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DEALING WITH UNCERTAINTY :
A SOUTH AFRICAN INDUSTRIAL PERSPECTIVE

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A thesis submitted to the Faculty of Business Administration, University of the Witwatersrand, Johannesburg, in fulfilment of the requirements for the degree of Doctor of Philosophy.

Johannesburg, 1992

ABSTRACT

The primary purpose of this research was to determine if South African industrial companies have structured themselves appropriately to be able to deal with the increasing environmental uncertainty. The secondary objective of this research was to determine if the appropriately structured companies have performed better than their inappropriately structured counterparts. The two research objectives were combined into a research model with external (volatility) and internal (perceived) measures of environmental uncertainty and a number of other categorical and continuous variables as controls.

Based on the extensive review of literature, a theoretical framework to deal with environmental uncertainty was developed. It was extended, in terms of the predominant force utilised by organisations to deal with environmental uncertainty and change, into two configurations. The "prospector" configuration was regarded as more appropriate for uncertain environment. The "defender" configuration was regarded as more appropriate for certain environment.

Four research propositions were deduced from the "prospector" configuration and the theoretical concepts in the propositions were operationalised for empirical verification in South African industrial organisations listed on Johannesburg Stock Exchange. None of the proposed relationships were found to be statistically significant when the results of the detail questionnaire, abridged questionnaire or the combined results were considered. It therefore implies that the South African industrial companies listed on Johannesburg Stock Exchange are "defenders".

Organisational size was found to have a significant impact on organisational structure, environmental uncertainty and financial performance. Smaller organisations appear to be "prospectors", while larger organisations appear to be "defenders".

It appears that formalised planning system is used by larger organisations as a mediator, between environmental influences and organisational structure, by reducing the perceived environmental uncertainty and environmental volatility. It appears that they use technocratic or power response to deal with environmental uncertainty. However, when the potential control on the source of uncertainty decreases, they may be unable to cope with changes and may eventually become unprofitable.

DEDICATION

To my wife
CHANDAN,
son
SHYAM,
daughter
BHAVYA,
and mother
VALI,

for their continuous support
and encouragement, and

in memory of my father
BHOWAN DAYA,
who passed away before his
dream could be realised.

ACKNOWLEDGMENTS

The "Supreme Being" for giving me the inspiration and the strength to embark on this ambitious project and then making it possible for me to actually complete it. The Chairman: Mr.S.M.Dougherty, the Financial Director: Mr G.E.Aldridge, and the Personnel Manager: Mr. W.R.Kempen of Tongaat Foods (Pty) Ltd for the Ph.D. sponsorship. Dr. Nick. Binedell, Dr. Peter. Pirow and other members of the research committee, of the Faculty of Business Administration, for their confidence and support. The members of the responding organisations, without whose help the completion of the study would not have been possible. The director, Prof. A.P.Zevenbergen, of the Bureau of Financial Analysis for providing the financial performance information of the listed industrial companies. The librarian, Dianne Kruger, for her help in the computer search (Dialog, Sabinet & Navo) of relevant literature and prior studies. The computer centre for offering computer courses (Multimate by Gilian Jackson, CMS by Koola Theo, and SAS by Anna Ferreira) and the utilisation of their "Walk-in-Centre". The tolerance, understanding and support of the family.

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CHAPTER 1 : INTRODUCTION

The main purpose of this study is to extend the research done in corporate planning over the last few decades and to determine if South African industrial companies have structured themselves appropriately, in terms of organisational structure and system of planning, to be able to deal with the increasing environmental uncertainty.

1.1 EVOLUTION OF PLANNING IN SOUTH AFRICAN ORGANISATIONS

Considerable interest was generated in the planning function in South Africa during the seventies, after it gained recognition in Europe and USA (Kabat,1984). The main reason for the development of the planning discipline overseas was the need to respond to the multitude of environmental challenges faced by the changing strategic posture (size, complexity and diversity) of the multi-divisional and multi-national corporations (Ansoff,1977,1983).

The review of prior studies (Kabat,1974; Pickthall, 1976; Woodburn,1980; Binedell,1982; Schwarz,1986) depicted a gradual evolution of planning in South African organisations. It was initially implemented in local subsidiaries of the multinational organisations to comply with their group guidelines and policies. Its practice increased in the South African conglomerates by the process of diffusion (Kabat,1974). The practice of planning grew with organisational size and diversity. The greatest influencing factor for the adoption of formal

long-range planning was found to be the degree of organisational complexity - size and type of organisation structure. The rate of technological change was found to be the next important influencing factor, followed by the degree of capital intensity (Kabat,1974).

The research into the nature, extent and formalisation of planning indicated that initially it was merely a financial projection, which resulted in budgeting only (Kabat,1974). As the size and complexity of organisations increased, planning appeared to be utilised mainly as a powerful internal integrator for coordination and control (Woodburn, 1980).

> "While environmental uncertainty does play a part in determining the degree of an organisation's involvement in the corporate planning process, the size and complexity of the organisation itself plays a stronger and more dominant role in dictating the degree of involvement. Planning appears to become a powerful internal integrator of complex organisations, rather than a mechanism or device with which to cope with external environmental uncertainty" (Woodburn,1980)

With the rapidly emerging shifts in the environment, more managers are becoming aware of the need for environmental scanning and its linkage to planning for effective adaptation (Binedell,1982; Schwarz,1986).

> "The survey and interviews conducted revealed that managers formally examine the environment, particularly the economic sector, as part of the planning process. It is suggested, however, that in most instances

> this examination is too superficial given the rapidly emerging shifts and pressures in the South African environment." (Binedell,1982)

The first cycle or phase in the evolution of planning was related to the growth and diversity of organisations. It was related to the heterogeneous or complex environment in which the diversified organisations navigated (Woodburn, 1980). The next phase or the second cycle in the evolution of planning in South African companies should be the utilisation of planning process and systems to cope with the increasing environmental uncertainty (Kabat,1974; Woodburn,1980; Binedell,1982). It is related to the adaptation of the organisations to the dynamism of the environment.

1.2 IMPORTANCE OF INDUSTRIAL ORGANISATIONS

Bureau for Economic Research, in their publication (Smit, Pellissier, van der Merwe and Viviers 1988) provides the percentage contribution of various sectors towards Gross Domestic Product, at factor cost and at constant 1985 prices, from 1946-49 to 1985-87. These percentages are listed in the table below.

TABLE 1 : PERCENTAGE CONTRIBUTION TOWARDS GROSS DOMESTIC PRODUCT

	SECTORS	1946-9	1985-7
I	Agriculture,forestry & fishing	10.5	5.9
II	Mining & quarrying	28.9	15.4
III	Manufacturing	12.6	22.2
IV	Wholesale ,retail,catering & accommodation	10.8	11.1
V	Transport,storage & communication	5.8	8.3
VI	Finance,insurance,real estate & business services	11.3	15.2

The significant contribution of industrial companies to Gross Domestic Product elucidate their importance to South African economy. The percentage contribution of sectors I and II decreased substantially, from 39.4 to 21.3, while the contribution of sectors III, IV, V and VI increased proportionately. The greatest increase is depicted by the sectors III, IV and V collectively, from 30.2 percent to 41.6 percent, and sector III particularly. The majority of companies grouped into sectors III, IV and V are broadly classified as "Industrials" on Johannesburg Stock Exchange.

1.3 RESEARCH OBJECTIVES

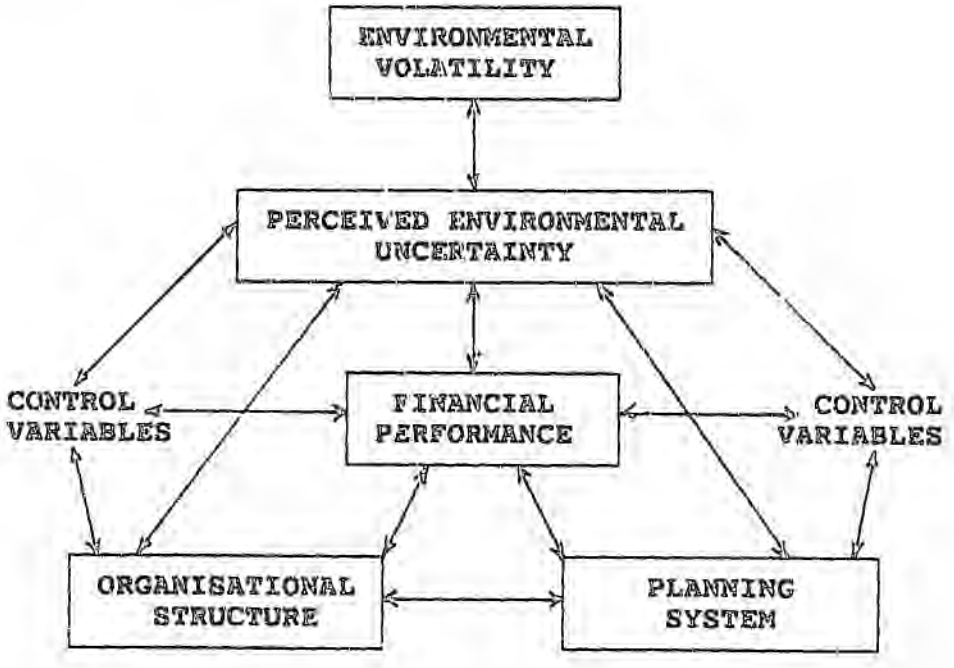


FIGURE 1.3 : RESEARCH MODEL

The primary objective of this research is to determine if South African industrial companies have structured

themselves appropriately, in terms of organisational structure and system of planning, to be able to deal with the increasing environmental uncertainty. The secondary objective of this research is to determine if the appropriately structured companies have performed better than their inappropriately structured counterparts. The two research objectives are combined into a research model with external (volatility) and internal (perceived) measures of environmental uncertainty (Bourgeois,1980) and a number of other categorical and continuous variables as controls. Figure 1.3 illustrates the research model.

1.4 OUTLINE OF CHAPTERS

The next chapter reviews the related concepts and findings of Organisational Theory literature and Business Policy literature. The convergence of the two fields into a theoretical framework to deal with environmental uncertainty is developed and extended in terms of the predominant force utilised by organisations to deal with environmental uncertainty and change into two configurations, prospector and defender.

Four relationships are selected in chapter three, from the research model, for the development of research propositions, for the "prospector" configuration, which is more appropriate for uncertain environment. The theoretical concepts are operationalised for empirical verification in South African industrial organisations listed on Johannesburg Stock Exchange. The methodology used to collect the required data and the analysis thereof is discussed. The research variables are reviewed for their appropriateness before the proposed relationships are considered.

The research results and the outcome of the analyses thereof, for each of the four proposed relationships, are deliberated in chapter four. The results are compared to satisfy the primary and secondary objectives of the study. The implications and the significance of the results are considered. Chapter five outlines the overall study, reviews it limitations, presents the contribution to knowledge and suggests a multi-phased process for further research.

CHAPTER 2: LITERATURE REVIEW

The broad theoretical foundation of this research, based on the research objectives and the research model, encompasses both Organisation Theory literature and Business Policy literature. The Organisation Theory literature, relevant to the research, is considered in section 2.1. The Business Policy literature, relevant to the research, is considered in section 2.2.

Bourgeois (1980) states that the "strategic decision making is at the heart of the organisation-environment co-alignment process so heavily emphasized in both the Business Policy and Organisation Theory literature." He further states that "the nexus of this marriage is the hierarchical nature of the two variables : while the Business Policy literature has begun to distinguish between 'corporate' and 'business' strategies, the Organisation Theory literature has discriminated between 'general' and 'task' environments." He argues that the domain definition (corporate) strategies are enacted at the general environmental level, and the domain navigation strategies are carried out in the specific task environment. The convergence of Business Policy literature and Organisation Theory literature into a theoretical framework to deal with uncertainty is considered in section 2.3.

2.1 ORGANISATIONAL THEORY LITERATURE

Section 2.1.1 reviews the characteristics and views of the environment, objective and perceived environment, definitions and components of perceived environmental

uncertainty, the relationship between perceived environmental uncertainty and environmental volatility, and the relationship between environmental uncertainty and financial performance. Section 2.1.2 reviews the definitions and dimensions of organisational structure, the relationship between organisational structure and perceived environmental uncertainty, and the relationship between organisational structure and financial performance.

2.1.1 Environment

2.1.1.1 Characteristics and Views of the Environment

Environment has been conceptualized as either general or specific (Hall, 1972). Dill (1958) regarded specific environment as relevant environment while Thompson (1967) regarded it as task environment.

Emery and Trist (1965) identified four 'ideal' types of environment that an organisation may confront as 'causal textures'. Placid-randomized environment changes slowly over time with random demands, creating a minimum degree of threat and uncertainty for organisations. Placid-clustered environment changes slowly over time with clustered demands, creating some degree of threat and uncertainty for organisations, who respond to it by centralizing and engaging in long-term strategic planning. Disturbed-reactive environment is disturbed by one or more large companies, dominating an industry with similar goals, attempting to influence the environment, through tactical initiatives and counteractions; and causing a reactive response by the dominated companies, who have decentralized structures and organisational flexibility to survive. Turbulent-field environment

changes dynamically with interrelated elements creating highest degree of threat and uncertainty for organisations.

Thompson (1967) identified and described the contingency theory of organisations based on a framework of two key aspects, stability and homogeneity. He defined stability as the amount of change in the dimensions of the organisations task environment over time, and homogeneity as the degree to which the task environment has numerous buyers, customers and suppliers. Duncan (1972) conceptualized the environment on two dimensions. Static-dynamic dimension indicates the degree to which the factors of the decision unit's internal and external environment remain basically the same over time or are in continuous process of change. Simple-complex dimension indicates the degree to which the factors in the decision unit's environment are few or large in number and are similar to one another.

Khandwalla (1977) noted five attributes of the external environment which are likely to have impact on the organisations. These five attributes depict the environment as a group of forces, with each force operating at various points on its continuum, in terms of the degree of turbulence (dynamic, unpredictable, expanding and fluctuating), hostility (risky, stressful and dominating), diversity (various characteristics and needs), technical complexity (highly sophisticated) and restrictiveness (legal and political).

2.1.1.2 Objective and Perceived Environment

Bourgeois (1980) described three views of the

environment, based on various perspectives, their dimensions and their respective operational definitions. Table 2.1.1.2 details these views.

TABLE 2.1.1.2 : OBJECTIVE AND PERCEIVED ENVIRONMENT

PERSPECTIVE	DIMENSIONS	OPERATIONAL DEFINITIONS
External : Objects	General environment Task environment	Not operationalised. Customers, competitors suppliers and regulatory agencies.
External : Attributes	Complexity, Heterogeneity Dynamic-shifting Volatility	Number of task environment components. Rate of change. Technological and market volatility.
Internal : Perceptions	Perceived environmental uncertainty	Lack of information, knowledge about decision outcomes, ability to estimate environment's effect on performance.

The external (objects and attributes) perspective defines the objective environment while the internal perspective defines the perceived environment. Complexity indicates a number and diversity of environmental factors affecting an organisation. Dynamic-shifting indicates the degree of change or variability. Volatility indicates the degree of "discontinuity" an organisation experiences.

2.1.1.2.1 The Relationship between Objective and Perceived Environment

Duncan (1972) identified the components of the environment and its specific dimensions, to facilitate the identification of the types of environments and

their effect on the degree of perceived environmental uncertainty, as experienced by individuals involved in decision making. He proposed that static-simple environment results in a low degree of perceived uncertainty, static-complex environment results in a moderately low degree of perceived uncertainty, dynamic-simple environment results in a moderately high degree of perceived uncertainty and dynamic-complex environment results in a high degree of perceived uncertainty.

To be able to test his propositions, Duncan studied twenty two decision units : ten decision units in three manufacturing organisations and twelve decision units in three research and development organisations. The research and development organisations were expected to have more complex and dynamic environments than the three manufacturing organisations, which were expected to have simple and stable environments.

Simple-complex environmental index was developed by taking the product of the number of decision factors identified by the decision unit members and the square of the number of components the factors comprised of. Static-dynamic environmental index was determined by the degree to which the factors were stable and the frequency with which the decision unit members consider new and different factors in their decision making process. Responses of the decision unit members, on all the items of a variable, were pooled to reflect the degree of the given variable experienced by the unit as a whole.

The data indicated that organisational type explains thirty percent of the variance in uncertainty, while environmental type explains seventy percent of the variance. The nature of the environment was found to

be more important than the kind of organisation in explaining the degree of uncertainty experienced. Multiple comparisons of the four environments were used to generate results.

The decision units with static-simple environments experienced the least amount of uncertainty, significantly lower than dynamic-simple and dynamic-complex but not static-complex. The decision units with dynamic-complex environments experienced the greatest degree of perceived uncertainty, significantly from all the other types. The decision units with dynamic-simple environments experienced a greater degree of perceived uncertainty than units with static-complex environments, but the difference was not significant. The difference between static and dynamic environment was always significant regardless of whether the environment was simple or complex and the difference in perceived uncertainty between simple and complex environment was contingent upon the environment being dynamic. Static-dynamic dimension of the environment was found to be a more important contributor to the perception of uncertainty.

2.1.1.3 Perceived Environmental Uncertainty

2.1.1.3.1 Definitions and Components

Lawrence and Lorsch's (1967) measure, as reorganized by Downey, Hellriegel and Slocum (1977), considers three internal aspects to define perceived environmental uncertainty : time span necessary for feedback on job performance, clarity of job requirements and degree of difficulty involved in job performance. Their measure was based on the assumption

that internal "job" uncertainty is a surrogate measure for perceived environmental uncertainty.

Duncan (1972) based the measurement of perceived environmental uncertainty on three generally accepted definitions of uncertainty. Milliken (1987) classified the three definitions or components of the Duncan's (1972) measure into three different forms of uncertainty. State Uncertainty or Perceived Environmental Uncertainty as the uncertainty experienced by administrators when they perceive the organisational environment, or a particular component of that environment, to be unpredictable. Effect Uncertainty as an inability to predict what the nature of the impact of a future state of the environment or environmental change will be on the organisation. It involves a lack of understanding of cause-effect relationships. Response Uncertainty as a lack of knowledge of response options and/or an inability to predict the likely consequences of a response choice.

2.1.1.4 The Relationship between Perceived Environmental Uncertainty and Environmental Volatility

Three noteworthy studies conducted by Tosi, Aldag and Storey (1973), Downey, Hellriegel and Slocum (1975) and Snyder and Glueck (1982) to determine the relationship between perceived environmental uncertainty and environmental volatility are reviewed in the following sub-sections.

2.1.1.4.1 Tosi, Aldag and Storey (1973)

Tosi et al. replicated Lawrence and Lorsch's study to examine their uncertainty measurement scale and to determine if the items represent different things and concepts, if the items should be combined into a single subscale, if the scales are reliable and if the scales are valid.

To determine the criterion validity of the scales, an alternative set of measures of uncertainty, termed volatility, was used. Coefficient of variation of sales over a period of ten years as a measure of market volatility. Coefficient of variation of the average ratio of the sum of research and development and capital expenditure to total assets over a period of ten years as a measure of technological volatility. Coefficient of variation of earnings before interest and taxation over a period of ten years as a composite measure of the two volatilities.

One hundred and two middle and top level managers responded to their questionnaire. Internal reliabilities were computed, scale and subscale scores were correlated with the alternative measures of uncertainty and the questionnaire was factor analyzed. The relationship between Lawrence and Lorsch's uncertainty scores and environmental volatility was explored at three levels. Correlations at industry level were low and inconsistent ranging from -0.294 and 0.036. Manufacturing subscale showed low positive correlations. Marketing subscale showed low negative correlations. Total scale showed low negative correlations. Correlations at firm level ranged from strongly negative to slightly positive. Correlations between research subscale and technological volatility; and between marketing subscale and sales

volatility were significantly negative. Correlations between manufacturing subscale and technological volatility for manufacturing department and research and technical engineering department were 0.086 and 0.146 respectively.

