation) + 1.133 PC(Technology) + .483 PC(Finance) – 1.141 PC(P.M.) +1.145 PU(Technology)

R2 = .927 F is significance Residuals distribution is Normal.

Manufacturing Sector:

Strategy = 1.998 + .468 PC(P.M.)

R2 = .174 F is significance Residuals distribution is Normal.

Strategy = 6.613 - .664 PC(Labour) - .693 PC(Finance)

R2 = .564 F is significance Residuals distribution is Normal.

Retailer Sector:

Strategy = -4.068 + 1.944 PC(P.M.)

R2 = .384 F is significance Residuals distribution is Not Normal.

Strategy = 6.45 +.716 PC(Labour) – 1.157 PU(Raw)-.322 PC(Finance) - .543 PU(P.M.)

R2 = .989 F is significance Residuals distribution is Normal.

Regression Equations in the Transformation Charcteristicsfor Relationship between:

First: Efficiency & CI, U (Pro. M.) And & All the Variables:

Linear Relationship:

Divergent Companies:

- Efficiency = 2.565 + .355 PC(P.M.)
  R2 = .321 F is significance Residuals distribution is Not Normal.

- Efficiency = 3.110 - .794 PC(Finance) + .491 PU(Legislation) + .481 PU(Finance) +.188 PU(P.M.)
  R2 = .897 F is significance Residuals distribution is Normal.

Multiplex Companies:

Statistics can not be computed in the relation to efficiency.

Efficiency = 5.274 - .324 PU(P.M.) + .354 PU(Management) +.279 PC(Technology) - .750 PU(Raw)

R2 = .959 F is significance Residuals distribution is Normal.

Convergent Companies:

Efficiency = .964 PC(P.M.)

R2 = .321 F is significance Residuals distribution is Not Normal.

Efficiency = 2.800 - .618 PU(Legislation) - .615 PU(Finance) - .504 PU(Raw) + 1.330 PC(P.M.) – 2.134 PU(Labour) + 1.493 PC(Labour)

R2 = .845 F is significance Residuals distribution is Normal.

Second: Optimisation & CI, U (Pro. M.) And & All the Variables:

Linear Relationship:

Divergent Companies:

Optimisation = 2.231 + 1.543 PC(P.M.) - 1.813 PU(P.M.)

R2 = .639 F is significance Residuals distribution is Normal.

Optimisation = -2.466 + 1.818 PC(Labour) + .526 PC(Management)

R2 = .733 F is significance Residuals distribution is Normal.

Multiple Companies:

Optimisation = 8.021 - 1.814 PU(P.M.)

R2 = .215 F is significance Residuals distribution is Not Normal.

Optimisation = 9.269 – 1.498 PU(Legislation) – 1.201 PU(Finance) – 1.085 PU(P.M.) +.813 PU(Management)

R2 = .952 F is significance Residuals distribution is Normal.

Convergent Companies:

Optimisation = .786 PC(P.M.) – .451 PU(P.M.)

R2 = .379 F is significance Residuals distribution is Normal.

Optimisation = 1.114 + .973 PC(P.M.) – 1.377 PU(Finance) - .567 PU(Management) + 1.210 PC(Finance) - .524 PU(Raw)

R2 = .721 F is significance Residuals distribution is Normal.

Third: Strategy & CI, U (Pro. M.) And & All the Variables:

Linear Relationship:

Divergent Companies:

Strategy = 1.813 + .529 PC(P.M.)

R2 = .306 F is significance Residuals distribution is Normal.

Strategy = 5.247 - .687 PC(Finance)

R2 = .760 F is significance Residuals distribution is Normal.

Multiple Companies:

Strategy = 1.512 PC(P.M.)

R2 = .243 F is significance Residuals distribution is Not Normal.

Strategy = 6.127 – 1.678 PU(Raw) – 1.682 PU(Legislation) + 1.382 PC(Legislation) + .488 PU(Management)

R2 = .974 F is significance Residuals distribution is Normal.

Convergent Companies:

Strategy = .882 C(P.M.)