2.1.1.4.2 Downey, Hellriegel and Slocum (1975)

Downey et al. examined the conceptual and methodological adequacy of Lawrence and Lorsch's and Duncan's uncertainty instruments, compared them and replicated Duncan's analysis of complexity and dynamism. Four criterion measures were used to determine the construct validity of the uncertainty instruments : department of commerce's change in projections volatility; perceived degree of competition in the division's industry; perceived, detrended volatility of the division's prices; and perceived, detrended volatility of the division's sales.

Fifty-one managers of relatively autonomous divisions of one of the largest United States conglomerates participated in completing the questionnaire. Kendall's tau was used to compare the uncertainty scales and the criterion measures. Duncan's total uncertainty score did not correlate with any of the criterion measures. Lawrence and Lorsch's total uncertainty score correlated only with detrended sales volatility. When uncertainty subscales were compared with the criterion measures, several significant relationships were observed. Three were significant ($p<.05$) and consistent with their expectations, 2 neared significance ($p<.06$) and one was significant ($p<.05$) but inconsistent with their expectations. When the scales and subscales were related to product and

industry groupings only one relationship, feedback time and industry grouping, approached significance.

2.1.1.4.3 Snyder and Glueck (1982)

Snyder and Glueck studied three most volatile and three least volatile industries, selected from the list used by Tosi et al. (1973), with the purpose of determining the validity of their objective volatility measures.

Five companies were selected at random from each of the six industries and matched against the sixty-five percent dominant product criterion to control for diversity. Tosi et al's market and technological volatility indices were computed for the period five years and their average used as an overall measure of volatility.

The study assumed that executives are biased in the degree to which they perceive industry volatility to be, and that extremely knowledgeable industry analysts from stockbroking firms could be more objective raters. Four stockbroking firms were requested to provide opinions of their relevant industry analysts as to the degree of uncertainty experienced by the firms in the chosen six industries. Five point scales were provided, in terms of market and technological volatility, to the broking firms with Tosi et al.'s definitions. Nineteen opinions were obtained, with at least two for each industry. The perceived uncertainty scales were averaged and compared with the composite measure of volatility using Kendall's tau. A high tau coefficient was obtained (0.867, $p<.02$). It supported the contention by Tosi et al. that objective criteria exist that can be used to calculate volatility indices

without actually interviewing the executives.

2.1.1.5 The Relationship between Environmental Uncertainty and Financial Performance

Bourgeois (1985) in his research compared top managements' perceptions of environmental uncertainty to objectively measured environmental volatility and linked the match between objective vis-a-vis perceived to financial performance. Interviews, questionnaires and secondary data sources were used to measure the variables.

Questionnaires were sent to all top management team members, of twenty non-diversified public corporations in Pacific Northwest, who were identified through interviews. Of the one hundred and six questionnaires sent, ninety-nine usable responses were obtained. Tosi et al.'s (1973) measures of volatility were modified to reduce the influence of major trends and was regarded as a true indicator of discontinuities. Perceived environmental uncertainty was measured with a modified version of Duncan's (1972) instrument.

The four environmental volatility coefficients were factor reduced to two variables, commercial and technological volatility. Financial performance was defined as a composite of return on total assets, growth in net earnings, growth in earning per share, return on sales and growth in capital averaged over the period of five years. An index was obtained through factor analysis. The scores of the two volatility factors and the score of the perceived environmental uncertainty were first standardized and then their two respective differences were summed in order to create a divergence score.

The zero-order and second-order (controlling for both volatility factors) correlations between the degree of divergence and economic performance index were -0.555 ($p<.01$) and -0.563 ($p<.01$) respectively. The congruence between perceived environmental uncertainty and volatility tends to associate positively with performance, even when volatility was controlled for. The match between environmental volatility and perceived environmental uncertainty was found to explain approximately thirty percent of the variance in financial performance.

2.1.2 ORGANISATIONAL STRUCTURE

2.1.2.1 Definitions and Dimensions of Organisational Structure

A number of variables have been used by organisational theorists to define structure - administrative component (Reimann, 1974), autonomy (Hage, 1965), centralisation (Hage, 1965; Thompson, 1967; Reimann, 1974), complexity (Hage and Aiken, 1967), delegation of authority (Reimann, 1974), differentiation (Weber, 1947; Lawrence and Lorsch, 1967), formalisation (Reimann, 1974), integration (Lawrence and Lorsch, 1967; Perrow, 1970), professionalisation (Hall, 1968), span of control (Ouchi and Dowling, 1974), specialisation (Hage, 1965; Reimann, 1974), standardisation (Hage, 1965), and vertical span (Reimann, 1974).

Campbell, Bownas, Peterson and Dunnette (1974) described the various organisational variables as either "structural" or "structuring". "Structural" aspects denote the physical characteristics of an

organisation and the "structuring" aspects denote the policies and activities that restrict or prescribe the behaviour of people in an organisation. Robbins (1983) defines organisational structure mainly in terms of "structuring" variables, as having three core components or dimensions.

Complexity refers to the degree of differentiation that exists within an organisation. Formalisation refers to the degree to which jobs within the organisation are standardised. Centralisation refers to the degree to which decision making is concentrated at a single point in the organisation. It is concerned with formal organisation, it looks at decision discretion and it implies concentration at a high level.

Horizontal differentiation refers to the degree of differentiation between units based on the orientation of members, the nature of the tasks they perform, and their education and training. Vertical differentiation refers to the number of hierarchical levels in the organisation. Spatial dispersion refers to the degree to which the location of an organisation's office, plants and personnel are dispersed geographically.

Hage and Aiken (1967) and Child (1972) provides strong evidence that an inverse relationship exist between centralisation and complexity. Pugh, Hickson, Hining and Turner (1968) found no strong relationship between centralisation and formalisation. Child (1972) and Donaldson, Child and Aldrich (1975) found a strong negative relationship between centralisation and formalisation. It is argued by theorists that high vertical differentiation result in low formalisation and high horizontal differentiation result in high degree of formalisation.

2.1.2.2 The Relationship between Organisational Structure and Perceived Environmental Uncertainty

A number of studies (Burns and Stalker,1961; Thompson,1967; Lawrence and Lorsch,1967; Duncan,1972,1979; Schmidt and Cummings,1976; Leifer and Huber,1977; Bourgeois,McAllister and Mitchell,1978; Krebiniak and Snow,1980; Koeberg,1987) attempting to determine the likely relationship between organisational structure and perceived environmental uncertainty are reviewed in the following sub-sections.

2.1.2.2.1 Burns and Stalker (1961)

Burns and Stalker made the first attempt to determine which structure and management practices are appropriate for different environmental demands. After conducting interviews in twenty Scottish and English firms (fifteen in electronics industry, four involved in research and development and a rayon mill), they developed a conceptual scheme which described organisations on a continuum from Mechanistic to Organic.

Mechanistic management system was found to be appropriate for stable conditions and was described by Burns et al. as follows :

1. the specialised differentiation of functional tasks...
2. the abstract nature of each individual task, which is pursued with techniques and purposes more or less distinct from those of the concern as a whole

3. the reconciliation ... of these distinct performances by the immediate superiors, who are also in turn responsible for seeing that each is relevant in his own special part of the main task.
4. the precise definition of rights and obligations and technical methods attached to each functional role.
5. the translation of rights and obligations and methods into the responsibilities of a functional position.
6. hierarchic structure of control, authority and communication.
7. a reinforcement of the hierarchic structure by the location of knowledge of actualities exclusively at the top of the hierarchy, where the final reconciliation of distinct tasks and assessment of relevance is made.
8. a tendency for interaction between members of the concern to be vertical, i.e., between superior and subordinate.
9. a tendency for operations and working behaviour to be governed by the instructions and decisions issued by superiors.
10. insistency on loyalty to the concern and obedience to superiors as a condition of membership.
11. a greater importance and prestige attached to internal (local) than to general (cosmopolitan) knowledge, experience and skill.

Organic form was found to be more appropriate for changing conditions and was described by Burns et al. as follows :

1. the contributive nature of special knowledge and experience to the common task of the concern.
2. the adjustment and continual re-definition of individual tasks through interaction with others.

3. the shedding of 'responsibility' as a limited field of rights, obligations and methods.
4. a network structure of control, authority and communication, the sanction which apply to the individual's conduct in his working role derive more from presumed community of interest with the rest of the working organisation in the survival and growth of the firm, and less from a contractual relationship between himself and a non-personal corporation, represented for him by an immediate superior.
5. omniscience no longer imputed to the head of the concern; knowledge about the technical or commercial nature of the here and now task may be located anywhere in the network; this location becoming the ad hoc centre of control authority and communication.
6. a lateral rather than a vertical direction of communication through the organisation, communication between people of different rank, also, resembling consultation rather than command.
7. a content of communication which consists of information and advice rather than instructions and decisions.
8. commitment to the concern's tasks and to the 'technological ethos' of material progress and expansion more highly valued than loyalty and obedience.
9. importance and prestige attached to affiliations and expertise valid in the industrial and technical and commercial millieux external to the firm.

The Mechanistic and Organic forms, as defined by Burns and Stalker, represent extremes on a continuum with a number of intermediate stages. The mechanistic system is consistent with classical theory, resembling

Weber's bureaucracy with high complexity, high formalisation and high centralisation. The organic system is consistent with human relations theory, resembling Mayo's psychologically appropriate organisation with low complexity, low formalisation and low centralisation.

2.1.2.2.2 Thompson (1967)

Thompson proposed how organisations should adapt to the various environments, as conceptualized on stability and homogeneity dimensions and summarised in table 2.1.2.2.2.

TABLE 2.1.2.2.2 : THOMPSON'S PROPOSITIONS

		HOMOGENEITY	
		HOMOGENEOUS	HETEROGENEOUS
STABILITY	STABLE	Rules and categories for applying rules.	Divisions and sections. Rules and categories for applying rules
	UNSTABLE	Uncertainty absorption, (monitoring). Contingency planning. Decentralised decision making.	Divisions. Sections Uncertainty absorption. Contingency planning. Decentralised decision making.

1. "Organisations facing heterogeneous task environments seek to identify homogeneous segments and establish structural units to deal with each".
2. "Boundary-spanning components facing homogeneous segments of the task environment are further

subdivided to match surveillance capacity with environmental actions."

3. "The organisation component facing a stable task environment will rely on rules to achieve its adaptation to that environment."
4. "When the range of variation presented by the task environment segment is known, the organisation component will treat this as a constraint and adapt by standardising sets of rules."
5. "When the range of task environment variations is large or unpredictable, the responsible organisation must achieve the necessary adaptation by monitoring that environment and planning responses, and this calls for localised units."

2.1.2.2.3 Lawrence and Lorsch (1967)

Lawrence and Lorsch conducted six detailed case studies among firms in the plastic industry to understand qualitatively the relationships among environment, differentiation and integration. Thereafter, they used interviews and questionnaires to collect data from thirty to fifty middle and upper level executives in the plastic, food and container industries to determine why certain organisations were highly effective and why others were not. The three industries had different rate of technological change in both products and processes, and were expected to experience different degrees of uncertainty.

They identified a number of key dimensions that describe the diversity in a firm's tasks (production, sales and research) and a number of dimensions that describe the differentiation in their organisation. In effective plastic firms there was a direct relationship between the two sets of characteristics,

as shown in table 2.1.2.2.3.A. The uncertainty of the information associated with a task and the time span of feedback were related to the degree of formality and the pattern of time orientation. "The more the parts of the environment differ in certainty and time span of feedback, and the less dominant any part was, the more differentiated were the pairs of the units in the high performing organisations".

TABLE 2.1.2.2.3.A
DIVERSITY AND DIFFERENTIATION

TASKS	PRODUCTION	SALES	RESEARCH
DIMENSIONS OF DIVERSITY			
Key variables	costs, quality	sales, volume	new ideas, talents
Uncertainty of information	low	moderate	high
Time span of feedback	short	medium	long
DIMENSIONS OF DIFFERENTIATION			
Goal orientation	costs, quality	sales, volume	new ideas, talents
Formality	high	moderate	low
Time orientation	short	medium	long
Interpersonal organisation	task	social	task

They also identified a second set of dimensions which describe a firm's tasks as they relate to integration. Successful organisations, in the three industries, achieved a high level of integration among their key task interdependencies, as shown in table 2.1.2.2.3.B. "The most successful organisations tended to maintain states of differentiation and integration consistent with the diversity of the parts of the environment and the required interdependence of these parts. "The highly differentiated plastic industry used formal

integrating departments; the less differentiated food industry used individual integrators; and the least differentiated container industry used direct managerial contact. The findings were consistent with the prediction that the demands of an uncertain environment will require less formalisation and more decision making at lower levels.

TABLE 2.1.2.2.3.B
DIFFERENTIATION AND INTEGRATION

FIRMS	CONTAINER	FOODS	PLASTICS
DIMENSIONS OF MAIN SUBUNITS			
Diversity.	low	moderate	high
Amount of inter dependence	low	moderate	high
Key inter-dependencies	sales-promotion	sales-research research-production	sales-research research-production
Key subtask to achieving goals	sales	sales-research	integrating units task
DIMENSIONS OF INTEGRATION			
Units where high integration achieved	especially sales-production	especially sales-research research-production	especially between integrating units
Time devoted to integration	low	moderate	high
Influence in resolving conflict	sales	sales-research	integrating units
Mode of conflict resolution	<----------confrontation---------->		

2.1.2.2.4 Duncan (1972,1979)

Duncan combined static-dynamic and simple-complex dimensions into four different kinds of environments. Simple-static environment was characterised by a small

number of similar factors and components which remain basically the same and are not changing. Simple-dynamic environment was characterised by a small number of similar factors and components which are in continual process of change. Static-complex environment was characterised by a large number of dissimilar factors and components which remain basically the same. Dynamic-complex environment was characterised by a large number of dissimilar factors and components which are in a continual process of change.

Table 2.1.2.2.4 extends the conceptualisation of the environment by Duncan, and the relationship between environmental dimensions and perceived environmental uncertainty discussed previously, to include "what is the right organisational structure ?".

TABLE 2.1.2.2.4 : DUNCAN'S PROPOSITIONS

	SIMPLE	COMPLEX
STABLE	low perceived uncertainty high complexity high formalisation high centralisation	moderately low perceived uncertainty high complexity high formalisation low centralisation
DYNAMIC	moderately high perceived uncertainty low complexity low formalisation high centralisation	high perceived uncertainty low complexity low formalisation low centralisation

The simple-stable environment creates the least amount of uncertainty and the appropriate structure is expected to be highly Mechanistic. The dynamic-complex environment creates the highest degree of uncertainty and the appropriate structure is expected to be highly

Organic, with considerable attention devoted to monitoring the environment and the utilisation of contingency planning to absorb the uncertainty.

2.1.2.2.5 Schmidt and Cummings (1976)

Schmidt and Cummings obtained data from twenty-three employment service district offices (each serving a specific geographical area with substantial degree of autonomy) in Midwestern State with the purpose of determining the relationship between organisational differentiation and the degree of perceived environmental uncertainty.

Perceived environmental uncertainty was measured by a questionnaire administered to the directors of each office. Uncertainty index was constructed from two dimensions : predictability and adequacy of information. The measure of their internal (size) and external (urbanisation, economic conditions and government service) environment was obtained through state statistical sources. The organisational differentiation was determined by the physical attributes of the office structure : number of levels, number of occupational specialities and number of separate units, from the organisational charts of the administration office.

All the zero-order correlations were negative with the relationships between number of units ($r=-0.36$) and the number of levels ($r=-0.46$) with perceived environmental uncertainty significant at $p<.10$ and $p<.05$ respectively. When the effects of the other measures of differentiation were controlled, only the number of levels ($r = -.365$, $p<.05$) was significantly related to the degree of perceived uncertainty.

2.1.2.2.6 Leifer and Huber (1977)

Leifer and Huber completed a cross-sectional field study in a health and welfare organisation in a Midwestern State government, to determine the relationships between perceived environmental uncertainty, organisation structure and boundary spanning behaviour. A questionnaire was administered to all two hundred and twenty employees in twelve work groups. One hundred and eighty two employees responded.

Perceived environmental uncertainty was measured by using seven items, on a zero to one hundred scale, anchored at five points : never, seldom, sometimes, often and always. Boundary spanning activity was operationalised as the total verbal and written interactions with external work units. Eight boundary-spanning behaviours were tapped. The organisational structure was measured as the degree of "organicness" using six components : participation in work decisions, formalisation, hierarchy of authority, impersonality, division of labour and participation in strategic decisions.

The measures were factor analysed to determine if all the items should be included in the variables. The unweighted mean scores on each measure were then used to obtain the scores. Contingency tables were generated with approximately equal number of subjects in the marginals. Owing to the ordinal properties, the data were analysed using Goodman-Kruskal Gamma. They were further analysed using a partial gamma.

The relationship between "organicness" and perceived environmental uncertainty was found to be significantly positive, but did not exist after the

variance due to boundary spanning was eliminated. The relationship between "organicness" and boundary spanning was found to be highly significant and positive and existed even after the variance due to perceived environmental uncertainty was eliminated. The relationship between perceived environmental uncertainty and boundary spanning was found to be highly significant and positive but did not exist after the variance due to "organicness" was eliminated.

Their findings indicated that boundary spanning may intervene between or mediate the relationship between perceived environmental uncertainty and organisation structure, and that "organicness" may intervene between or mediate the relationship between perceived environmental uncertainty and boundary spanning. They argued that the causality in the relationship between organisation structure and perceived environmental uncertainty may be from structure to uncertainty rather than the current contingency notion of uncertainty affecting structure.

2.1.2.2.7 Bourgeois, McAllister and Mitchell (1978)

Bourgeois et al. designed an exercise in which scenarios of two organisational environments, one stable and one turbulent, were presented to subjects; who were instructed to assume the role of the president of a new division, and after assessing the environment presented, to organise in order to take appropriate action. The scenarios were pretested by using independent judges. The t-test of their score showed that the scenarios were statistically significant ($t = 7.83$, $p<.001$).

Three studies were conducted. The first and second with senior and junior business administration students respectively. The second differed from the first only with respect to the control of prior exposure to contingency theory. The students were assigned randomly to the two scenario groups and then the scenarios were reversed. The third study was conducted with forty-three practising managers, without reversing the scenarios.

The organisation structure was operationalised by using Burns and Stalker's organic-mechanistic descriptions. Seven items were presented on five-point Likert type scales to the first group. The items were increased to ten for the second group. The ten items were developed into a single page decision problem for selection for the third group.

It was established, as expected, by study one and three, that (a) managers who encounter turbulent and threatening business environments will react by "pulling in the reins", resorting to a mechanistic structure to gain a sense of control over the situation, and (b) a more stable and supportive environment would result in the manager's "loosening-up" into a more organic style. Study one also established, as expected, that given a stable environment which subsequently becomes turbulent, decision makers would tend to shift from an organic to a mechanistic structure, but not vice versa.

The expectations of Bourgeois et al. were based on a substantial body of literature that suggests that most managers would respond to turbulent environments in a manner opposite to that which is predicted to lead to greater effectiveness. They state that this may be due

to either no prior exposure to contingency theory or due to managerial choice.

2.1.2.2.8 Hrebiniak and Snow (1980)

Hrebiniak and Snow used seven 'expert' informants to determine an initial list of industries ranging from low to high on the degree of environmental predictability. The list of thirteen industries was then shortened to seven at the extremes of the uncertainty continuum. Four industries were selected from the shortened list to determine whether industry is an important variable for the kind of uncertainty perceived by top managers and for organisational characteristics associated with uncertainty, such as structure and influence patterns.