R2 = .250 F is significance Residuals distribution is Normal.

Strategy = 1.687 – 1.135 PC(Legislation) - .763 PU(Management) + 1.944 PC(P.M.) - .934 PU(Finance)

R2 = .683 F is significance Residuals distribution is Normal.

Regression Equations in the Ownership Categories for Relationship between:

First: Efficiency & CI, U (Pro. M.) And & All the Variables:

Linear Relationship:

Public Category:

Efficiency = 4.066 - .404 PU(P.M.)

R2 = .270 F is significance Residuals distribution is Normal.

Efficiency = 2.758 + .272 PC(Management) – .279 PC(Legislation)

R2 = .664 F is significance Residuals distribution is Normal.

Private Category:

Efficiency = 1.583 + .571 PC(P.M.)

R2 = .201 F is significance Residuals distribution is Not Normal.

Efficiency = 2.260 + .437 PC(Management) + .841 PC(P.M) - .822 PU(Raw) - .875 PU(Labour) + .129 PC(Technology)

R2 = .650 F is significance Residuals distribution is Normal.

Second: Optimisation & CI, U (Pro. M.) And & All the Variables:

Linear Relationship:

Public Category

Optimisation = 3.382 - .760 PU(P.M.)

R2 = .311 F is significance Residuals distribution is Normal.

Optimisation = 1.153 PU(P.M.) + .951 PU(Labour) -.780 PU(Finance)

R2 = .853 F is significance Residuals distribution is Normal.

Private Category:

Optimisation = 2.396 + .798 PC(P.M.) -.999 PU(P.M.)

R2 = .182 F is significance Residuals distribution is Normal.

Optimisation = .923 PC(P.M.) - .815 PU(P.M.) + .385 PU(Management)

R2 = .593 F is significance Residuals distribution is Normal.

Third: Strategy & CI, U (Pro. M.) And & All the Variables:

Linear Relationship:

Public Category:

Strategy = 4.275 – 654 PU(P.M.)

R2 = .204 F is significance Residuals distribution is Not Normal.

Strategy = 1.477 PU(P.M.)- .927 PU(Raw) +1.486 PU(Labour) +.676 PC(Finance)–.916 PU(Finance)

R2 = .908 F is significance Residuals distribution is Normal.

Private Category:

Strategy = .774 C(P.M.)

R2 = .228 F is significance Residuals distribution is Normal.

Strategy = 2.869 + 1.235 C(P.M.) - . 324 C(Raw) - .923 U(Raw) –1.830 U(Labour) + .403 C(Management) + .725 U(Management) - .491 C(Finance)

R2 = .817 F is significance Residuals distribution is Normal.

Appendix 8: Have the Moderating Variables Adopted Effects?

1- Kruskal Wallis H. for Managers' Education Levels

Ranks

	Managers Education	N	Mean Rank
COMPUTE effecinc = (ushistor + useffici + uscommun + usreduc + usmeasca + usmotiva + uslabpro + usequppr ... (COMPUTE)	High education	41	66.13
	Middle Education	26	30.50
	Lower Education	21	19.60
	Total	88	
COMPUTE optimisa = usmixdec + ustransf + usmakbuy + usecosiz + usthrrat (COMPUTE)	High education	41	52.88
	Middle Education	26	39.48
	Lower Education	21	34.36
	Total	88	
COMPUTE strategy = (betmetho + usinvest + uscomstr + uscuspro + usfuture + ustechno + usprodco + usqualit... (COMPUTE)	High education	41	65.62
	Middle Education	26	32.48
	Lower Education	21	18.14
	Total	88	
COMPUTE cupmar = (cprodmar + uprodmar) / 2 (COMPUTE)	High education	41	57.80
	Middle Education	26	27.85
	Lower Education	21	39.14
	Total	88	
COMPUTE cufm1 = (uncntcmn + uncuman) / 2 (COMPUTE)	High education	41	28.20
	Middle Education	26	53.52
	Lower Education	21	65.17
	Total	88	
COMPUTE cufm2 = (contcman + contuman) / 2 (COMPUTE)	High education	41	52.46
	Middle Education	26	34.23
	Lower Education	21	41.67
	Total	88	
COMPUTE culegisl = (clegisla + ulegisla) / 2 (COMPUTE)	High education	41	43.07
	Middle Education	26	41.65
	Lower Education	21	50.81
	Total	88	

Test Statistics[a,b]

	COMPUTE effecinc = (ushistor + useffici + uscommun + usreduc + usmeasca + usmotiva + uslabpro + usequppr ... COMPUTE)	COMPUTE optimisa = usmixdec + ustransf + usmakbuy + usecosiz + usthrrat (COMPUTE)	COMPUTE strategy = (betmetho + usinvest + uscomstr + uscuspro + usfuture + ustechno + usprodco + usqualit... (COMPUTE)	COMPUTE cupmar = (cprodmar + uprodmar) / 2 (COMPUTE)	COMPUTE cufm1 = (uncntcmn + uncuman) / 2 (COMPUTE)	COMPUTE cufm2 = (contcman + contuman) / 2 (COMPUTE)	COMPUTE culegisl = (clegisla + ulegisla) / 2 (COMPUTE)
Chi-Square	57.270	8.758	56.231	23.162	33.792	8.452	1.773
df	2	2	2	2	2	2	2
Asymp. Sig	.000	.013	.000	.000	.000	.015	.412

a. Kruskal Wallis Test

b. Grouping Variable: Managers Education

2- Kruskal Wallis H. for Organisation Size

Ranks

	Company Size	N	Mean Rank
COMPUTE efficien = (ushistor + useffici + uscommun + usreduc + usmeasca + usmotiva + uslabpro + usequppr... (COMPUTE)	Small company	5	8.70
	Large Company	24	16.31
	Total	29	
COMPUTE optimisa = usmixdec + ustransf + usmakbuy + usecosiz + usthrrat (COMPUTE)	Small company	5	12.80
	Large Company	24	15.46
	Total	29	
COMPUTE strategy = (betmetho + usinvest + uscomstr + uscuspro + usfuture + ustechno + usprodco + usqualit... (COMPUTE)	Small company	5	7.60
	Large Company	24	16.54
	Total	29	
COMPUTE CUpromar = (cproduct + uproduct)/2 (COMPUTE)	Small company	5	10.00
	Large Company	24	16.04
	Total	29	
COMPUTE CUfacma1 = (cunconm + uunconm)/2 (COMPUTE)	Small company	5	22.40
	Large Company	24	13.46
	Total	29	
COMPUTE CUfacma2 = (cconm + uconm)/2 (COMPUTE)	Small company	5	10.00
	Large Company	24	16.04
	Total	29	
COMPUTE CUlegisl = (clegisla + ulegisla)/2 (COMPUTE)	Small company	5	15.40
	Large Company	24	14.92
	Total	29	

Test Statistics[a,b]

	COMPUTE efficien = (ushistor + useffici + uscommun + usreduc + usmeasca + usmotiva + uslabpro + usequppr... (COMPUTE)	COMPUTE optimisa = usmixdec + ustransf + usmakbuy + usecosiz + usthrrat (COMPUTE)	COMPUTE strategy = (betmetho + usinvest + uscomstr + uscuspro + usfuture + ustechno + usprodco + usqualit... (COMPUTE)	COMPUTE CUpromar = (cproduct + uproduct)/2 (COMPUTE)	COMPUTE CUfacma1 = (cunconm + uunconm)/2 (COMPUTE)	COMPUTE CUfacma2 = (cconm + uconm)/2 (COMPUTE)	COMPUTE CUlegisl = (clegisla + ulegisla)/2 (COMPUTE)
Chi-Square	3.313	.405	4.594	2.095	4.568	2.084	.014
df	1	1	1	1	1	1	1
Asymp. Sig.	.069	.524	.032	.148	.033	.149	.907