Automobile and air transportation industries had low degree of perceived uncertainty. Plastics and semiconductor industries had high degree of perceived uncertainty. Twenty-five and thirty-two companies were selected from automobile and air transportation industries respectively. Twenty-four and nineteen companies were selected from plastics or synthetic resins and semiconductor industries respectively. Questionnaires were mailed to seven hundred and twenty one executives of the one hundred companies. Two-hundred and forty-seven usable questionnaires were received.

Environmental uncertainty was measured on the degree of predictability of thirty-three items, which were then factor analyzed. Five factors were isolated : financial, government, competitors, suppliers and general. Environmental complexity was determined by comparing the manager's perception of the five factors

with that of other managers in the industry. Structure was measured by determining work routine, reliance on rules, extent of autonomy and decentralisation in decision making. The components were factor reduced to two variables : standardisation and decentralisation. Departments responsible for the solution of problems or the attainment of organisational goals were used to determine influence patterns which could be affected by environmental contingencies.

Industry was found to be associated with varying levels of the different types of environmental uncertainty, with F ratios showing significant differences. Strong differences were found in the influence of department across the four industries. Of the two dimensions of organisation structure, only decentralisation showed significant variation. Correlation analysis between perceived environmental uncertainty and the components of organisational structure for each industry indicated that the relationship exists but the strength and direction of the correlation varied by industry and that the relationships between standardisation and decentralisation, and uncertainty and complexity were also affected by industry.

2.1.2.2.9 Koeberg (1987)

Koeberg randomly selected fifty-five schools from one hundred and sixty five elementary, junior high and senior high schools; to determine the relationships between perceived environmental uncertainty, scarcity of environmental resources, organisational structure and types of organisational adjustments.

Questionnaire was distributed to the principal or senior administrative officer of each chosen school. Eighty eight responses were received : twenty seven from elementary, twenty two from junior high and thirty nine from senior high schools. Environmental uncertainty was measured by adapting Duncan's scale. Environmental resource scarcity was measured by a scale developed by Ungson and Schwab. Organisational structure was measured by using Hage and Aiken's approach: absence of rules and procedures, participatory decision making and decentralisation of the hierarchy of authority. Five types of organisational adjustments (procedural, personnel, process, structural and strategic), as arranged in an ascending order of scope and cost, were used.

Little or no correlation was found between organisation structure and environmental variables, and between environmental uncertainty and resource scarcity. Frequency of procedural adjustments was found to be significantly greater than the frequency reported of the other four types. Frequencies of personnel and process adjustments were found to be significantly more than the structural and strategic adjustments.

Both uncertainty and resource scarcity accounted for variation in the overall frequency of organisational adjustments. Uncertainty was the strongest contributor to procedural adjustment and resource scarcity was the strongest contributor to the frequency of process, structural and strategic adjustments.

2.1.2.3 The Relationship between Organisational Structure and Performance

The results of prior studies investigating the relationships between dimensions of structure and performance, as summarised by Dalton, Todor, Spendolini, Fielding and Porter (1980), are listed in table 2.1.2.3. Some studies indicated that the relationship between complexity and performance was positive. Blau et al. (1966) found that the relationship was positive in small health care organisations and not significant in large organisations. Some studies indicated that the relationship between formalisation and performance was positive. Child (1974) found that the relationship was positive in less variable environment and inverse in variable environment. Some studies indicated that the relationship between centralisation and performance was negative. Dalton et al. state that the association between complexity and performance, and between formalisation and performance have not been clearly demonstrated and limited evidence tends to support a negative relationship between centralisation and performance.

It was not possible for Dalton et al. to summarise the contingency approach to structural-performance relationship because (i) many of the studies did not incorporate performance as a variable, (ii) those that did incorporate such variables used "soft" criteria, and (iii) as Child (1977) stated, " studies conducted with contingency framework do not demonstrate conclusively that variation in the design of organisations operating in similar structures will have serious consequences for their level of performance"

TABLE 2.1.2.3
STRUCTURAL DIMENSIONS AND PERFORMANCE

SPECIALISATION/ COMPLEXITY AND PERFORMANCE
1. Blau, Heyderbrand & Stauffer, 1966 : Health care organisations, Small units - POSITIVE, Large units - ZERO
2. Corwin,1970 : High school - ZERO
3. Hage & Dewar, 1973 : Health & welfare organisations - POSITIVE
4. Reimann, 1975 : Manufacturing firms - ZERO
5. Baldridge & Burnham, 1975 : School districts - POSITIVE
6. Beck & Betz, 1975 : Elementary & secondary schools - POSITIVE
FORMALISATION AND PERFORMANCE
1. Hage & Dewar, 1973 : Health & welfare organisations - POSITIVE
2. Child, 1974 : British organisations, variable environment - INVERSE, less variable environment - POSITIVE
3. Harrison, 1974 : Scientists - POSITIVE
4. Schuler, 1975 : Manufacturing employees - ZERO
5. Baum & Youngblood, 1975 : Lab students - POSITIVE
6. Rogers & Mulnar, 1976 : County administrators - ZERO
7. Vrendenburgh & Alutto, 1977 : Bank employees - ZERO
8. Vinson & Holloway, 1977 : Clerical, professional and managerial employees - POSITIVE
CENTRALISATION AND PERFORMANCE
1. Weiss, 1957 : Companies - ZERO
2. Tannenbaum, 1961 : Voluntary organisations - INVERSE
3. Bower, 1964 : Insurance companies - ZERO
4. Miller, 1967 : Engineers : INVERSE
5. McMahon & Peritt, 1971 : Managers - ZERO
6. Khandwalla, 1973 : Companies - ZERO
7. Hage & Dewar, 1973 : Health & welfare organisations - ZERO
8. Luke, Block, Davey & Averch, 1973 : Retail food organisations - INVERSE
9. Fiedler & Gillo, 1974 : Community colleges - ZERO
10. Harrison, 1974 : Scientists - INVERSE
11. Sorenson & Baum, 1975 : Voluntary organisations - INVERSE
12. Beck & Betz, 1975 : Elementary & secondary schools - INVERSE
13. Reimann, 1975 : Manufacturing firms - ZERO
14. Pennings, 1976 : Brokerage firms - INVERSE
15. Reimann & Negandhi, 1976 : Manufacturing firms - ZERO
16. McMahon & Ivancevich, 1976 : Managers - ZERO
17. McMahon, 1976 : Managers - INVERSE

2.2 BUSINESS POLICY LITERATURE

Section 2.2.1 reviews the dimensions and the design of strategic planning system, the evolution of management system and its interaction with organisational structure, the relationship between planning system and perceived environmental uncertainty, and the relationship between planning system and financial performance.

2.2.1 Strategic Planning System

2.2.1.1 Dimensions of Strategic Planning System

Ramanujam, Venkatraman and Camillus (1986) argued that planning systems are multifaceted management systems that are contextual and cannot be adequately described in terms of a few characteristics. They identified five design elements and two contextual elements, based on the support of an extensive literature, and which are controllable by managers. Lorange and Vancil (1977) used "adaptive" and "integrative" terms and their relative importance in their three-cycle model of goal-setting, planning and budgeting.

Figure 2.2.1.1 displays an adapted diagram of the dimensions of planning system, as suggested by Venkatraman et al. and Lorange et al. The organisational context considers the importance of adequate resources and the negative influence of resistance in the effectiveness of a planning system.

The system design context considers the ability of the system to balance the conflicting creativity and

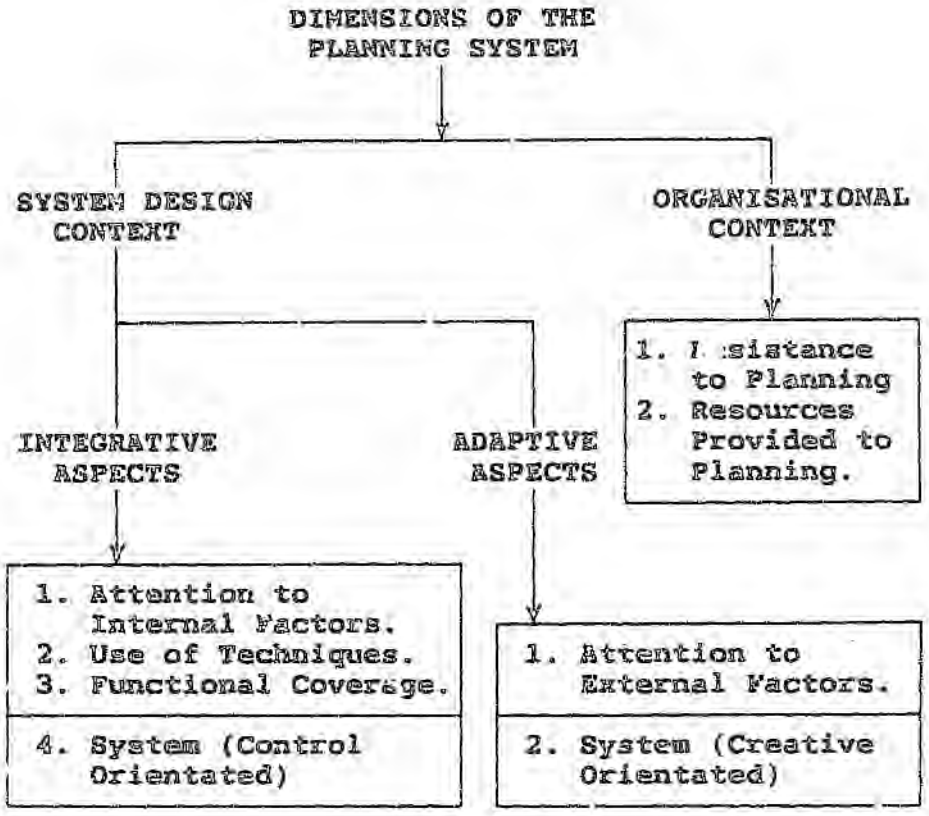


FIGURE 2.2.1.1 : DIMENSIONS OF PLANNING SYSTEM

control orientations in the organisation, to integrate the internal functional elements of an organisation, and to adapt the organisation to the changes in its task environment. The integrative aspect considers the importance of techniques and methodologies, attention to internal analysis and functional coverage, in the effectiveness of a planning system. The techniques indicates the decision-making approach used by organisations. Internal analysis indicates the appropriate diagnosis of the capability of an organisation. Functional coverage indicates the different emphasis various organisations place on their respective functional areas to implement their chosen strategic thrust.

2.2.1.2 The Design of Strategic Planning System

2.2.1.2.1 Lorange (1979)

After reviewing the literature on strategic planning system design, Lorange noted the following generalisations from the various contingency-based studies :

1. contingency-based approach towards the design of formal planning system is necessary to develop more effective systems;

2. several situational factors appear to be important when designing an appropriate formal system for a particular corporate setting,
   (a) demographic factors : size of the company, maturity of planning system;
   (b) factors relating to the strategic posture : diversity of its portfolio of businesses and nature of product/market setting of its various businesses; and
   (c) management style : perceptions about the needs and benefits of planning.

3. several system design factors appear to be relevent when developing a formal planning system for a company, in its particular setting,
   (a) top-down versus bottom-up process;
   (b) relative emphasis on long-term objectives versus short-term action plans;
   (c) selection of various tools to link together the elements of the planning process;
   (d) role of the corporate planner and other staff and line executives in the planning process.

No mention of either the environment or uncertainty as a possible important situational factor was made.

2.2.1.2.2 Chakravarthy

Chakravarthy (1987) operationalised the notion of fit between a planning system and its context. It focussed exclusively on the characteristic that addresses the balance between creativity and control orientation, and explored if the fit was an important determinant of how a planning system is evaluated by the firm's managers.

Three elements of strategic formulation cycle and three elements of strategy implementation cycle were combined into four different planning types : (I) centralised strategic planning, (II) decentralised strategic planning, (III) portfolio planning and (IV) dual focus. Three contextual elements were portfolio pressure, financial pressure (profitability and liquidity) and internal culture. System novelty was used as a moderator in the rating of the planning system by the various company evaluators.

Based on the strategy formulation (SF) and strategy implementation (SI) orientation; and portfolio (PP) and financial (FP) pressure, the appropriate type of planning system was postulated. High PP, high FP, centralised SF and centralised SI was called Type I. High PP, low FP, decentralised SF and centralised SI was called Type II. Low PP, high FP, centralised SF and decentralised SI was called Type III. Low PP, low FP, decentralised SF and decentralised SI was called Type IV.

Myopic, militaristic, autocratic, conservative and risk-averse culture was regarded as supportive of integration. Fast, vibrant, loose, risk seeking, research and development driven and creative culture was regarded as supportive of adaptation. The system appropriate for integration orientation was expected to be either I or III; and the system appropriate for the adaptation orientation was expected to be II or IV.

One hundred and sixty three executives attending a general management program were used to collect data, of which one hundred and eleven responded. Chakravarthy found that tailoring a formal strategic planning system to its context does not appear to be of concern to corporate officers, there is a lack of concern of planners for tailoring their planning system, the preference of divisional officers in both strategy formulation and implementation cycle is one of integration, and most incentive systems rewarded short-term profits rather than long-term adaptation.

2.2.1.3 The Evolution of Management System and its Interaction with Organisational Structure

Ansoff (1977,1983) argued that the adaptation to a new strategic posture goes beyond organisational restructuring and major changes remain ineffective until other components have been updated and rearranged with the new structure. He proposed that while structure (static element) assign roles and establishes relationship among them, management systems (dynamic element) specify the dynamics of interaction within the structure, the timing, the sequence, the content of the roles and the flow among them.

The differences in structure arises mainly due to the complexity of a company's strategic posture and the increasingly turbulent challenges in the environment. The differences in management system arises mainly due to the complexity of the many streams of activities occuring within an organisation and the kind of changes experienced by its elements. Ansoff observed that as strategic posture becomes more complex, systems become more comprehensive. For effective performance, he comments, a firm needs both structure and systems and they should be compatible and mutually reinforcing. If they are not, organisational dysfunctions will result.

TABLE 2.2.1.3 : COMPATIBILITY OF SYSTEMS AND STRUCTURE

	1	2	3	4	5
MORE MECHANISTIC					
A. Functional	++	++	++	-	-
B. Divisional	++	++	++	+-	+
C. International	+	+	++	+-	++
D. Multinational	+	+	++	+-	+
MORE ORGANIC					
E. Matrix	-	+	++	++	++
F. Dual Structure	-	+	++	++	++
G. Multistructure	-	+	++	++	++

KEY :

LESS COMPREHENSIVE
1 : Financial Control & Long-range Planning
2 : Budgeting & Management by Objectives
3 : Issue Management
MORE COMPREHENSIVE
4 : Strategic Planning & Strategic Management
5 : Crisis/Surprise Management

++ : implies natural and mutually reinforcing match
+ : implies compatibility
- : implies incompatibility

Table 2.2.1.3 summarises, the effective interaction of organisational structure and systems. The

organisational forms were separated into two groups : more mechanistic and more organic. The management systems were also separated into two groups : less comprehensive and more comprehensive.

The more mechanistic structures (A,B,C,D) need less comprehensive or sophisticated systems (1,2,3) to be effective. The more organic structure (E,F,G) need more comprehensive or sophisticated systems (3,4,5) to be effective. Issue management system appears to be appropriate for any organisational form. The emphasis on the integrative dimensions of the planning system should increase with the increase in the internal complexity of the organisational forms. The emphasis on adaptive dimensions of the planning system should increase with the increase in the degree of discontinuity of key task environmental variables.

2.2.1.4 The Relationship between Planning System and Perceived Environmental Uncertainty

Only a few research studies (Lindsay and Rue,1980; Boulton, Lindsay, Franklin and Rue,1982, Javidan,1984; and Ireland, Hitt, Bettis and De Porras,1987) considered the relationship between planning process or systems and perceived environmental uncertainty.

2.2.1.4.1 Lindsay and Rue (1980)

Lindsay and Rue's study was the first to consider the relationship between long-range planning process and environmental complexity and instability.

They envisaged that as the environmental dimensions of complexity and instability increase, emphasis on

components of the long-range planning process will change. The use of uncertainty-reducing methods, specifically consultants and computer models, will increase. The use of the "open-systems" approaches to planning as measured by more participation of lower organisation levels, more upward flows of information, and more public information, will increase. Formal long-range planning process will have been in use for a longer period of time and its time span will be shorter. Planning review periods will be shorter and planning premises will support more immediate and tangible goals, as opposed to longer-range and intangible goals.

Three hundred and ninety firms in a wide variety of durable, nondurable and service industries, which responded to earlier research to determine the completeness of long-range planning process, were sent another questionnaire to classify them according to their perceived environmental uncertainty. One hundred and ninety-eight companies responded to the second questionnaire.

The measurement of the completeness of the planning process was based on the normative framework recommended in the literature. The process should be applicable to most segments of the business, should contain objectives and goals, should contain the metho procedures, and means for realising and implementing the goals and objectives and should contain some procedures for auditing and controlling the plan.

Duncan's and Harvey's studies were used to develop a complicated procedure to measure the three dimensions of the environment : complexity, stability and product volatility. The product volatility measure was used as

an objective criterion against which the perceived environmental uncertainty was compared. Four scales were developed for the analysis of environmental data : external complexity, internal complexity, external stability and internal stability. The companies were grouped into three categories based on the multiple cutoff procedure of the questionnaire. Correlation analysis using Kendall's tau and stepwise regression analysis was conducted to test the propositions.

Chi-square test showed that there were significant differences ($p<.01$) between the organisational environment of large and small companies. Kendall's tau indicated that planning completeness was significantly ($p<.05$) related to organisational environment in large firms using external and total environment measures. It approached significance ($p<0.058$) using the internal environment measures. Although the relationship for small organisations was in the predicted direction, it was not significant.

Regression analysis indicated that overall planning completeness, the length of time the planning process has been in use, and types of goals, were significantly related to the external stability dimension. In each case stability component was the dominant factor in the external environmental measure, which explained the variation in the planning components.

The internal environment measure, unlike the external environment measure, showed no significant relationship to planning process completeness. There was some evidence that the planning completeness did not have a significant impact on the perception of complexity and stability of the environment. The degree of the openness of the planning process was

directly related to the environmental components for large firms but inversely related to the environmental components of small firms. The planning review frequency was inversely related to environment components.

2.2.1.4.2 Boulton, Lindsay, Franklin and Rue (1982)

The purpose of Boulton et al.'s research was to continue the line of environmental study as it relates to perceived environmental uncertainty and strategic planning practices. Their study investigated the nature of current environmental characteristics, approaches for using uncertainty measures, and the relationships between planning activities, environmental characteristics and perceived environmental uncertainty.

Questionnaires were sent to three hundred and fifty eight companies that had responded to Rue's planning questionnaire. One hundred and forty-four companies responded, of which one hundred and three questionnaires were usable. Lindsay and Rue's planning questionnaire was used with an environmental section incorporating Duncan's external environmental characteristics (PE) and Bourgeois' perceived uncertainty characteristics (PEU).

The underlying structures of the thirteen environmental elements incorporated into Duncan's five environmental dimensions were analysed using principal component analysis with VARIMAX rotation to determine the nature of "current environmental characteristics". A four [illegible] solution was obtained with the competitor dimension loaded on the separate customer and supplier dimensions. Thirteen perceived

environmental uncertainty scores were analysed using principle component analysis using VARIMAX rotation. Four factor solution was obtained.

Paired comparisons of PE and PEU factor matrices were made using coefficient of congruence. High similarity was found between the supplier/technological dimension factors and socio-political dimension factors. Marginal similarity was found between the customer dimension factors. No similarity was found between other factors. PE and PEU were compared by industry groupings and planning completeness levels, in order to determine whether the incorporation of uncertainty aids in the analysis. No significant differences were found.