a. Kruskal Wallis Test

b. Grouping Variable: Company Size

3- Kruskal Wallis H. for Kinds of Consultants

Ranks

	External or Internal Advise	N	Mean Rank
COMPUTE efficien = (ushistor + useffici + uscommun + usreduc + usmeasca + usmotiva + uslabpro + usequppr... (COMPUTE)	External	21	14.93
	Internal	8	15.19
	Total	29	
COMPUTE optimisa = usmixdec + ustransf + usmakbuy + usecosiz + usthrrat (COMPUTE)	External	21	15.26
	Internal	8	14.31
	Total	29	
COMPUTE strategy = (betmetho + usinvest + uscomstr + uscuspro + usfuture + ustechno + usprodco + usqualit... (COMPUTE)	External	21	15.50
	Internal	8	13.69
	Total	29	
COMPUTE CUpromar = (cproduct + uproduct)/2 (COMPUTE)	External	21	14.93
	Internal	8	15.19
	Total	29	
COMPUTE CUfacma1 = (cunconm + uunconm)/2 (COMPUTE)	External	21	15.00
	Internal	8	15.00
	Total	29	
COMPUTE CUfacma2 = (cconm + uconm)/2 (COMPUTE)	External	21	13.74
	Internal	8	18.31
	Total	29	
COMPUTE CUlegisl = (clegisla + ulegisla)/2 (COMPUTE)	External	21	14.19
	Internal	8	17.13
	Total	29	

Test Statistics[a,b]

	COMPUTE efficien = (ushistor + useffici + uscommun + usreduc + usmeasca + usmotiva + uslabpro + usequppr... (COMPUTE)	COMPUTE optimisa = usmixdec + ustransf + usmakbuy + usecosiz + usthrrat (COMPUTE)	COMPUTE strategy = (betmetho + usinvest + uscomstr + uscuspro + usfuture + ustechno + usprodco + usqualit... (COMPUTE)	COMPUTE CUpromar = (cproduct + uproduct)/2 (COMPUTE)	COMPUTE CUfacma1 = (cunconm + uunconm)/2 (COMPUTE)	COMPUTE CUfacma2 = (cconm + uconm)/2 (COMPUTE)	COMPUTE CUlegisl = (clegisla + ulegisla)/2 (COMPUTE)
Chi-Square	.005	.072	.264	.005	.000	1.673	.710
df	1	1	1	1	1	1	1
Asymp. Sig	.942	.788	.607	.941	1.000	.196	.400

a. Kruskal Wallis Test

b. Grouping Variable: External or Internal Advise

4- Kruskal Wallis H. for Locations of Authority

Ranks

	The places of Authorties	N	Mean Rank
COMPUTE efficien = (ushistor + useffici + uscommun + usreduc + usmeasca + usmotiva + uslabpro + usequppr... (COMPUTE)	Egyptian caompanies	19	10.21
	Foreign East Companies	2	18.50
	Total	21	
COMPUTE optimisa = usmixdec + ustransf + usmakbuy + usecosiz + usthrrat (COMPUTE)	Egyptian caompanies	19	10.05
	Foreign East Companies	2	20.00
	Total	21	
COMPUTE strategy = (betmetho + usinvest + uscomstr + uscuspro + usfuture + ustechno + usprodco + usqualit... (COMPUTE)	Egyptian caompanies	19	10.29
	Foreign East Companies	2	17.75
	Total	21	
COMPUTE CUpromar = (cproduct + uproduct)/2 (COMPUTE)	Egyptian caompanies	19	10.00
	Foreign East Companies	2	20.50
	Total	21	
COMPUTE CUfacma1 = (cunconm + uunconm)/2 (COMPUTE)	Egyptian caompanies	19	11.58
	Foreign East Companies	2	5.50
	Total	21	
COMPUTE CUfacma2 = (cconm + uconm)/2 (COMPUTE)	Egyptian caompanies	19	10.21
	Foreign East Companies	2	18.50
	Total	21	
COMPUTE CUlegisl = (clegisla + ulegisla)/2 (COMPUTE)	Egyptian caompanies	19	11.74
	Foreign East Companies	2	4.00
	Total	21	