For industry group and planning level, both linear regression and moderated regression models were constructed for each of the environmental dimensions and a total score which sums the four dimensions. Uncertainty was used as a moderator. The F-test indicated that uncertainty moderates the relationships among industry groups for all environmental dimensions. Uncertainty moderates the relationship among planning levels for only the supplier and technological dimensions of the environment.

Boulton et al. concluded that uncertainty, defined by the product of the uncertainty of the effects of the various elements and the span of uncertainty about the effects of these elements, does not have a consistent impact on all aspects of strategic planning and industry research.

2.2.1.4.3 Javidan (1984)

Javidan continued the line of research into the relationship between environmental uncertainty and the usage of long-term planning by management as an adaptive tool. Questionnaires were sent to the presidents of two hundred largest savings and loan associations and to thirty-two supervisory agents responsible for overseeing the industry. The responses of the supervisory agents were used to test the validity of the responses of the presidents. Ninety-one presidents and seventeen supervisory agents responded to the request. Telephone interviews were also conducted with six presidents who indicated that they practised "limited" planning and five presidents who indicated that they practised "extensive" planning.

The measurement of the completeness of long-range planning was based on Lindsay and Rue's approach with few modifications. Environmental uncertainty was defined as the perceived degree of predictability of the key components of the task environment. The key components were determined by interviewing chief executive officers of seven associations. The data was analysed using Hartwig and Dearing's approach.

The findings indicated that (1) the presidents agreed with the extreme degree of uncertainty in their "current" environment, (2) the president felt, contrary to the supervisory agents, that their planning was significantly more extensive "now" than five years ago, (3) both presidents and supervisory agents agreed that, although long-range planning was difficult under high uncertainty, it was of some value, and (4) the short-term outlook prevailed.

The difference in "limited" and "extensive" planners' perception of uncertainty was not statistically significant. They, however, showed major differences in their responses to the changed circumstances. The "limited" planners stated that the extreme degree of uncertainty had reduced the value of long-term planning, because of the inability to forecast the future with any degree of confidence. The "extensive" planners stated that even though long-range planning was difficult under extreme uncertainty, it was still a valuable tool to deal with environmental changes and challenges.

No significant impact of company size was found on the research variables. Javidan noted that the effect of environmental uncertainty appear to be moderated by the perceived need for internal change and the perceived value of long-range planning in formulation and implementation of such a change.

2.2.1.4.4 Ireland, Hitt, Bettis and De Porras (1987)

Ireland et al. obtained information from three largest companies with headquarters in Venezuela, in petrochemical, brewing and oil tools industries; with the purpose of determining (a) whether perceptions of strength and weakness indicators vary by management level and by firms in different industries, and (b) whether the perceptions of environmental uncertainty vary by management level.

Thirty one subjects were selected from the oil tools company : seven top managers, six middle managers and eighteen lower-level managers. Four subjects were selected from the petrochemical company : one top manager and three middle managers. Twenty one subjects

were selected from the brewing company : four top managers, fifteen middle managers and two lower-level managers. The different proportions reflected the different approaches used in the strategic planning process.

A policy-capturing procedure was used to provide models of managerial judgements regarding the relevant strength and weakness indicators. The number of cases were limited to thirty for reasons of response practicality. Managers were asked to rate the effectiveness of each firm on a scale of one to seven based on the indicator level presented in each case. Miles and Snow's PEU instrument, modified for the Latin American environment was used to collect data on perceived environmental uncertainty.

The environmental uncertainty, as perceived by managers, was expected to vary by firm in different industries. Mean scores for oil tools, brewing and petrochemical firms were 21, 18.15 and 21.63 respectively. Analysis of variance was significant ($F = 4.1$, $p<.05$), but Duncan's multiple range test failed to show significant differences by firm.

The environmental uncertainty, as perceived by managers, was expected to differ by management level. Mean scores for top, middle and lower-level were 20.15, 18.48, 22.19 respectively. Analysis of variance was significant ($F = 4.96$, $p<.02$). Major differences existed by management level in the perceived uncertainty of clients ($F = 7.01$, $p<.02$), financial markets ($F = 2.86$, $p<.07$) and labour unions ($f = 2.9$, $p<.07$).

Top managers perceived more environmental uncertainty with labour unions than middle managers. Lower-level

managers perceived (1) more general environmental uncertainty than middle level managers but not as compared to top level managers, (2) more environmental uncertainty in the clients dimension than top or middle managers, and (3) more uncertainty in the financial markets than middle managers.

The results also supported the expectations that the perceptions of important strength and weakness indicators vary by management level and by firm in different industries.

2.2.1.5 The Relationship between Planning System and Organisational Performance

King (1983) reviewed two approaches to the evaluation of planning. The indirect approach is based on the assumption that planning will lead to improved business performance. It treats the outputs of the planning process as "black box" and should be evaluated only in terms of the ultimate performance of the business. It does not consider any process benefits and does not utilise external standards in the evaluation. It indicates only the degree of association of the planning process with the business performance. It evaluates the influence of planning by comparing various firms, each operating at different levels of planning. The results of a number of field studies which used the indirect approach are reviewed in section 2.2.1.5.1.

The direct approach involves a number of assessments at the various points in the planning process, from the resource inputs to the system, from the system to its outputs, and from the outputs to the business performance. It involves multidimensional assessment

and uses both internal and external standards. It analyses multiple system stakeholders and uses judgemental and objective assessments. Two studies which used multidimensional conceptualisation of planning and multiple criteria of effectiveness are reviewed in section 2.2.1.5.2.

2.2.1.5.1 Field Studies with Indirect Approach

Armstrong (1982) reviewed a number of studies on the value of formal planning in organisations and analysed them in terms of the process variables, the situational variables and the monitoring of results as related to the objectives of each shareholder, after consultation with the researchers concerned.

The various studies, their time span and their descriptions are listed in table 2.2.1.5.1. Despite the limitations of the studies a pattern did emerge. Planning was useful with improved performance noted in ten out of fifteen comparisons with five statistically significant at the 0.05 level.

Almost all the studies (except 6 & 7) indicated that the formalisation of objectives will produce superior performance. Only a few studies indicated that the formalisation of (a) strategy generation and evaluation (1,2 & 7), (b) monitoring procedure (1,5,10 & 12) and (c) the gain of commitment (1,6,7 & 8) will produce superior performance. Two out of three studies (1,4 & 9) incorporating "inefficient market", found that formal planning was superior. Three out of five studies (1,2,3,4,& 7) incorporating "large changes", found planning to be superior. No explicit measures of "uncertainty" and "complexity" were incorporated in any of the studies.

TABLE 2.2.1.5.1
VALUE OF PLANNING : INDIRECT APPROACH

1. Van de ven (1980) - [1973-1975]
   9 planners versus 5 non-planners in the introduction of community child care programmes.
2. Ansoff et al. (1970) - [1947-1966]
   Acquisitions by 22 planners versus 40 non-planners.
3. Thune and House (1970) - [1958-1965]
   (a) 9 planners versus 9 non-planners in pharmaceutical, chemical and engineering industries.
   (b) 8 planners versus 10 non-planners in food, oil and steel industries.
4. Herold et al. (1970) - [1962--1969]
   5 planners and 5 matched non-planners in pharmaceutical and chemical industries.

5. Kudla (1980,1981) - [1960-1975]
   78 planners versus 51 non-planners from Fortune 500.
6. Marju (1981) - [1976-1979]
   12 planners with commitment versus 31 lacking either formal planning or commitment or both.
7. Karger and Malik (1975); Malik and Karger (1975) -[1964-1973]
   19 planners versus 19 non-planners among pharmaceutical, chemical, electronics and engineering industries.
8. Wood and Laforge (1979,1981) - [1965-1976]
   Survey of banks : interview and questionnaire; 27 planners versus 9 non-planners.

9. Kallman and Shapiro (1978) - [1965-1974]
   Five levels of planning examined in 298 firms in motor freight industry.
10. Grinyer and Noburn (1975) - [1971-1977]
    In depth interviews with 91 executives from 21 companies.
11. Leontiades and Tezel (1980) - [1971-1977]
    61 companies from Fortune 1000 largest industrial firms.
12. Fulmer and Rue (1974); Rue and Fulmer (1973) - [early 1970s]
    (a) 33 planners versus 20 non-planners. in durable goods sector.
    (b) 108 planners versus 43 non-planners in non-durable goods sector.
    (c) 27 planners versus 40 non-planners in service industries.

2.2.1.5.2 Multidimensional Conceptualisation with Multiple Criteria of Effectiveness

Ramanujam, Venkatraman and Camillus (1986) developed seven key dimensions of planning system, five reflecting their design content and two reflecting their organisational content, and identified three criteria of effectiveness, (1) fulfillment of planning objectives : predicting future trends, evaluating alternatives, enhancing management development, avoiding problem areas, and improving short-term and long-term performance; (2) performance relative to competition : growth in sales, growth in earnings, change in market share, return on investment; and (3) satisfaction with planning system.

Detailed questionnaires were sent to six hundred executives to evaluate the ability of the seven dimensions of planning system to distinguish between more and less effective planning systems. Two-hundred executives responded to the information requested. The effectiveness dimensions were categorised into two groups, high and low, for discriminant analysis.

Factor analysis of the seven dimensions of planning system did n result in any parsimony and none of the factors were easy to interpret.

Thirteen discriminant analysis procedures were conducted, seven for fulfillment of objectives, five for performance relative to competition and one overall measure of satisfaction. Twelve were significant at $p<.05$ and one significant at $p<0.10$. The seven dimension generated significant functions for each of the effectiveness criteria used. Variables measuring fulfillment of objectives and relative performance were all highly correlated.

The top-ranked discriminators for the three criteria of effectiveness were as follows :

1. Satisfaction with planning systems : resistance to planning, system capability, resources provided and external analysis;
2. Fulfillment of objectives : system capability, resistance to planning, functional coverage and use of techniques;
3. Relative performance : resources provided, system capability, functional coverage and resistance to planning.

Venkatraman et al. concluded that the importance of design elements varied considerably depending on the criterion of effectiveness used. System capability emerged overall as the most important discriminator. They recommended that system design should be tailored to specific purposes of planning and must include the system capability as its key dimension.

Ramanujam and Venkatraman (1987) provided an analytical extension of the research conducted by Ramanujam et al. (1986). The 'system capability' dimension was excluded from the planning system and was regarded as a criterion of effectiveness. The 'satisfaction of planning system' criterion of effectiveness was excluded altogether.

The multivariate relationship between planning system and effectiveness was explored using canonical correlation analysis. The linear combination of the criterion set dimensions derived from the canonical analysis was regarded as an empirical based multivariate measure of effectiveness. Organisational content dimensions emerged as the most important contributors to planning effectiveness.

2.3 THEORETICAL FRAMEWORK : DEALING WITH UNCERTAINTY

The convergence of organisational theory literatur and business policy literature into a theoretica framework to deal with environmental uncertainty ar change is considered in this section. The framework i further extended, in terms of the predominant forc utilised by organisations to deal with environmenta uncertainty, into two organisational configurations.

2.3.1 Convergence of Organisational Theory Literature and Business Policy Literature

Much of the development in organisation theory, fr bureaucracy school to contingency theory school, to place within the notion of "policy formulation" a pre-strategy paradigm. Once an organisation environmental domain was selected during its creatio it had to change its initial bureaucratic view t incorporate human elements and thereafter adaptatio to the 'environment' in which it was historicall bound; in order to be efficient, productive and profitable.

The evolution of the neo-contingency notion, the evolution of initial strategy paradigm and thereafte the strategic management paradigm, attempted to offe organisations a strategic planning and decisio framework to actually review its "core strategy" ar "historical environment"; and if unfavourable, throug strategic choice (Child, 1972) select the environmen in which it wishes to engage or through the process o enactment (Weick, 1977) create its own environment.

The developments in Organisational Theory (Burns ar Stalker, 1961; Woodward ,1965; Lawrence and Lorsch

1967; Perrow, 1967; Galbraith ,1977; etc.) provides an institutional leader the various mechanisms he or she can use in his or her attempt to create an efficient enterprise which is satisfying and motivating to its human resources and which is appropriately structured to the technology and the environment. The technology and the environment were determined by the selection of an appropriate mission or purpose through strategic choice or enactment. Snow and Miles (1983) used the term "internal arrangement"; and Ansoff (1977) used the term "internal dynamics and structure".

The developments in Business Policy (Andrews, 1971; Drucker, 1954, 1974; Chandler, 1962; Thompson, 1967; Weick, 1969, 1977; Child, 1972; Miles, Snow and Pfeffer, 1974; Miles and Snow, 1978; etc.) provides an institutional leader a mechanism, in a form of planning processes and systems to review the "chosen" mission and strategy in light of the new challenges presented by the dynamic and complex environment; and if inappropriate or undesirable develop a new mission and strategy to either change its competitive posture or exit from the environment altogether. Snow and Miles (1983) used the term "environmental alignment", and Ansoff (1977) used the term "relationship with the environment".

Snow and Miles (1983) argued that, "Just as the organisation must be continually fitted to its environment, internal structures and processes must be fitted to each other in ways that support environmental-alignment mechanism". Ansoff (1977) suggested that, "Organisations can prepare 'before-the-fact' strategic preparedness to environment dynamics and discontinuities by (a) responses that change the firm's relationship with the environment and by (b) responses which change the

internal dynamics and structure of the firm. "Snow and Miles and Ansoff considered the importance of both the Organisational Theory and Business Policy, like the two sides of a coin, for organisations to deal with environmental uncertainty. Figure 2.3.1 illustrates the convergence of Organisational Theory Literature and Business Policy Literature into a theoretical framework - Dealing with Uncertainty.

2.3.2 Stability and Flexibility : Two Opposing Forces

The change in environmental alignment is normally preceded by the formulation, evaluation and selection of appropriate strategies; which in turn depends on the comprehensiveness of the planning process (Lindsay and Rue, 1980). The degree of sophistication of the planning system, in terms of the emphasis given to the organisational and system design elements, determines the effectiveness of the planning process (Ramanujam, Venkatraman and Camillus, 1986). A more dynamic and complex environment requires a sophisticated system of planning, with greater emphasis on adaptive aspect of system design and creative aspect of system capability, to continually monitor the environmental alignment of an organisation and if necessary indicate any incongruency for action.

The change in environmental alignment requires implementation of changes in the internal arrangement. The ease with which an organisation can change its internal structure and processes determines its ability to support the environmental-alignment mechanism. The greater the frequency of environmental alignment, the greater the flexibility of the internal

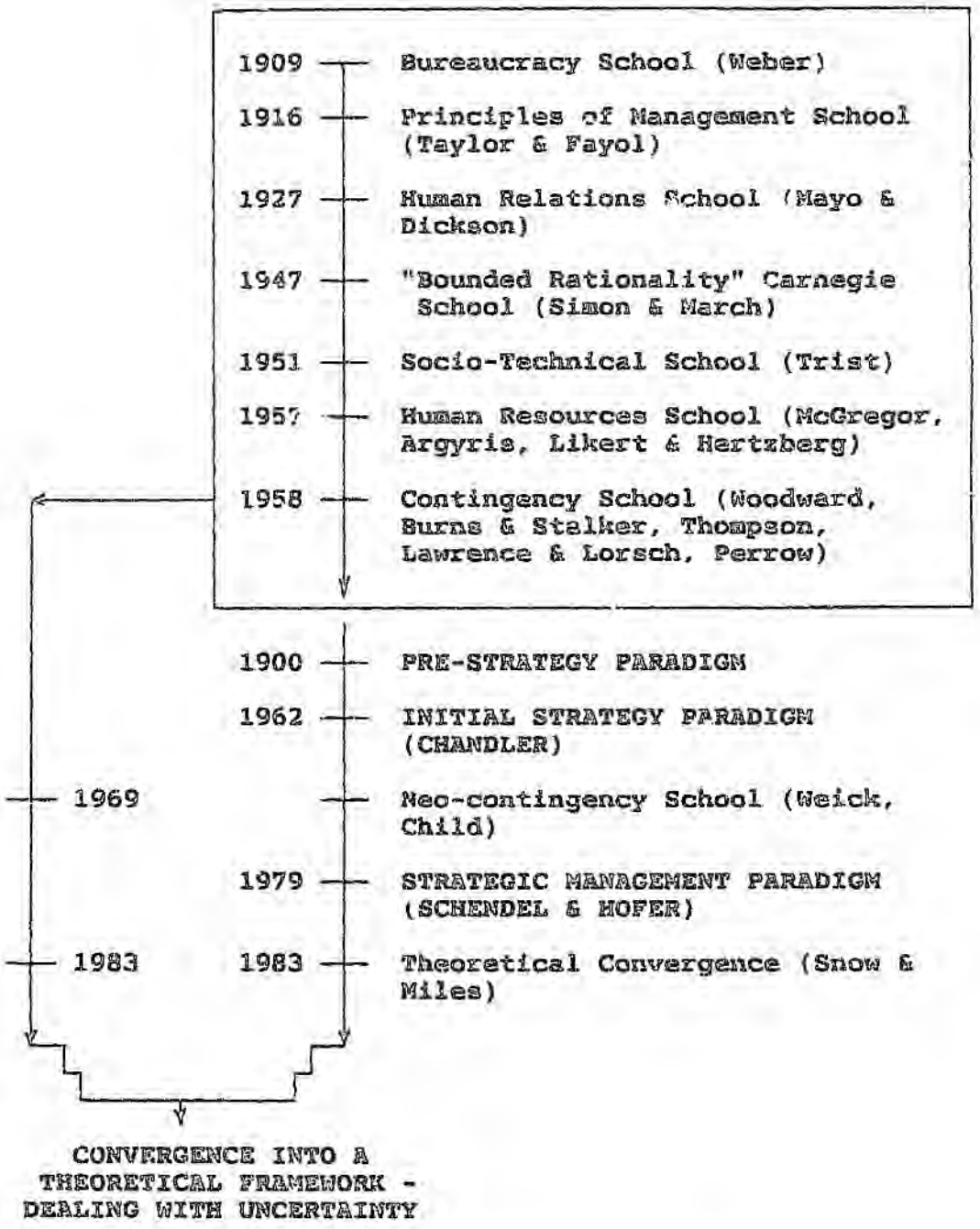


FIGURE 2.3.1 : THEORETICAL FRAMEWORK - DEALING WITH UNCERTAINTY

arrangement should be, for effective adaptation to the environment. Organic structure is appropriate for changing conditions and mechanistic structure is appropriate for stable conditions (Burns and Stalker, 1961).

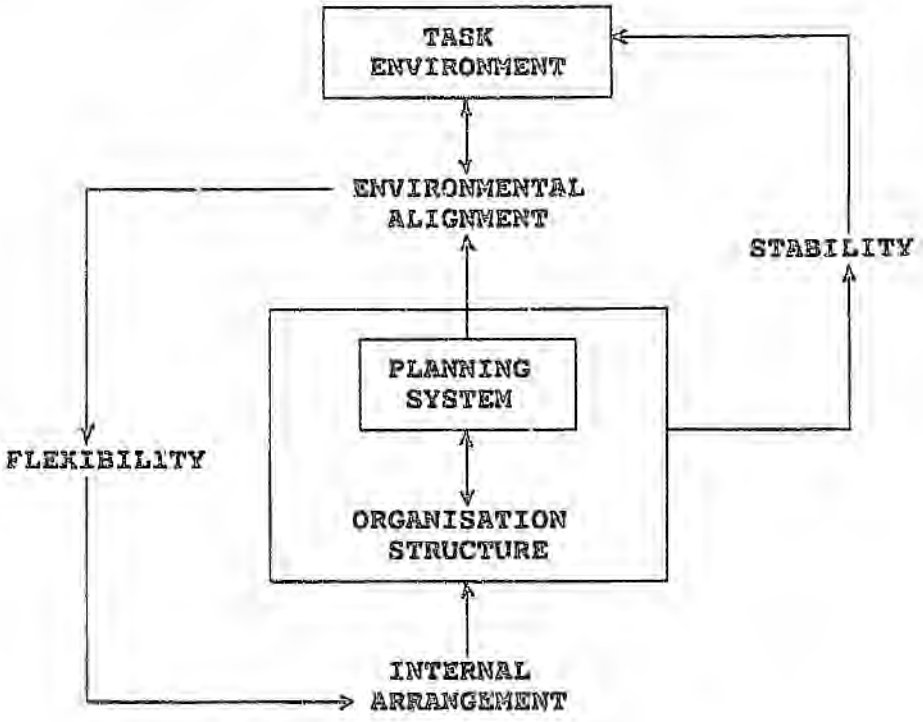


FIGURE 2.3.2 : STABILITY AND FLEXIBILITY

Ansoff (1983) defined organisational structure as an architecture of a corporation and is STATIC. He defined planning system as a DYNAMIC process of the architecture. The architecture (organisational structure) needs to be appropriate, with its component processes (dynamic elements) fitted to each other, so that it supports the environmental alignment. The dynamic element of the architecture (planning system) is restricted by the nature of the architecture. The dynamic element (planning system) in its quest for effective environmental alignment may signal the change in the architecture by which it is bound, and

if the architecture does change, the dynamic element may itself need to change, as depicted in figure 2.3.2.