Test Statistics[a,b]

	COMPUTE efficien = (ushistor + useffici + uscommun + usreduc + usmeasca + usmotiva + uslabpro + usequppr... (COMPUTE)	COMPUTE optimisa = usmixdec + ustransf + usmakbuy + usecosiz + usthrrat (COMPUTE)	COMPUTE strategy = (betmetho + usinvest + uscomstr + uscuspro + usfuture + ustechno + usprodco + usqualit... (COMPUTE)	COMPUTE CUpromar = (cproduct + uproduct)/2 (COMPUTE)	COMPUTE CUfacma1 = (cunconm + uunconm)/2 (COMPUTE)	COMPUTE CUfacma2 = (cconm + uconm)/2 (COMPUTE)	COMPUTE CUlegisl = (clegisla + ulegisla)/2 (COMPUTE)
Chi-Square	3.242	4.696	2.626	5.216	1.739	3.232	2.924
df	1	1	1	1	1	1	1
Asymp. Sig	.072	.030	.105	.022	.187	.072	.087

a. Kruskal Wallis Test

b. Grouping Variable: The places of Authorties

Appendix 9: Curve Fit Regression

For All Data:

Independent: Managers' Perception of Environmental Conditions

Dependent	Mth	R^2	Sig.F	Const.	b1	b2
Efficiency	Linear	.163	.000	1.67	.57	
Efficiency	Logarithm	.132	.000	1.82	1.48	
Efficiency	Quadratic	.238	.000	6.09	-2.49	.51
Optimisation	Linear	.001	.764	2.03	.05	
Optimisation	Logarithm	.000	.883	2.12	.08	
Optimisation	Quadratic	.010	.658	3.81	-1.18	.20
Strategy	Linear	.153	.000	.874	.73	
Strategy	Logarithm	.128	.001	1.02	1.91	
Strategy	Quadratic	.204	.000	5.66	-2.60	.55

Curve Fit

For Assembling Companies:

Independent: Managers' Perception of Environmental Conditions

Dependent	Mth	R^2	Sig F	b0	b1	b2
Efficiency	Linear	.02	.71	2.54	.47	
Efficiency	Logarithm	.01	.74	2.20	1.61	
Efficiency	Quadratic	.39	.13	197.87	-102.71	13.55
Optimisation	Linear	.05	.53	4.42	-.46	
Optimisation	Logarithm	.05	.50	5.15	-1.87	
Optimisation	Quadratic	.37	.15	109.60	-56.02	7.29
Strategy	Linear	.03	.58	6.38	-.68	
Strategy	Logarithm	.04	.55	7.52	-2.79	
Strategy	Quadratic	.46	.08	207.94	-107.15	13.98

For Constructing Organisations

Independent: Managers' Perception of Environmental Conditions

Dependent	Mth	R^2	Sig F	b0	b1	b2
Efficiency	Linear	.46	.000	7.60	-1.62	
Efficiency	Logarithm	.44	.000	7.82	-4.64	
Efficiency	Quadratic	.53	.000	-19.69	17.23	-3.24
Optimisation	Linear	.43	.000	6.62	-1.65	
Optimisation	Logarithm	.43	.000	6.90	-4.79	
Optimisation	Quadratic	.43	.001	1.80	1.67	-.57
Strategy	Linear	.19	.018	6.69	-1.47	
Strategy	Logarithm	.18	.020	6.87	-4.19	
Strategy	Quadratic	.24	.025	-27.25	21.97	-4.03

For Manufacturing Organisations

Independent: Managers' Perception of Environmental Conditions

Dependent	Mth	R^2	Sig F	b0	b1	b2
Efficiency	Linear	.216	.01 2	.53	.42	
Efficiency	Logarithm	.233	.008	2.55	1.20	
Efficiency	Quadratic	.278	.014	-1.02	3.20	-.49
Optimisation	Linear	.229	.009	1.49	.48	
Optimisation	Logarithm	.218	.011	1.60	1.27	
Optimisation	Quadratic	.230	.033	2.13	-.02	.09
Strategy	Linear	.171	.026	1.92	.55	
Strategy	Logarithm	.186	.019	1.94	1.55	
Strategy	Quadratic	.207	.049	-1.96	3.58	-.53

For Retailer Organisations

Independent: Managers' Perception of Environmental Conditions

Dependent	Mth	R^2	Sig F	b0	b1	b2
Efficiency	Linear	.051	.352	1.95	.44	
Efficiency	Logarithm	.047	.374	1.64	1.51	
Efficiency	Quadratic	.116	.373	23.70	-11.90	1.73
Optimisation	Linear	.541	.000	10.60	-2.54	
Optimisation	Logarithm	.536	.000	12.86	-8.94	
Optimisation	Quadratic	.544	.002	2.44	2.08	-.65
Strategy	Linear	.132	.126	-1.07	1.28	
Strategy	Logarithm	.130	.130	-2.17	4.49	
Strategy	Quadratic	.143	.290	15.04	-7.86	1.28

Curve Fit

MODEL: MOD_3.

Divergent Organisations

Independent: Managers' Perception of Environmental Conditions

Dependent	Mth	R^2	Sig F	b0	b1	b2
Efficiency	Linear	.459	.001	2.51	.42	
Efficiency	Logarithm	.491	.000	2.54	1.19	
Efficiency	Quadratic	.562	.001	-.56	2.82	-.42
Optimisation	Linear	.317	.008	1.47	.48	
Optimisation	Logarithm	.297	.011	1.59	1.26	
Optimisation	Quadratic	.326	.029	2.71	-.48	.16
Strategy	Linear	.276	.014	1.77	.61	
Strategy	Logarithm	.299	.010	1.80	1.74	
Strategy	Quadratic	.325	.029	-2.20	3.73	-.54

For Multiplex Organisations

Independent: Managers' Perception of Environmental Conditions

Dependent	Mth	R^2	Sig F	b0	b1	b2
Efficiency	Linear	.037	.358	2.04	.50	
Efficiency	Logarithm	.038	.348	1.53	1.81	
Efficiency	Quadratic	.045	.601	-7.68	6.01	-.77
Optimisation	Linear	.203	.024	9.91	-2.19	
Optimisation	Logarithm	.191	.029	11.62	-7.51	
Optimisation	Quadratic	.286	.025	-46.79	29.93	-4.51
Strategy	Linear	.117	.094	-.77	1.26	
Strategy	Logarithm	.119	.091	-1.97	4.48	
Strategy	Quadratic	.121	.243	-9.28	6.08	-.68

For Convergent Organisations

Independent: Managers' Perception of Environmental Conditions

Dependent	Mth	R^2	Sig F	b0	b1	b2
Efficiency	Linear	.219	.002	.06	.98	
Efficiency	Logarithm	.197	.003	-.37	3.12	
Efficiency	Quadratic	.335	.000	18.75	-10.32	1.67
Optimisation	Linear	.104	.037	.56	.45	
Optimisation	Logarithm	.091	.053	.39	1.39	
Optimisation	Quadratic	.198	.014	11.59	-6.23	.98
Strategy	Linear	.135	.017	.15	.80	
Strategy	Logarithm	.124	.022	-.23	2.56	
Strategy	Quadratic	.176	.023	11.68	-6.17	1.03

Curve Fit

For Public Organisations

Independent: Managers' Perception of Environmental Conditions

Dependent	Mth	R^2	Sig F	b0	b1	b2
Efficiency	Linear	.208	.029	4.05	-.38	
Efficiency	Logarithm	.127	.095	3.78	-.78	
Efficiency	Quadratic	.655	.000	-1.31	3.61	-.72
Optimisation	Linear	.263	.012	3.57	-.65	
Optimisation	Logarithm	.199	.033	3.26	-1.50	
Optimisation	Quadratic	.473	.002	-2.08	3.54	-.76
Strategy	Linear	.175	.047	4.35	-.64	
Strategy	Logarithm	.114	.116	3.93	-1.37	
Strategy	Quadratic	.464	.002	-3.68	5.32	-1.08