There are two opposing forces, stable and flexible. The "stable" force will attempt to reduce the change in the environment or prevent the change in its alignment in order to maintain its status quo. It will develop strategies which are appropriate for its existing structure. The "flexible" force will attempt to maintain it environmental-alignment and change the internal arrangement. It will develop a structure which is appropriate for its new alignment strategies.

2.3.3 Defender and Prospector : Two Organisational Configurations

2.3.3.1 Strategy-Structure Typologies

Miles, Snow, Meyer and Coleman (1978) classified organisations, based on the characteristics of their entrepreneurial, engineering and administrative problems, into four strategy-structure typologies: defenders, prospectors, analysers and reactors. Table 2.3.3.1 detail various strategies, their goals and their structural characteristics.

The defenders prefer stability and are highly mechanistic. The prospectors prefer flexibility and are highly organic. The analysers prefer stability and flexibility and use a dual structure. Hambrick (1983) found that defenders generally outperformed prospectors in terms of profitability and cash flow and that prospectors outperformed defenders in terms of market share gains in only innovative industries.

TABLE 2.3.3.1 : STRATEGY-STRUCTURE TYPOLOGIES

STRATEGY	STRUCTURAL CHARACTERISTICS
Defender	Prefers stability and efficiency : Tendency toward functional structure with extensive division of labour and high degree of formalisation. Centralised control and complex vertical information systems. Simple coordination mechanisms and conflict resolved through hierarchical channels.
Prospector	Prefers flexibility : Tendency toward product structure with low division of labour and low degree of formalisation. Decentralised control and simple horizontal information systems. Complex coordination mechanisms and conflict resolved through integrators.
Analyser	Prefers stability and flexibility : Tendency toward a loose structure combining both functional and product structures. Moderately centralised control. Extremely complex and expensive coordination mechanisms; some conflict resolution through product managers, some through normal hierarchical channels.

Namiki (1989) found that prospectors outperformed defenders and analysers in terms of sales growth, return on assets and overall performance in a highly volatile semiconductor industry. Namiki also tested Miles and Snow's suggestion that prospectors tended to prefer uncertain environment while defenders prefer stable environment. Burns and Stalker's (1961) propositions appears to be corroborated by the appropriateness of the prospector and defender strategy-structure typologies, in changing and stable environment respectively.

2.3.3.2 Integrative-Adaptive Culture

Chakravarthy 1987) regarded myopic, militaristic, autocratic, conservative and risk averse culture as supportive of integration; and fast, vibrant, loose, risk seeking, research and development driven and creative as supportive of adaptation. It appears that th culture which supports integration makes an organisation defensive, with "stability" as the dominating force in its attempt to deal with environmental uncertainty. It appears that the culture which supports adaptation makes an organisation prospective, with "flexibility"" as the dominating force in its attempt to deal with environmental uncertainty.

2.3.3.3 Technocratic-Structural-Power Response

Allaire and Firsirotu (1989) proposed a framework to 'cope with strategic uncertainty'. Their framework, depicted in table 2.3.3.3, is based on the level of uncertainty and the degree of potential control on source of uncertainty. Technocratic response attempts to get a handle on the future events by using strategic planning, which will fail whenever changes occur faster than the organisation's ability to respond. Structural response attempts to design firm to absorb uncertainties over which it cannot ert control by diversifying, by setting up alliances and by expanding or contracting quickly with the change in uncertainty. Power response attempts to shape and control events by lobbying, social-responsibility programs, domination of competitive environment, process of acquisition and divestment, competitor disciplining and power of the courts.

TABLE 2.3.3.3 : LEVEL OF UNCERTAINTY AND POTENTIAL CONTROL ON SOURCE OF UNCERTAINTY

	LEVEL OF UNCERTAINTY (Volatility and/or unpredictability) LOW ⟵ ⟶ HIGH	
DEGREE OF POTENTIAL CONTROL ON SOURCE OF UNCERTAINTY: LOW ↑ ↓ HIGH	TECHNOCRATIC RESPONSE (predict and prepare)	STRUCTURAL RESPONSE (built-in insulation and flexibility)
	TECHNOCRATIC OR POWER RESPONSE	POWER RESPONSE (act to create or control the environment)

The defenders with the emphasis on "stability" force will attempt to use technocratic or power response to deal with environmental uncertainty. Whenever, the potential control on the source of uncertainty decreases, the defender may be unable to cope with changes and may eventually become unprofitable. The defenders will usually be mechanistic and use formal planning system for integration.

The prospector with the emphasis on "flexibility" force will attempt to use technocratic or structural response to deal with environmental uncertainty. Whenever the level of uncertainty increases faster than the organisation can respond, it will use structural response. The prospector will usually be organic and use informal planning system for adaptation.

The analyser with the emphasis on both "stability" and "flexibility" forces will attempt to use all three forces in its attempt to deal with environmental uncertainty. The utilisation of power response will depend on the potential control on the various sources

of uncertainty. The analyser will usually have dual structure and use planning system for integration and adaptation. It will have to manage the conflicting demands of the dual structure and the different planning emphasis.

2.3.3.4 Types of Adjustments

Koeberg (1987) postulated and tested the proposition that, organisations most frequently uses the type of adjustment which is low in scope and is economical. The five types of adjustments as arranged in ascending order of scope and cost, is depicted in table 2.3.3.4.

TABLE 2.3.3.4 : TYPES OF ADJUSTMENTS

TYPE OF ADJUSTMENT	DEFENSIVE ORGANISATIONS	PROSPECTIVE ORGANISATIONS	SCOPE AND COST
Procedural	Most frequent	Least frequent	Low
Personnel	↑	↑	↑
Process	↕	↕	↕
Structural	↓	↓	↓
Strategic	Least frequent	Most frequent	High

Defender organisations, with dominant "stability" force, are likely to use procedural, personnel and process adjustments more frequently than structural and strategic adjustments to deal with environmental uncertainty and change. Prospector organisations, with dominant "flexibility" force, are likely to use strategic and structural adjustments more frequently than procedural, personnel and process adjustments to deal with environmental uncertainty and change.

Frequent strategic and structural adjustments by prospective organisations are costly and may result in low profitability as compared to defensive organisations, at least in the short-term. It may explain Hambrick's (1983) findings that defenders have outperformed prospectors in terms of profitability and cash flow. The defenders may have, however, sacrificed their long-term survival for short-term profitability.

2.3.3.5 Characteristics of the Two Organisations

Two organisational configurations, defender and prospector, and their characteristics, as synthesised from the various developments by Snow and Miles (1983), Ansoff (1977), Chandler (1962), Miles, Snow Meyer and Coleman (1978), Chakravarthy (1987), Allaire and Firsirotu (1989), Koeberg (1987), Child (1972), Weick (1977) and Mintzberg (1979) are listed in table 2.3.3.5.

TABLE 2.3.3.5 : TWO ORGANISATIONAL CONFIGURATIONS

DEFENDER	ORGANISATION	PROSPECTOR
Internal	FOCUS	External
Operational Control	MANAGEMENT	Strategic Capability
Efficiency	QUEST FOR	Effectiveness
Doing Things Right	KEY OBSESSION	Doing the Right Thing
Production & Finance	REWARD SYSTEM FAVOURS	Marketing & R & D
Standards & Targets	PERFORMANCE MEASUREMENTS	Competitors & Potential
Centralised	MANAGEMENT CONTROL	Decentralised

TABLE 2.3.3.5 (CONT.) : TWO ORGANISATIONAL CONFIGURATIONS

DEFENDER	ORGANISATION	PROSPECTOR
Functional	STRUCTURE	Product
Complex Vertical	INFORMATION SYSTEM	Simple Horizontal
Simple	CO-ORDINATING MECHANISM	Complex
Hierarchical Channels	CONFLICT RESOLUTION	Through Integrators
Stability	DOMINANT FORCE	Flexibility
Certain	PREFERRED ENVIRONMENT	Uncertain
Integration	CULTURE	Adaptation
Mechanistic	ORGANISATIONAL STRUCTURE	Organic
Control Integrative	PLANNING SYSTEM	Creative Adaptive
Planning	STRATEGY MODE	Adaptive
Constrained	FLEXIBILITY OF MODE	Adaptive
Technocratic Power	PREDOMINANT RESPONSE TO UNCERTAINTY	Technocratic Structural
Strategy follows Structure	STRATEGY-STRUCTURE CAUSALITY	Structure follows Strategy
Evolutionary	PREFERRED CHANGE	Revolutionary
1. Procedure 2. Personnel 3. Process 4. Structural 5. Strategic	SEQUENCE OF ADJUSTMENT TO ENVIRONMENTAL CHANGE	1. Strategic 2. Structural 3. Process 4. Personnel 5. Procedure
High in Certain Environment	PROFITABILITY	High in Uncertain Environment

2.4 SUMMARY

Section 2.1 reviewed related concepts and findings of Organisation Theory literature and section 2.2 reviewed related concepts and findings of Business Policy literature. The convergence of Business Policy literature and Organisation Theory literature into a theoretical framework to deal with environmental uncertainty was developed in section 2.3. The framework was extended, in terms of the predominant force utilised by organisations to deal with environmental uncertainty and change, into two organisational configurations, prospector and defender. In view of the objectives of the research and given that the prospector configuration is more appropriate for uncertain environment, various propositions are deduced, for prospector organisations, in the next chapter for empirical verification.

CHAPTER 3 : RESEARCH METHODOLOGY

The approach used to construct hypothesis and its verification is based on the "Classical Approach" consisting of three stages (Bailey, 1987). The chapter begins with the development of research propositions after the survey of related concepts, theories and research findings in the previous chapter (Stage 1). The concepts used in the propositions are then operationalised to bridge the gap between concepts at theoretical level and the variables at empirical level (Stage 2). Thereafter, the methodology used to collect research data and the analysis thereof to verify the proposed relationships is discussed (Stage 3).

3.1 RESEARCH PROPOSITIONS

Four relationships were selected from the research model for further investigation : perceived environmental uncertainty, planning system and financial performance; perceived environmental uncertainty, organisational structure and financial performance; environmental volatility, perceived environmental uncertainty and financial performance; and organisational structure and planning system.

Research propositions for each of the four relationships are deduced in the following sub-sections. Each sub-section reviews and synthesises the related theory, concepts and findings discussed in the previous chapter, illustrates the likely shape of the relationship for prospector organisations and thereafter tabulates the propositions in an analysis of variance framework.

3.1.1 Perceived Environmental Uncertainty, Planning System and Financial Performance

Linsay and Rue (1980) found that firms tend to adopt more complete formal long-range planning process as the complexity and instability of the business environment increases. They also found some evidence that the planning completeness did not have a significant impact on the perception of complexity and stability of the environment.

If planning is regarded as "boundary-spanning" activity, then as per Leifer and Huber (1977), the higher the perceived environmental uncertainty, the higher the boundary-spanning or monitoring (Thompson, 1967) activity, but it is moderated by the degree of "organicness".

Bolton, Lindsay, Franklin and Rue (1982) concluded that uncertainty does not have a consistent impact on all aspects of strategic planning. It appears that with increasing uncertainty, more emphasis is placed on external factors and adaptation rather than internal factors and integration. The findings of Ireland, Hitt, Bettis and De Porras (1987), that perceived uncertainty and indicators of strength and weakness varied by management level and industry, explains the different emphasis on internal factors by different management levels and different industries at the same management level.

Javidan (1984) found that planning in savings and loan associations was more extensive with the increase in the degree of uncertainty. Thompson (1967) proposed that when the range of variation in task environment is large and unpredictable, it is necessary to adapt by monitoring and planning responses.

Terreberry (1968) concluded that the rapidity and complexity of environmental change increasingly precludes effective long-term planning. Mintzberg (1979) proposed that when organisations face a complex, and rapidly changing environment, their stratgy-making mode is adaptive and incremental.

Allaire and Firsirotu (1989) in their framework, coping with strategic uncertainty, illustrated that, if the degree of potential control on source of uncertainty is low, then as the level of uncertainty increases, the utilisation of technocratic response is replaced by structural response. The replacement takes place when the changes are occuring faster than the c oration's ability to respond.

Ansoff (1983) observed that the strategic information perspective changes from past to future as environmental state changes from stable, to incremental to known discontinuities, to novel discontinuities; and that the management system becomes more comprehensive from financial control to strategic planning and management. He also identified the need for surprise or crisis management as the speed of change in the environment exceeds the speed with which an organisation can respond.

Armstrong (1982) in his review of field research on the value of planning for strategic decisions concluded that despite the limitations of the various studies, planning was useful with improved results. None of the studies explicitly included environmental uncertainty and complexity measures and therefore no conclusion could be made. He proposed that within a practical range of uncertainty, planning should be beneficial. Ramanujam, Venkatraman, and Camillus (1986) found that strategic planning system was

related to the effectiveness of the planning process, with the system capability as the most important contributor. Ramanujam and Venkatraman (1987) found that organisational aspects emerged as the most important contributors to planning effectiveness, with system capability as a criterion of effectiveness.

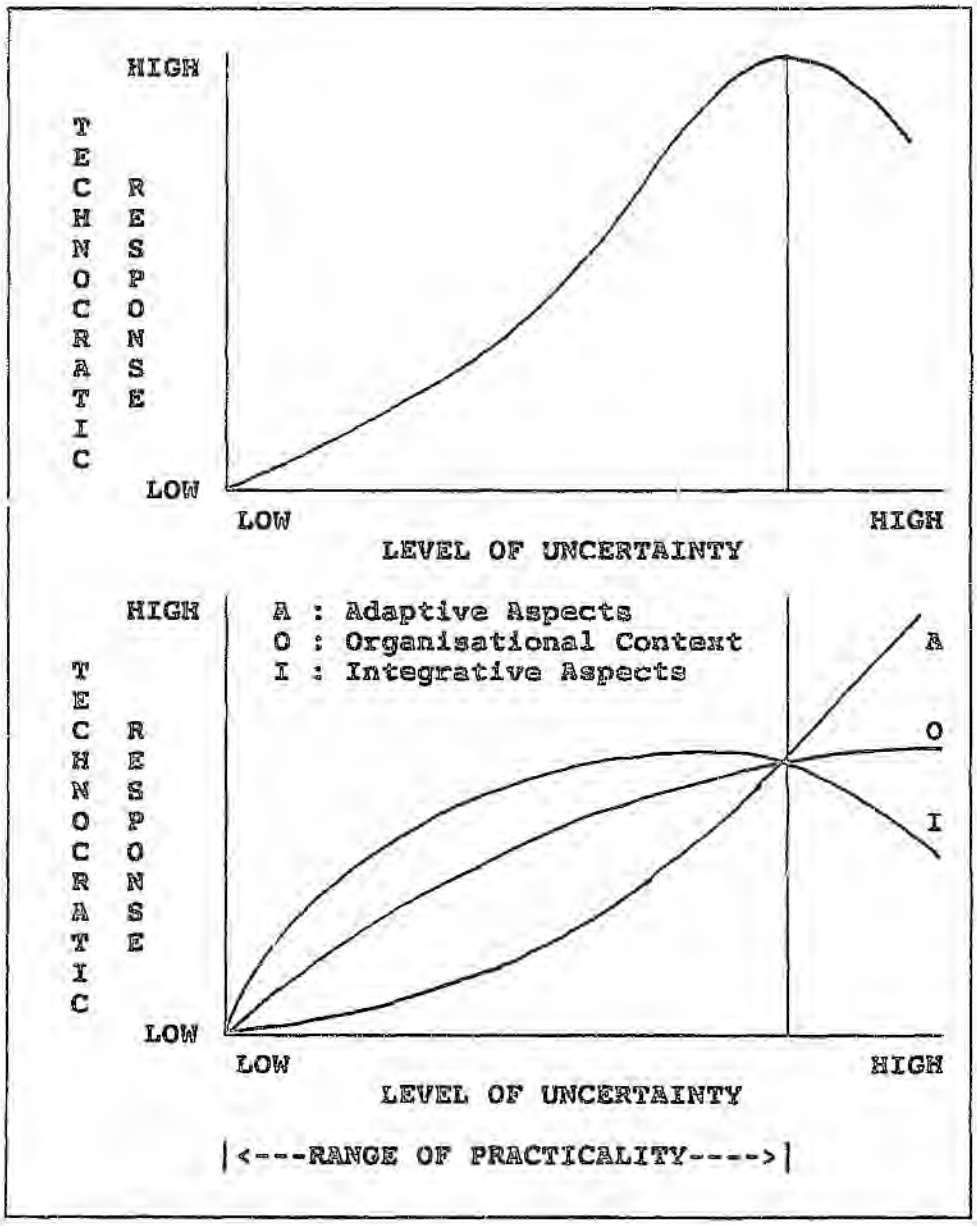


FIGURE 3.1.1 TECHNOCRATIC RESPONSE AND LEVEL OF UNCERTAINTY

The proposed relationship between the technocratic response and the level of uncertainty for prospector organisations is illustrated in figure 3.1.1. The illustration considers the range of practicality or reality. It is believed that any change above the range of practicality signifies excessive uncertainty in the task environment. The uncertainty is associated with a kind of "novel discontinuity", which makes the overall tecnocratic response less effective. The adaptive aspect of planning becomes mo' . important to ensure survival.

The proposed relationship between perceived environmental uncertainty (PEU), planning system (PS) and financial performance (FP), within the range of

TABLE 3.1.1 : RESEARCH PROPOSITIONS-PEU, PS AND FP

FP		PEU	
		HIGH	LOW
PS	HIGH	High Financial Performance I	? IV
	LOW	Low Financial Performance II	High Financial Performance III

I : The higher the perceived environmental uncertainty and the more sophisticated the system of planning, the higher the financial performance.

II : The higher the perceived environmental uncertainty and the less sophisticated the system of planning, the lower the financial performance.

III : The lower the perceived environmental uncertainty and the less sophisticated the system of planning, the higher the financial performance.

IV : Unpredictable result.

practicality, is depicted, in a two-way analysis of variance framework, in table 3.1.1, and stated below it. Considering the dominant "flexible" force in prospector organisations, the direction of causality is envisaged to be from perceived environmental uncertainty to planning system.

3.1.2 Perceived Environmental Uncertainty, Organisational Structure and Financial Performance

Burns and Stalker (1961) commented that bureaucratic and mechanistic structures are appropriate for stable and predictable environments, whereas flexible and organic structures are appropriate for turbulent and uncertain environments. Thompson (1967) proposed that stable and homogeneous environment need rules and heterogeneous and unstable environment need divisionalisation and decentralised decision making. Lawrence and Lorsch (1967) found that the higher the uncertainty of information and the longer the time span of feedback experienced by a key task or subunit, the less formalised it is in effective organisations. Duncan (1979) postulated that low perceived environmental uncertainty is associated with high complexity, high formalisation and high centralisation; and high perceived uncertainty is associated with low complexity, low formalisation and low centralisation.

Schmidt and Cummings (1976) discovered that the higher the perceived environmental uncertainty, the lower the number of levels in the organisational structure. Leifer and Huber (1977) found that the relationship between "organicness" and perceived environmental uncertainty was significant but moderated by

boundary-spanning activities. They also argued that the causality may be from structure to perceived environmental uncertainty. Bourgeois et al. (1978) used two extreme scenarios, stable and turbulent ($p<0.001$) and determined that managers who encounter turbulent environment will resort to mechanistic structure, and managers who encounter stable environment will resort to organic structure. They did, however, comment t' t their actions may be ineffective; which may be either due to their ignorance of contingency theory or due to managerial choice.

Huber, O'Connell and Cummings (1975) conducted a military tactical experiment and found that members of tight groups, using hierarchical decision making style, perceived higher perceived environmental uncertainty. Hrebiniak and Snow (1980) discovered that the relationship between structure and uncertainty exists, but the strength and direction varied by industry. The confusion may be due to the consideration of both defender and prospector models. Koeberg (1987) discovered that uncertainty was the strongest contributor to procedural adjustment and resource scarcity was the strongest contributor to the frequency of process, structural and strategic adjustments. The sequence of response appears to be typical of defensive organisations.

Allaire and Firsirotu (1989) in their framework, coping with strategic uncertainty, illustrated that, if the degree of potential control on source of uncertainty is low, then as the level of uncertainty increases, the utilisation of technocratic response is replaced by structural response. The replacement takes

place when the changes are occuring faster than the corporation's ability to respond. Mintzberg (1979) postulated that in extreme hostile environment organisations centralise, at least temporarily.

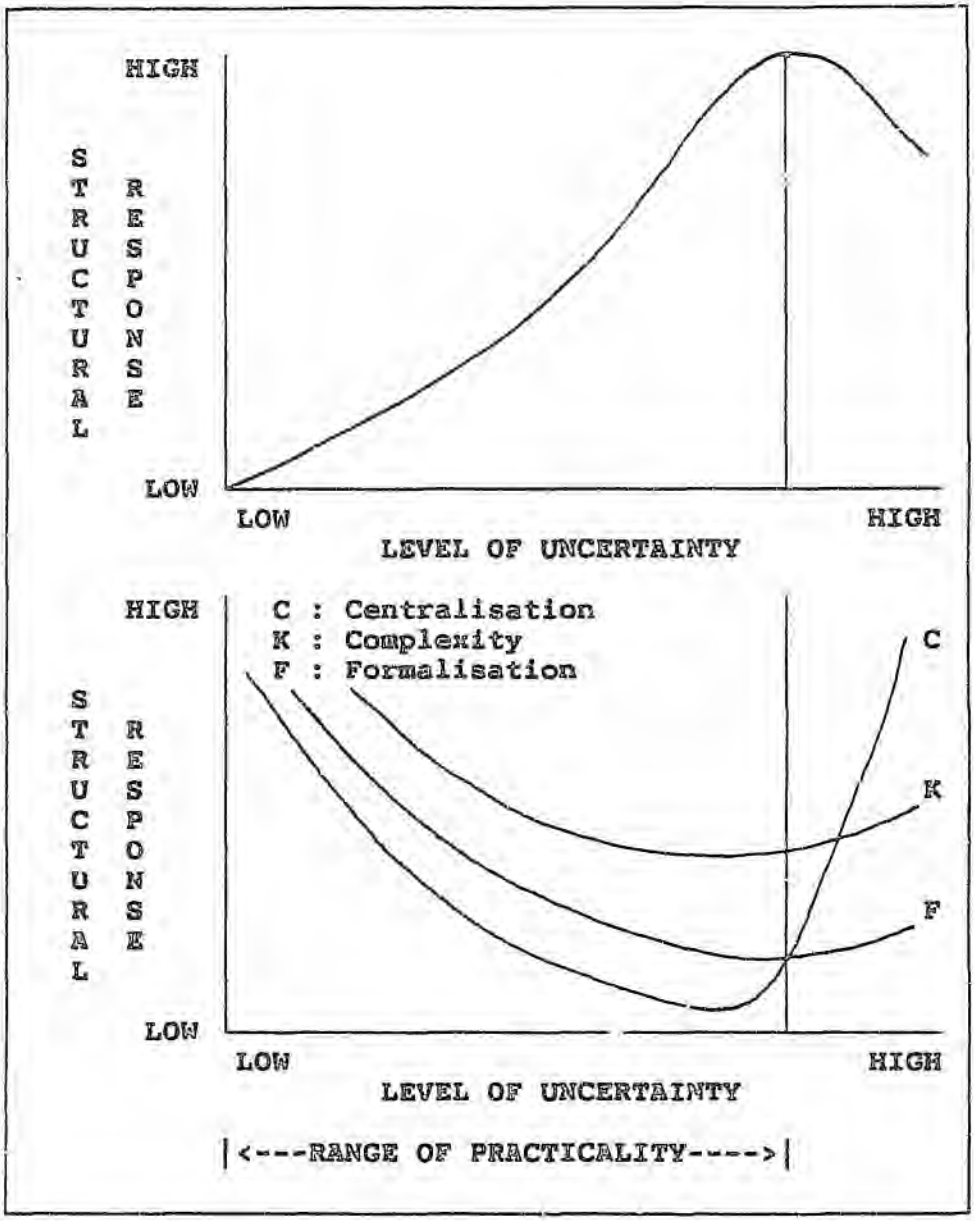


FIGURE 3.1.2 : STRUCTURAL RESPONSE AND LEVEL OF UNCERTAINTY

Dalton et al. (1980) did not find conclusive evidence that the structuring components are positively or negatively related to financial performance. They were also unable to summarise the contingency approach to structure-performance relationship due to a number of problems.

The proposed relationship between the structural response (degree of organicness) and the level of uncertainty for prospector organisations is illustrated in figure 3.1.2. The illustration also considers the range of practicality or reality. It is believed that any change above the range of practicality signifies the total collapse of the task environment. The uncertainty is associated with a

TABLE 3.1.2 : RESEARCH PROPOSITIONS-PEU, OS AND FP

FP		PEU	
		HIGH	LOW
OS	HIGH	High Financial Performance I	? IV
	LOW	Low Financial Performance II	High Financial Performance III

I : The higher the perceived environmental uncertainty and the more organic the structure, the higher the financial performance.

II : The higher the perceived environmental uncertainty and the less organic the structure, the lower the financial performance.

III : The lower the perceived environmental uncertainty and the less organic the structure, the higher the financial performance.

IV : Unpredictable result.

kind of "surprise" or "crisis", which makes the flexibility of the organic structure less effective. The degree of centralisation becomes more important for management to "pull in the reins".

The proposed relationship between perceived environmental uncertainty (PEU), organisational structure (OS) and financial performance (FP), within the range of practicality, is depicted, in a two-way analysis of variance framework, in table 3.1.2, and stated below it. Considering the dominant "flexible" force in prospector organisations, the direction of causality is envisaged to be from perceived environmental uncertainty to organisational structure.

3.1.3 Environmental Volatility, Perceived Environmental Uncertainty and Financial Performance

Tosi, Aldag and Storey (1973) found the correlation between task uncertainty and environmental volatility low and inconsistent ranging from strongly negative to slightly positive. Downey, Hellriegel and Slocum (1975) found that the measure of "actual" characteristics and measure of "perceived" characteristics of environment are not highly correlated. Milliken (1987) argued that the operationalisations of the uncertainty measure by Lawrence and Lorsch (1967) and Duncan (1972) were inappropriate. Snyder and Glueck (1982) discovered a high correlation between environmental uncertainty and volatility; and concluded that the volatility measure could be used as a surrogate or a criterion measure for perceived uncertainty. Bourgeois (1985) determined that the match between environmental volatility and perceived environmental uncertainty

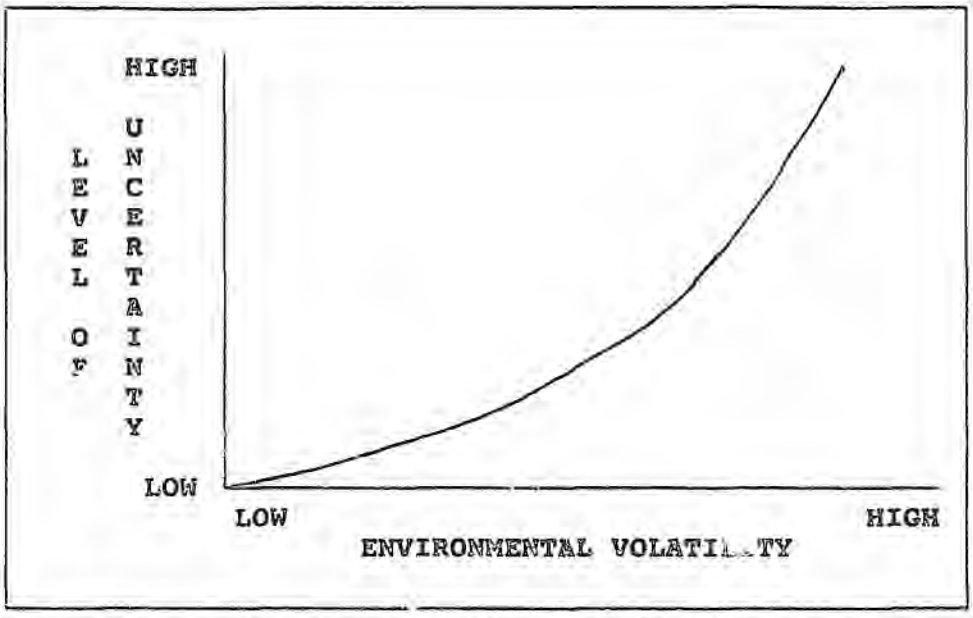


FIGURE 3.1.3 : ENVIRONMENTAL VOLATILITY AND LEVEL OF UNCERTAINTY

TABLE 3.1.3 : RESEARCH PROPOSITIONS - EV, PEU AND FP

FP		EV	
		HIGH	LOW
PEU	HIGH	High Financial Performance I	? IV
	LOW	Low Financial Performance II	High Financial Performance III

I : The higher the environmental volatility and the higher the perceived environmental uncertainty, the higher the financial performance.

II : The higher the environmental volatility and the lower the perceived environmental uncertainty, the lower the financial performance.

III : The lower the environmental volatility and the lower the perceived environmental uncertainty, the higher the financial performance.

IV : Unpredictable result.

accounted for approximately thirty percent of the variance in financial performance.

The proposed relationship between environmental volatility and perceived environmental uncertainty for prospector organisations is illustrated in figure 3.1.3. The proposed relationship between environmental volatility (EV), perceived environmental uncertainty (PEU) and financial performance (FP) is depicted in a two-way analysis of variance framework in table 3.1.3, and stated below it.

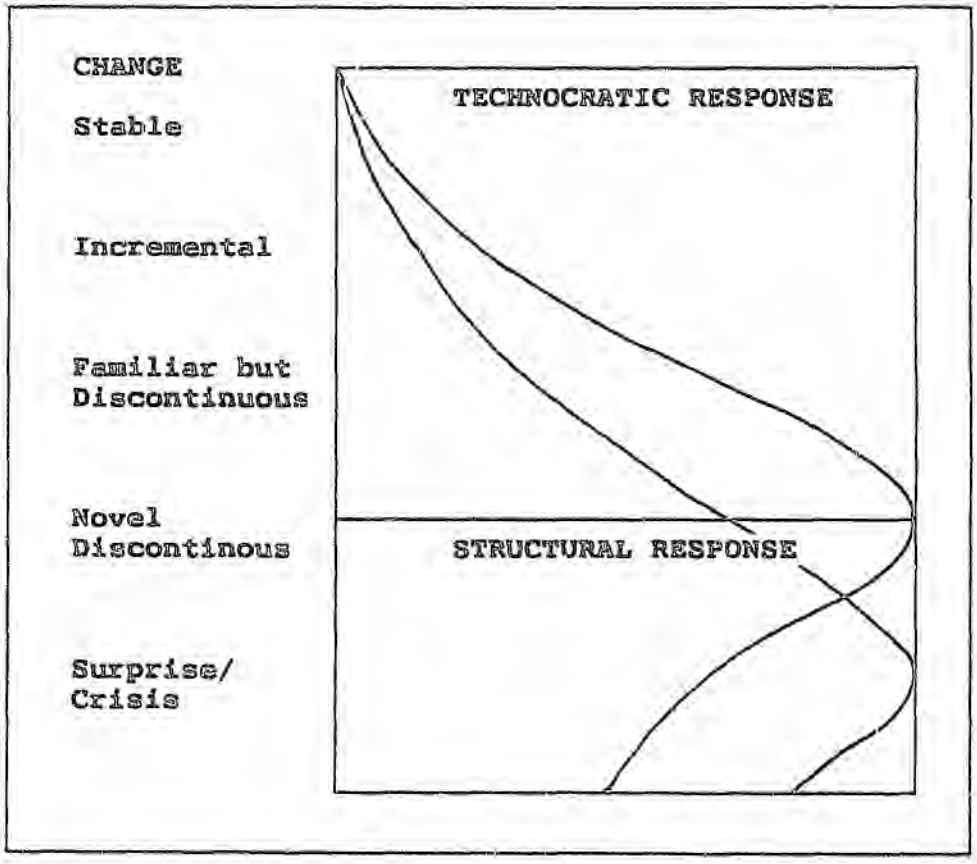


FIGURE 3.1.4 TECHNOCRATIC AND STRUCTURAL RESPONSES

3.1.4 Organisational Structure and Planning System

Ansoff (1983) postulated that as organisations become more complex in terms of their strategic posture, the general management system becomes more comprehensive. Allaire and Firsirotu (1989) deduced that as the level of uncertainty increases, the technocratic response is replaced by structural response, in a situation which allows little or no control on the sources of uncertainty. The proposed relationship between organisational structure and planning system for prospector organisations is illustrated in figure 3.1.4. It can be deduced mathematically from their respective relationships with perceived environmental uncertainty (tables 3.1.1 and 3.1.2).

3.2 OPERATIONAL DEFINITIONS OF THE THEORETICAL CONCEPTS AND CONTROL VARIABLES

The dimensions of the theoretical concepts used in the various propositions and their respective operational definitions are listed in table 3.2.

TABLE 3.2 : DIMENSIONS AND OPERATIONAL DEFINITIONS

CONCEPTS	DIMENSIONS	DEFINITIONS
Planning System (Sophistication)	Resources, Resistance, Internal Factors, External Factors, Functional Coverage, Use of Techniques, Capability of the System.	The degree of change - increase or decrease, - more or less emphasis, - improvement or deterioration in the components of the planning system. (Ramanujam, Venkatraman and Camillus, 1986)

TABLE 3.2 (CONT.) : DIMENSIONS AND OPERATIONAL DEFINITIONS

CONCEPTS	DIMENSIONS	DEFINITIONS
Organisational Structure (Mechanistic/ Organic)	Complexity	The degree of differentiation exists within an organisation.
	Formalisation	The degree to which jobs within the organisation are standardised.
	Centralisation	The degree to which decision making is concentrated at a high level. (Robbins, 1983)
Perceived Environmental Uncertainty (Internal: Perception)	Suppliers, Competitors, Customers, Financial and Capital Markets, Government Regulations, Labour Unions, Economic and Socio-political Climate, Technology.	The uncertainty experienced by administrators, when they perceive the organisational environment, or a particular component of that environment, to be unpredictable. -State Uncertainty. (Milliken, 1987)
Financial Performance	Growth,	Growth in Sales, Profit and Assets.
	Efficiency,	Return on Sales.
	Profitability	Return on Capital Employed, Return on Total Assets.
Environmental Volatility (External: Attribute)	Sales Volatility, Profit Volatility, Technological Volatility.	Coefficient of Variation. (Tosi, Aldag and Storey, 1973) (Bourgeois, 1985)
Control Variables	Continuous	Organisational Size Capital Intensity Organisational Age
	Categorical	Sector, Diversity LTP, TOP100

3.2.1 Planning System

Venkatraman and Grant (1986,pp.74-77) reviewed a number of key operationalisations of strategy constructs, broadly regarded as representing the state of the art of strategy measurement. Four conceptualisations of strategy construct related to strategic decision making and strategic planning system were considered, (a) planner vs nonplanner (Herold,1972; Kudla,1980; Karger and Malik, 1975; Thune and House 1970); (b) four facets of planning orientation, system capability and planning effectiveness (Venkatraman, Ramanujam and Camillus, 1984); (c) degree of planning (Wood and LaForge, 1981); and (d) comprehensiveness of strategic decision process (Fredrickson, 1984; Fredrickson and Mitchell 1984).

The operationalisation by Venkatraman et al. was used to measure the degree of sophistication of planning system. Its content validity (Hambrick,1981,1983; Nunnally,1978) was checked by experts, its reliability (Bagozzi,1980; Cronbach,1951; Nunnally,1978; Peter, 1979) and the inter-item scale validity and convergent/discriminant validity (Bagozzi,1989,1981; Campbell and Fiske,1959; Farh,Hoffman and Hegarty,1984) were established. The component scores were determined by taking the mean of all the questions within the respective components and the total instrument score was determined as the sum of all the component scores.

3.2.2 Organisational Structure

Campbell, Bowmas, Peterson and Dunnette recommended a useful distinction between "structural" and

"structuring" characteristics of organisations. Various models of organisational structure (Hall,1962; Porter and Lawler,1965; Hall et al.,1968, Pugh et al.,1968; Indik,1968; Sells,1968; Hickson et al.,1969; Inkson et al.,1970, Prien and Ronan,1971; Child,1972; Payne and Mansfiled,1976; Hrebiniak,1974; James & Jones,1976), as tabulated by Dalton, Todor, Spendolini, Fielding and Porter (1980,p.50), considered various combinations of "structural" and "structuring" characteristics.

The model used for the measurement of organisational structure was based only on "structuring" components, as operationalised by Robbins (1983), with face validity. The component scores were determined by taking the mean of all the questions within the respective components and the total instrument score was determined as the sum of all the component scores.

3.2.3 Perceived Environmental Uncertainty

The measurement of perceived environmental uncertainty was based on the progression of research and the theoretical understanding of the concept, from an initial study by Lawrence and Lorsch (1967), advancement by Duncan (1972), adapted by Miles and Snow (1978) and the utilisation by Ireland, Hitt, Bettis and De Porras (1987) in a Latin American environment. Downey, Hellriegel and Slocum (1975) examined the conceptual and methodological adequacy of Duncan and Lawrence and Lorsch's uncertainty scales. The internal reliabilities, using Nunnally's (1967) coefficient alpha, of both scales and their respective subscales were supported only when alternative scoring methods were used for both scales. They found that neither of the two total uncertainty scale met the

more stringent reliability requirements suggested by Nunnally for applied setting. Application of Miles and Snow's instrument by Ireland, Hitt, Bettis and De Porras (1987), modified for the Latin American environment yielded acceptable coefficient alphas (Cronbach,1951) for the subscales, ranging from 0.60 for customers dimension to 0.89 for government regulatory agency actions dimension.

Milliken (1987) proposed that the confusion in the research literature on perceived environmental uncertainty was as a result of the combination of three definitions of uncertainty. He argued that the three definitions identifies three different states of uncertainty : state uncertainty or perceived environmental uncertainty, effect uncertainty and response uncertainty.