Curve Fit

For Private Organisations

Independent: Managers' Perception of Environmental Conditions

Dependent	Mth	R^2	Sig F	b0	b1	b2
Efficiency	Linear	.152	.001	1.78	.57	
Efficiency	Logarithm	.124	.004	1.95	1.49	
Efficiency	Quadratic	.219	.000	6.12	-2.47	.50
Optimisation	Linear	.001	.814	2.56	-.05	
Optimisation	Logarithm	.001	.771	2.61	-.18	
Optimisation	Quadratic	.002	.954	3.07	-.40	.059
Strategy	Linear	.160	.001	.95	.75	
Strategy	Logarithm	.137	.002	1.11	1.99	
Strategy	Quadratic	.201	.001	5.29	-2.30	.50

Curve Fit

For Defending Organisations

Independent: Managers' Perception of Environmental Conditions

Dependent	Mth	R^2	Sig F	b0	b1	b2
Efficiency	Linear	.011	.691	2.20	.18	
Efficiency	Logarithm	.004	.804	2.37	.34	
Efficiency	Quadratic	.412	.024	29.09	-17.36	2.83
Optimisation	Linear	.007	.751	2.28	-.14	
Optimisation	Logarithm	.015	.643	2.55	-.62	
Optimisation	Quadratic	.394	.030	27.91	-16.85	2.70
Strategy	Linear	.052	.381	1.38	.23	
Strategy	Logarithm	.045	.414	1.36	.66	
Strategy	Quadratic	.115	.426	7.57	-3.81	.65

Curve Fit

For Prospector Organisations

Independent: Managers' Perception of Environmental Conditions

Dependent	Mth	R^2	Sig F	b0	b1	b2
Efficiency	Linear	.282	.001	1.23	.74	
Efficiency	Logarithm	.274	.001	.75	2.47	
Efficiency	Quadratic	.305	.002	8.46	-3.56	.62
Optimisation	Linear	.001	.862	2.39	-.06	
Optimisation	Logarithm	.001	.872	2.42	-.21	
Optimisation	Quadratic	.001	.978	.71	.93	-.14
Strategy	Linear	.192	.007	1.19	.72	
Strategy	Logarithm	.190	.008	.69	2.45	
Strategy	Quadratic	.193	.029	2.97	-.33	.15

Curve Fit

For Analyser Organisations

Independent: Managers' Perception of Environmental Conditions

Dependent	Mth	R^2	Sig F	b0	b1	b2
Efficiency	Linear	.017	.592	3.58	.19	
Efficiency	Logarithm	.022	.541	3.51	.59	
Efficiency	Quadratic	.110	.393	-4.60	6.34	-1.08
Optimisation	Linear	.245	.031	.72	.69	
Optimisation	Logarithm	.259	.026	.71	1.95	
Optimisation	Quadratic	.299	.059	-5.28	5.21	-.79
Strategy	Linear	.051	353	5.32	-.33	
Strategy	Logarithm	.041	.409	5.19	-.83	
Strategy	Quadratic	.195	.177	-5.22	7.60	-1.39

Curve Fit

For Reactor Organisations

Independent: Managers' Perception of Environmental Conditions

Dependent	Mth	R^2	Sig F	b0	b1	b2
Efficiency	Linear	.540	.001	3.69	-.33	
Efficiency	Logarithm	.461	.004	3.53	-.76	
Efficiency	Quadratic	.770	.000	1.41	1.53	-.35
Optimisation	Linear	.622	.000	4.41	-.99	
Optimisation	Logarithm	.617	.000	4.10	-2.47	
Optimisation	Quadratic	.622	.002	4.23	-.84	-.02
Strategy	Linear	.347	.016	2.84	-.30	
Strategy	Logarithm	.263	.042	2.66	-.65	
Strategy	Quadratic	.790	.000	-.73	2.63	-.56