The measurement of perceived environmental uncertainty or state uncertainty was based on Miles and Snow's instrument. It measures the degree of predictability of twenty-five items on six dimensions. Two additional dimensions, economic and socio-political climate, and technology were incorporated of two-items each in the questionnaire. The component scores were determined by taking the mean of all the questions within the respective components and the total instrument score was determined as the sum of all the component scores.

3.2.4 Financial Performance

Hofer (1983) reviewed growth, profitability, asset utilisation, contribution to shareholders and other performance measures used in the various studies on the effectiveness of strategic planning (Thune and House,1970; Ansoff et al.,1970; Herold,1982; Rue and

Fulmer,1973; Sheehan,1975; Karger and Malik,1975; Woods,1977; Kudla,1980). He cited a number of problems associated with the different measures of organisational performance, how to rectify them by tranformation and proposed a new quasi-invariant measure, return on value added, across industries for further research.

Three growth measures (sales, profit before interest and tax, total assets), one profitability measure (return on sales), and two asset utilisation measures (return on capital employed, return on total assets) were selected (Ansoff, Bradenburg, Portner and Radosevich,1971) to determine financial performance. The growth measures were determined using the average percentage change over a period of five years preceeding data collection. Profitability and asset utilisation measures were determined using average percentage over a period of five year or less.

Values and ratios using value added were not used owing to the difficulty in verifying the information obtained or provided and the reluctance on the part of some respondents in revealing it. Bureau of Financial Analysis does not analyse value-added statements and not all companies reported or published their value-added statements.

3.2.5 Environmental Volatility

Tosi, Aldag and Storey (1973,p.30) developed and used three measures of volatility based on coefficient of variation. Profit before interest and tax was used to minimise the effects of differences in depreciation practices and the changes in financial leverage between firms. Downey and Slocum (1975,p.565) stated

that the use of coefficients of variation to measure volatility seems questionable unless time related effects are removed from the original data. Bourgeois (1985) argued that Tosi et al.'s indices describe systematic and predictable change occuring in an industry. He recommended that calculating changes in the rates of change associated with sales and earnings via the first difference technique provides a clearer indication of the extent to which an industry's environment is volatile. Snyder and Glueck (1982,pp.185-192) used share brokerage firms to provide the opinions of their industry analysts about the extend of market and technological volatility in six industries. The perceived uncertainty by the analysts correlated highly (tau coefficient = 0.867, $p<0.02$.) with "objective" measures.

The measurement of environmental volatility, a criterion measure for perceived environmental uncertainty, was based on Tosi et al.'s three indices, over a period of five years or less, preceeding data collection. The determination of technological volatility was based on the ratio of fixed assets (at cost or valuation and excluding land and building) to sales. Coefficient of variation of sales and profitability were also computed using first differences, as recommended by Bourgeois (1985). The average of market and technological volatility (Snyder et al.,1982) was used as a composite index.

3.2.6 Control Variables

To eliminate the effect of possible influential independent variables on dependent variable, one can incorporate them into the research design as "attribute" variables (Kerlinger,1973, p.309). Four

categorical and three continuous variables, included in the research as control variables, and their operational definitions were as follows:

(1) Diversity : number of distinct business units or divisions in different markets;

(2) Sector : the classification of the company on the Stock Exchange;

(3) TOP100 : the classification of a company as a member of the top one hundred listed companies by size - total assets (Financial Mail,February 1990);

(4) LTP : existence of a written long-term plan covering at least three years;

(5) Capital Intensity : average ratio of fixed assets, excluding land and building, to sales over a period of five years or less;

(6) Size : average sales over a period of five years or less; and

(7) Age : the number of years since an organisation was founded.

3.3 RESEARCH DATA COLLECTION

In terms of the scales of research, this research is more positivist than humanist, more objective than reflexive, more quantitative than qualitative, more coarse-grained than fine-grained and more mensural than hermeneutic. The total approach is one of cross-sectional analysis rather than one of longitudinal analysis. Survey research provides a course-grained design to "solve" the research problems through empirical generalisation (Kerlinger,1973). Figure 3.3 illustrates the stepwise approach used to

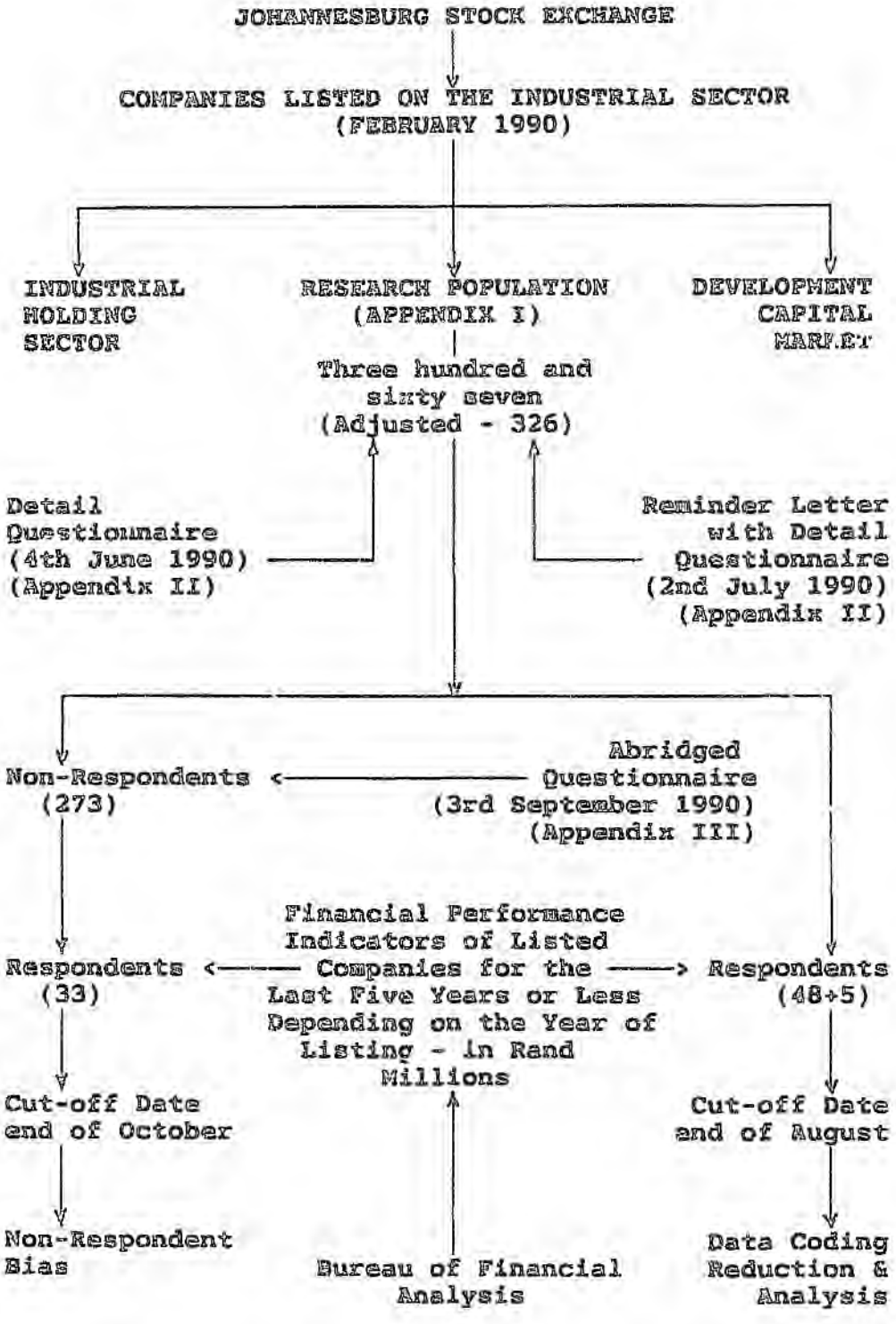


FIGURE 3.3 : RESEARCH DATA COLLECTION

collect the research data.

3.3.1 Research Population

The research population, as defined by the scope of the research problem, was taken as the total number of industrial companies listed on the Johannesburg Stock Exchange (Appendix I). Industrial Holding companies and companies listed on the Development Capital Market sector have been excluded. The former owing to the nature of their involvement in planning and the latter owing to their entrepreneurial mode of business conduct. The information was extracted from the latest available Handbook of Johannesburg Stock Exchange (Feb,1990).

The Retailers and Wholesalers sector has the highest number of listed companies - representing 16.1% of the total population. The Electronics, Electrical and Battery sector has 46 listed companies - representing 12.6% of the total population. Collectively, the companies listed under Retailers and Wholesalers; Electronics, Electrical and Battery; Engineering; and Clothing, Footwear and Textiles sectors represented 51% of the total research population. The remaining fourteen sectors represented 49% of the research population, an average of 3.5% per sector.

3.3.2 Questionnaire Distribution and Response

The detail (Appendix II) and abridged (Appendix III) questionnaires met the general requirements of a good instrument to gather information (Selltiz, Jahoda, Deutsch and Cook, 1959). It was not necessary for the questionnaire to be pretested before its actual

application, because the measurement instruments for the research variables were previously validated and the questions were simple, clear and concise with no ambiguity. Changes and additions were, however, incorporated over a period of six months before the final questionnaire was distributed, after considering comments from faculty staff and students.

The envelopes were personalised and the cover letter stated "a selected number of organisations" to create a sense of importance and therefore an intangible form of reward. A copy of the university registration letter was attached to the questionnaire to show legitimacy. Anonymity and confidentiality was emphasised, and the university address was affixed to the return envelope to create trust. Research findings were offered, if the questionnaire was returned, as a form of reward, with the respondent's name and address either provided behind the questionnaire or in a separate envelope. The questionnaire envelopes were grouped (18x20,1x8) for bulk posting. The return envelopes had a twenty-two cents stamp affixed on it for surface mail, which was determined by the approximate weight of the questionnaires and their return within the Republic of South Africa.

Sixty-nine percent of the questionnaires were distributed in the PWV and surrounding areas. Twenty-one percent of the questionnaires were distributed in the Cape Town, East London, Port Elizabeth and surrounding areas. Seven percent of the questionnaires were distributed in the Durban and surrounding areas.

One questionnaire was distributed to 298 chief executives, two questionnaires were distributed to 32 chief executives owing to their representation of two

organisations e.g Group Five Group and Group Five Holdings. Three questionnaires were distributed to 3 chief executives representing three 'linked' organisations. Seven questionnaires were distributed to companies with head offices in Zimbabwe, Swaziland, South West Africa and Canada. The research population was therefore revised down from 368 to 326.

Sixty-six (20.3%) detail questionnaires were received, of which forty-eight (14.8%) were completed, thirteen (4%) were not completed and five (1.5%) incorporated a letter explaining their inability to comply with the request owing to excessive workload. Thirty-eight (79%) completed questionnaires were received from the PWV and surrounding areas. Five (10.5%) completed questionnaires were received from the Cape Town, East London, Port Elizabeth and surrounding areas. Five (10.5%) completed questionnaires were received from the Durban and surrounding areas. Of the forty-eight respondents, twenty-nine (36%) were amongst the TOP80 Industrial Corporations (Financial Mail Survey, July 1990) by total assets.

After reviewing the responses to the detail questionnaires and the sector and company code on their return labels, additional letter was distributed with an abridged questionnaire to the remaining non-responding organisations (Appendix III), in order to determine the characteristics of non-respondents and the likely existence of any bias.

Thirty-three (12.1%) organisations responded to the abridged questionnaire. Altogether, eighty-one organisations responded to the three "mail-shots", which is 24.8% of the adjusted population. The most responses were obtained from Retailers and Wholesalers (17.4%), Engineering (12.4%), Electronics, Electrical

and Battery (8.6%), Building and Construction (8.6%), Food (7.4%), Paper and Packaging (7.4%) and Motor (6.2%) sectors. No response was received from any of the six companies listed in the Tobacco and Match sector.

3.3.3 Financial Information - Sources and Definitions

The request for financial information was placed at the end of the questionnaire owing to the possible reluctance of the respondents in providing the information. A majority of the respondents did, however, provide some information. The sector and company code (Appendix I), printed on the label of the return envelope, allowed the matching of general ordinal responses with financial information obtained from other sources.

Three likely sources were considered, (a) actual annual reports of the responding organisations, (b) a printout of required financial information from the data bank developed by the Bureau of Financial Analysis (BFA) of the University of Pretoria, and (c) Johannesburg Stock Exchange Handbook (February, 1990), which was used for the development of labels for the distribution of the questionnaire.

The annual reports, as a source of information, were not used owing to the considerable time and effort needed to acquire, peruse and note the required details after taking cognisance of the different accounting policies. The likelihood of the availability of older reports was also quite low. Johannesburg Stock Exchange Handbook was used to capture part of the information during the initial

stages of data capture, to test SAS (1985) programs and finalise the analytical approach. The director, Prof. A.P.Zevenbergen, of the Bureau of Financial Analysis was approached for the required information. Miss Botes, from the Bureau, provided a printout of the codes : 3051, 3073, 3075, 3012, 3040, and 3037 for all the listed industrial companies. The meaning of the various codes, as defined by the manual for the users of BFA ratio service (Zevenbergen,1977) are provided in Appendix II.

3.4 DATA ANALYSIS AND RESULTS

A two-pronged approach to the analysis of perceived environmental uncertainty, organisational structure and strategic planning system was adopted. The utilisation of both parametric and non-parametric techniques would allow greater confidence in the findings. Non-parametric tools would take care of any violations of parametric assumptions. Parametric techniques would provide more sophisticated set of analyses. The data analytic scheme used to code and analyse research data, and to test the research propositions is depicted in figure 3.4.

3.4.1 Test of Randomness

Initially, a stratified sample was chosen from the research population for the distribution of the detail questionnaire. However, due to the possibility of limited response and the existence of a small finite population, the decision was made to canvass the complete population for information. There was obviously no way of knowing which company would respond. Runs above and below the median

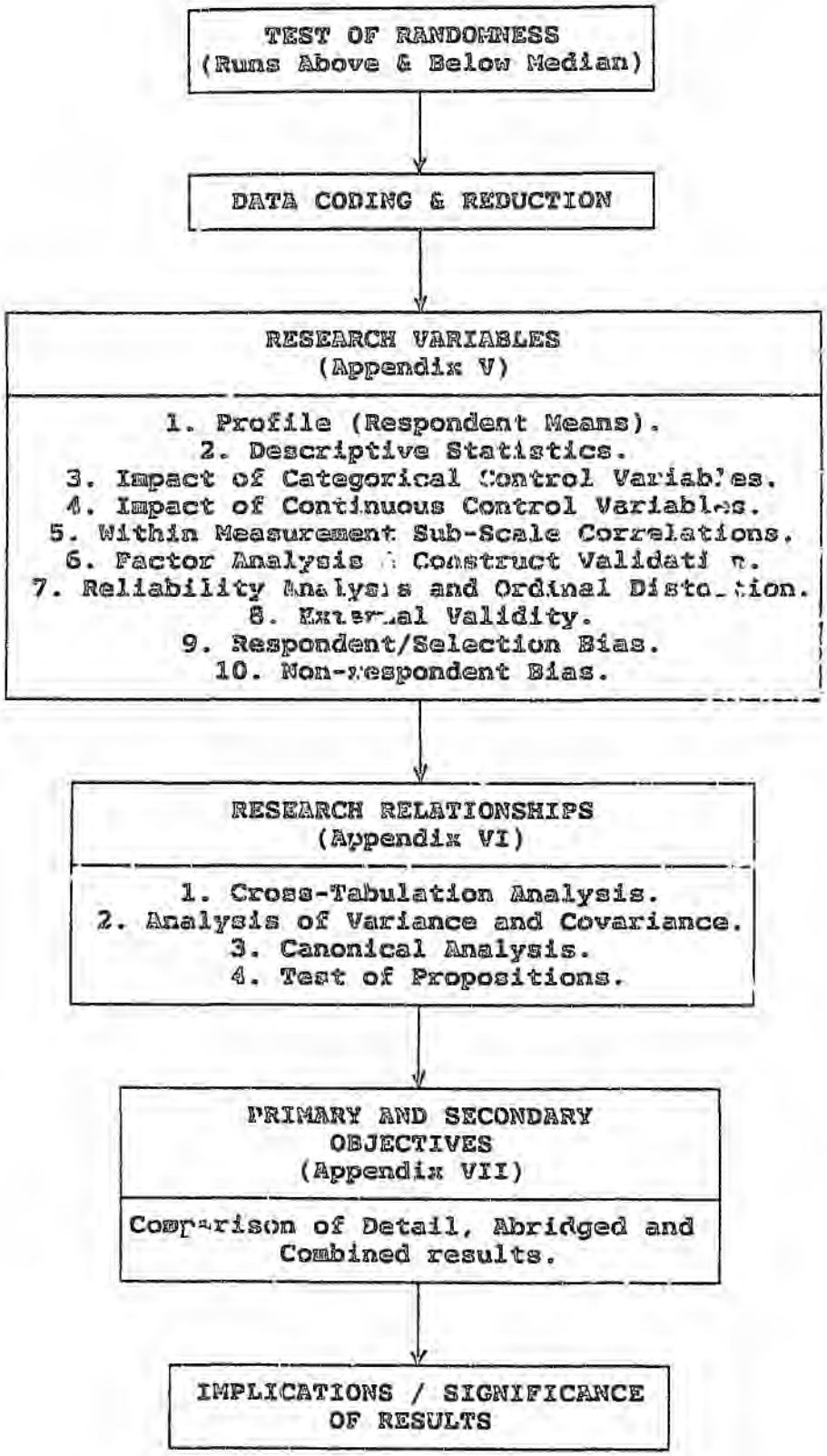


FIGURE 3.4 : DATA ANALYTIC SCHEME

(Freund,1979), using the scores of independent variable, perceived environmental uncertainty, was used to test the randomness of the questionnaires received. The analysis indicated that the sample was a random one with regard to the "independent variable" (Z=0.15).

3.4.2 Data Coding and Reduction

The data for perceived environmental uncertainty, organisational structure and strategic planning system were recoded (Appendix IV). The questionnaire depicted positive and negative scales in order to increase the ease with which the respondent can answer the questions (Bailey,1987). The coding structure for the abridged questionnaire was the same as for the detail questionnaire. The difference was only in the number of questions. Reverse coding was used for the components where appropriate, in accordance with the relationships expressed by the literature review and research propositions. Nonresponses for sections B,C and D of the questionnaire were coded as "0". Any information not available for sections A and E of the questionnaire were regarded as "missing" information.

SAS/FSP (1985) procedure was used to capture the collected data. A master file was created using a SAS (1985) program with zero observations. The execution of the SAS/FSP procedure utilising the master file, created three default screens with the research variables for data capture. The three default screens were reduced to two custom screens, for ease of data capture. The structure and design of the screens coincided with the structure and the sequence of the data capture forms to enable quick and accurate capture of responses. An alternative method of data

capture used to create SAS Data Sets with SAS procedures and commands, either within the same CMS (Conversational Monitor System) file or combined with INFILE statements, was not adopted because of the large number of variables involved.

SAS functions and expressions were used to determine the values of research variables, as discussed under the section 3.2 on measurement instruments. Basic variable names used for data capture and calculated variable names derived for analysis are listed in Appendix IV.

3.4.3 Research Variables

In order to understand basic characteristics and determine the appropriateness of research variables, various analyses were initially undertaken. They are described below with some noteworthy results. The actual results are tabulated, in the sequence shown in figure 3.4, for each of the five research variables, in Appendix V.

3.4.3.1 Profile (Respondent Means)

Mean values of the responses to the questionnaire items were calculated to illustrate the profile of planning system, organisational structure and perceived environmental uncertainty.

The increase in the time spent by chief executive office. in strategic planning was supported by the increase in the acceptance of the outputs of the strategic planning exercise by top management. Greater internal attention was devoted to the analysis of

strengths and weaknesses. Greater external attention was devoted to regulatory and political issues, customer and end user preferences, general economic and business conditions, competitive trends and technological trends. Of the functional areas the greatest importance was attributed to finance and data processing. The increase in the utilisation of financial models and forecasting and trend analysis was greater than other techniques. There has been some improvement in the overall capability of the system.

The view of the profile of organisational structure depicts a highly mechanistic form of structure of the responding companies with only a few organic elements. The proportion of employees holding advanced degrees or have many years of specialised training was only 11-20%. The average distance of the separate units from the head office was only between 301 to 600 km. Only forty to seventy percent of non-managerial employees were given written operating instructions for their jobs. Organisations have between 9 and 12 separate geographic locations. Top management participated in the interpretation of between sixty to eighty percent of the information input.

The greatest uncertainty was related to the socio-political climate, attitudes of labour unions and changes in policies regarding financial practices (taxation). The demand for existing products by customers, availability of credit for short-term debt, changes in policies regarding accounting procedures and the changes in technology or the substitution thereof were regarded as more predictable than other aspects of the perceived environmental uncertainty by the respondents.

3.4.3.2. Descriptive Statistics

Measures of location, measures of variability, measures of shape and t test for mean=0 for, (a) the sub-scales or components of planning system, organisational structure, and perceived environmental uncertainty, and (b) the measures of financial performance and environmental volatility were generated. Overall perceived environmental uncertainty score was used to determine any outliers for exclusion.

The means of the components of planning system indicates that the attention to external factors was given significantly more emphasis with increase in resources provided to the planning function than the emphasis on internal factors and the use of techniques. The means of the components of organisational structure indicates that the degree of complexity, as reverse coded, was the highest and the degree of formalisation, as reverse coded, was the lowest of the three components. The means of the components of perceived environmental uncertainty indicates that the greatest uncertainty was related to economical and socio-political climate, actions of labour unions and government regulations.

The average return on capital employed was 30.8%, return on sales was 11.2% and return on total assets was 15.1% for the respondents over the period of five years. The growth in profit over the same period was higher than either sales or assets. The average market (sales) volatility was 35.2%, profit volatility was 61.7% and technological volatility was 26%, giving an overall average environmental volatility of 30.6%. The sales and profit volatilities were also based on the first differences (Bourgeois, 1986). The average

market volatility was 69.6% and the profit volatility was 254.5%, giving an overall average volatility of 43.8%.

3.4.3.3 Impact of Categorical Control Variables

Analysis of Variance was used to determine the impact of categorical control variables (sector, diversity, LTP, TOP100) on research variables. Mean values were generated and the differences between the mean values were tested for significance. Scheffe's method (for unequal cell sizes) was used to determine which particular pairwise comparison was significant.

None of the categorical variables had significant impact on the planning system. Two responding companies in Transportation sector had the minimum improvement in their overall planning system. Four responding companies in Electronics, Electrical and Battery sector had the maximum improvement in their overall planning system. One responding company with 'thirty-one' degrees of diversity had the greatest improvement in planning while one responding company with 'eight' degrees of diversity had the lowest improvement in planning. There was no significant difference when the formal or informal involvement in planning was considered. The improvement was, however, greater for companies with formalised planning system. There was no significant difference when the classification of the company as one of the top one-hundred companies was considered. The improvement was, however, greater for companies considered as members of the top one-hundred.

Two of the four categorical variables had significant impact on the organisational structure. LTP was

significant at 0,0008 level and TOP100 was significant at 0.0058 level. Three companies in Furniture and Household Goods sector were the most organic of all the responding companies. Two companies in Chemicals and Oil sector were the least organic of the responding companies. One responding company with 'eight' degrees of diversity was the least organic while three responding companies with 'five' degrees of diversity were the most organic. More organic companies did not have a written long-term plan and were not classified as one of the TOP100 companies. Smaller organisations tended to be organic and did not have a formalised planning system.

None of the categorical variables had any significant impact on the perceived environmental uncertainty. One responding company in Sugar sector had the lowest degree of overall perceived environmental uncertainty. One responding company in Clothing, Footwear and Textiles sector had the highest degree of overall perceived environmental uncertainty. One responding company with 'eight' degrees of diversity had the lowest overall perceived environmental uncertainty. Three responding companies with 'five' degrees of diversity had the highest overall perceived environmental uncertainty. There was no significant difference when the formal or informal involvement in planning was considered. The perceived environmental uncertainty was, however, higher for companies with no written long-term plan. There was no significant difference when the classification of the company as one of the top one-hundred companies was considered. The perceived environmental uncertainty was, however, higher for the smaller companies which were not in the TOP100 category. The perceived environmental uncertainty was higher for smaller organisations and organisations with no written long-term plan.

None of the categorical variables had any significant impact on the return on sales (ROS). LTP and TOP100 had significant impact on return on capital employed (ROCE) and return on total assets (ROTA). Four responding companies in Building and Construction sector had the lowest ROCE. Seven responding companies in Engineering sector had the highest ROCE. One responding company with 'thirty-one' degrees of diversity had the lowest ROCE. Six companies with 'four' degrees of diversity had the highest ROCE. Companies without written long-term plans had much higher ROCE and ROTA than the companies with written long-term plans. Small companies (TOP100=2) had much higher ROCE and ROTA than their larger counterparts (TOP100=1). Small companies tended to have no written long-term plans.

None of the categorical variables had any significant impact on either the normal measure of environmental volatility (Tosi et al.,1973) or when the first differences were considered (Bourgeois,1986). Two responding companies in Chemicals and Oil sector had the lowest environmental volatility. Four responding companies in Electronics, Electrical and Battery sector had the highest environmental volatility. Three responding companies with 'three' degrees of diversity had the lowest environmental volatility. Three responding companies with 'five' degrees of diversity had the highest environmental volatility. Companies without written long-term plans (LTP=2) had much higher environmental volatility than the companies with written long-term plans (LTP=1). Small companies (TOP100=2) had much higher environmental volatility than their larger counterparts (TOP100=1).

3.4.3.4 Impact of Continuous Control Variables

Parametric and nonparametric correlations were used to determine the significance and strength of the impact of continuous control variables (size, age, capital intensity) on research variables.

None of the continuous control variables had any significant correlation with the overall planning system and the coefficients were considerably low. The correlation between capital intensity and planning system, as indicated by Pearson's r and Kendall's tau b, was negative. This does not imply that the greater the capital intensity the lower the involvement in planning system or vice versa. It is more likely that companies with high capital intensity had introduced the planning system before others and were already more sophisticated.

Pearson's correlation shows that the relationship between age and organisational structure is negative and significant ($r=-0.29, p<0.044$). Spearman's rho and Kendall's tau b shows that the relationship between size and organisational structure is negative and significant ($r=-0.33,-0.23$; $p<0.02$). All the three types of correlations shows that the relationship of each of the three continuous control variables with organisational structure is negative. That is, the greater the size of an organisation, the greater the capital intensity and the more older the organisation, the less organic the structure of an organisation is likely to be.

Spearman's rho and Kendall's tau b shows that the relationship between size and perceived environmental uncertainty is negative and significant ($r=0.30,-0.20$; $p<0.04$) and is confirmed by the impact of TOP100 on

perceived environmental uncertainty. None of the the other control variables had any significant impact on perceived environmental uncertainty. All the three correlation types shows that the relationship between perceived environmental uncertainty and each of the three control variables is negative. That is, the greater the size of an organisation, the greater the capital intensity and the more older the organisation, the lower its perceived environmental uncertainty is likely to be.

Of the three continuous control variables, the capital intensity was positively and significantly ($r=0.36$, $p<0.01$) associated with return on sales (ROS) but negatively and significantly ($r=-0.30, p<0.05$) associated with return on capital employed (ROCE). It shows that the higher the capital intensity, the higher the return on sales but the lower the return on capital employed. The relationships between ROCE and ROTA, and the three continuous control variables were negative, indicating that the greater the size of an organisation, the greater the capital intensity and the older the organisation, the lower the financial performance, as measured by ROCE and ROTA, is likely to be.

None of the three continuous control variables had any significant impact on either the normal measure (EV) of environmental volatility (Tosi et al.,1973) or when the first differences (EVFD) were considered (Bourgeois,1986). The relationship between environmental volatility and each of the three continuous control variable were negative, implying that the greater the size of an organisation, the higher the capital intensity and the older the organisation, the lower the environmental volatility is likely to be. When the first differences were used

as a measure of discontinuity, the relationship was only negative for age.

3.4.3.5 Within Measurement Correlations

Nonparametric and parametric correlations between the questions of planning system, between the questions of organisational structure, between the questions of perceived environmental uncertainty, between the measures of environmental volatility, and between the measures of financial performance, were used to determine if there were significant correlations to yield "priori" loadings for construct validation and to yield simple common factor structures.

More than fifty-percent of the correlations between, the components of planning system (ranging from 0.29 to 0.73), the components of perceived environmental uncertainty (ranging from 0.30 to 0.49), and the measures of financial performance (ranging from 0.40 to 0.80), were significant. Only one of the three correlations (Kendall tau b) between the components of organisational structure was significant. There were some degree of communality between the components of the two measures of environmental volatility. The correlation results indicated the need to factor analyse the measurement instruments to reduce the problem of multi- collinearity.

3.4.3.6 Factor Analysis and Construct Validation

Factor Analysis was used to determine simple common factor structures for, and construct validation of, planning system, organisational structure, perceived environmental uncertainty, environmental volatility

and financial performance. Based on the eigenvalue rule, the scree plot, the minimum number of variables per factor, and conceptual clarity, the appropriate number of factors were selected.

Thirteen factors for planning system, five factors for organisational structure, eight factors for perceived environmental uncertainty, two factors for financial performance and one factor for each of the two measures of environmental volatility, were selected and orthogonally (Varimax) rotated. The major loadings as identified by, and compared with, the target matrix for procrustean transformation, which were generated using oblique (Promax) rotation, are shown in the Appendix.

The Data Text Primer (Armor and Couch, 1972) regards a factor loading with an absolute value of 0.40 or more as high enough for further consideration. Only one item of planning system, one item of organisational structure, one item of perceived environmental uncertainty, and one measure of environmental volatility had loadings below 0.40.

The overall root mean square off-diagonal residual, a measure of the discrepancy between the observed and the reproduced correlations, were (a) 0.04 for planning system, (b) 0.06 for organisational structure, (c) 0.04 for perceived environmental uncertainty, (d) 0.07 for financial performance, and (e) 0.08 and 0.07 for the two measures of environmental volatility; and indicated the effectiveness of factor analysis.

The data was unable to verify the 'priori' theoretical construct developed by Ramanujam, Venkatraman and Camillus (1986) for planning system. The groupings

did, however, result in some conceptual clarity and seemed appropriate in the light of lower sample size. The data was able to verify the three 'priori' theoretical constructs generally accepted by organisational theorists for structure. The centralisation component was, however, separated into two further components, lower level discretion and high level control. An additional factor combining the degree of formalisation and the degree of complexity was also generated. The data was able to verify the 'priori' theoretical construct developed by Miles and Snow (1978) for perceived environmental uncertainty. There was just one particular question (GOV6) which loaded on another component (SUPPLIER). The changes in policies on accounting procedures (GOV6) may be regarded as an accounting requirement 'supplied' by the auditing firm used by an organisation.

3.4.3.7 Reliability Analysis and Ordinal Distortion

Three reliability coefficients were calculated in order to determine the internal consistency of the three ordinal measurement instruments and their components. Cronbach's Alpha was generated from correlation analysis. Omega was generated from principal component analysis. Theta was generated from common factor analysis with varimax rotation, with 'priors=smc' and the selection of the number of factors.

"As a general rule reliabilities should not be below 0.80 for widely used scales and it should be computed for any multi-item scale" (Carmines and Zeller, 1979). Only the reliabilities (alpha) of (a) techniques component of planning system (0.78), (b) formalisation component of organisational structure (0.63), and (c)

customer component of perceived environmental uncertainty (0.63), were below recommended levels. The values of Alpha, Theta and Omega for planning system, organisational structure and perceived environmental uncertainty were above 0.80.

Kim and Mueller (1978,pp.73-74) stated that "It is generally assumed that many 'ordinal variables' may be given numeric values without distorting the underlying properties... Fortunately, the correlation coefficients are fairly robust with respect to ordinal distortions in the measurement. Hence as long as one can assume that the distortions introduced by assigning numeric values to ordinal categories are believed to be not very substantial, treating ordinal variables as if they are metric variables can be justified." Ordinal distortion was operationalised as the percentage difference between the reliability (Cronbach's Alpha) based on Spearman's rho and the reliability based on Pearson's r. The distortion for planning system and perceived environmental uncertainty was found to be only 1.1% and no distortion was found for organisational structure.

3.4.3.8 External Validity

Shapiro-Wilk (W) statistic was used to test the null hypothesis that the input data values were a random sample from a normal distribution. Small values of W result in the rejection of the null hypothesis. W statistic for (a) planning system and its components were above 0.80, (b) organisational structure and its components were above 0.90, (c) perceived environmental uncertainty and its components were above 0.90, (d) the measures of financial performance were above 0.70, and (e) the measures of environmental

volatility were above 0.60. Large values of W indicates that the results have external validity and can be generalised, within a confidence interval, for the whole population. It further indicates that the utilisation of statistics based on normality assumption is valid.

3.4.3.9 Respondent/Selection Bias

Analysis of variance was used to determine if there was any response or selection bias, in terms of the possible interactions between questionnaire items and respondent groups. Eight different respondents, in terms of their position in the organisations, provided the necessary information. The analysis of the significance of the differences in means for planning system, organisational structure and perceived environmental uncertainty indicated no respondent bias. When the components of the three instruments were considered, only the resource component of planning system was found to be significant. Pairwise differences using Scheffe's method showed that the difference between the Chairman and Information System Director was the only significant one.

3.4.3.10 Non-respondent Bias

There is a possibility that the respondents may have visualised themselves as being in agreement with the favourable aspect of the research and therefore did not in any way resist the information requested. The opposite may be true for non-respondents. As outlined in the data collection section of the research methodology, the "initial" non-respondents were requested to complete an abridged questionnaire to

determine if there was any non-respondent bias which could nullify the external validity of the results.

Analysis of variance was used to determine if there was any non-respondent bias, by comparing the results of the abridged questionnaire with the results of the detail questionnaire. The results of the detail and abridged questionnaires were combined for the determination of non-respondent bias. The analysis of the differences in means for the three instruments indicated significance for only organisational structure ($p<0.003$). When the components of the three instruments were considered, the difference in the response to (a) the 'internal factor' component of planning system, (b) all the components of organisational structure, and (c) 'technology' component of perceived environmental uncertainty were found to be significant.

This particular bias was mainly due to the significant difference in the composition of the two samples with respect to size ($F=6.02$, $p<0.02$). The differences in capital intensity and organisational age were found to be insignificant. The comparison of the means of the two samples indicated lower complexity (as reversed), lower formalisation (as reversed) and higher centralisation (as reversed) for detail questionnaire; and higher complexity (as reversed), higher formalisation (as reversed) and lower centralisation (as reversed) for abridged questionnaire. The results of the detail questionnaire as compared to the results of the abridged questionnaire showed that the detail results were more indicative of larger organisations and the abridged results were more indicative of smaller organisations. The detail results indicate greater technological uncertainty relative to the abridged results.

3.4.4 Research Relationships

After reviewing the appropriateness of the researc variables, in terms of the reliability and validity o the collected data, parametric and nonparametri techniques were used to determine the strength an significance of the proposed relationships. Th analyses are described below. The actual results ar tabulated in Appendix VI, for each of the four sets c relationships, and discussed in the next chapter.

3.4.4.1 Cross-tabulation Analysis

Cross-tabulation analysis with non-parametric measure of associations generated numerous contingency table with measures of significance for each table within set, measures of associations for each table within set and summary statistics for all the tables in th controlled set of relatic ips. The researc variables were sep. ated as high and low at thei respective median values using SAS (1985) conditions statements. Fisher's exact 2-tail test was used for significance whenever the frequency of a cell was less than 5. The strength of the relationship was indicated by the popular four-fold coefficient, Phi, for 2x2 tables.

The results of the cross-tabulation analyses for th overall results are compared with the two groups c organisational size, capital intensity ar organisational age in the appendix. The first tabl compares the overall results with the results of smal and large organisations. The second table compares th overall results with the results of organisations wit low and high capital intensity. The third tabl compares the over.. ..ults with the results c

'younger' and 'older' organisations.

3.4.4.2 Analysis of Variance and Covariance

Analyses of variance and covariance were used to determine the existence of relationships between ordinal independent variables and dependent financial variables (ROCE and ROTA).The overall model results of the analysis of variance are compared with the overall results of the analysis of covariance. The research variables were separated as high and low at their respective median values using SAS (1985) conditional statements. Although, the minimum number of observations (20) required for normality assumption of each population group and the assumption of equal variance required for analysis were violated, the technique was used mainly to determine the significance of "interaction effects". To determine the significance of purely the interaction effects, partial sum of squares were used.

Factorial models were used for the likely interaction between perceived environmental uncertainty (PEU) and organisational structure (OS), between perceived environmental uncertainty and planning system (PS), and between environmental volatility (EV and EVFD) and perceived environmental uncertainty. The covariates were rganisational size, capital intensity and organisational age. The analyses were conducted for each category of LTP and TOP100, owing to the significant differences in the means of some of the research variables.

3.4.4.3 Canonical Analysis

Dewar and Werbel (1979) highlighted that contingency predictions are hard to test owing to a lack of standard operational definitions of the notion of fit. The contingency relationships were tested as follows: (i) the relationship between the components of the predictor set of the first relationship and the components of the criterion set was determined. e.g. PEU <---> OS (PS); (ii) the standardised scores of the eight PEU factors were summed and separated into high and low at the median point; and (iii) subsets of the overall PEU measure (high and low) were then used to determine the relationship between the components of the predictor set of the second relationship and the components of the criterion set. e.g subset (a) low PEU : OS <--> FP , subset (b) high PEU : OS <--> FP.

Factor weights were used to determine standardised scores for all the factors generated by factor analysis for planning system, organisational structure, perceived environmental uncertainty, financial performance and environmental volatility. To reduce inter-set multicollinearity, orthogonal rotation (Varimax) was used for scaling and subsequent canonical analysis. The utilisation of subsets and covariates, however, resulted in some inter-item correlations. Standardised scores for the factors, adjusted to test contingency relationships, were used for canonical analysis, after partial correlations were generated using organisational size, capital intensity and organisational age.

The significance of the first few canonical functions (likelihood ratio) and the overall mutivariate relationship (Wilks' Lambda, Pillai's Trace, Hotelling-Lawley Trace, Roy's Greatest Root) were

considered. The canonical weights, loadings, cross-loadings, cross-loadings squared and the percentage contribution of the components of the two sets are detailed for the first "most significant" canonical function in the appendix.

Lambert and Durand (1975) claim that 'for the purpose of comparison loading values of 0.30 and above are sufficient for drawing inferences about criterion-predictor relationships'. The cross-loadings, although conservative, are believed to be a more direct measure of the relationship between the criterion and predictor sets and were therefore used to determine the relative contribution of the variables towards the canonical relationship. Using 0.30 as a cutoff point, the squared cross-loading of the criterion and predictor variables, without and with partial variables were considered.

The canonical analysis seeks to maximise the correlation between the linear combinations of the variables and therefore the resultant correlation does not provide any information regarding the shared variance between the two sets of variables. Stewart and Love's (1968) redundancy index, measuring the standardised variance of the criterion and predictor variables explained by their own canonical variables and the opposite canonical variables, was therefore also shown. Owing to the different number of variables in the sets, the amount of variance explained by the canonical variables were different. All the variance in the set with the lower number of variables was explained.

In common factor analysis the computed (standardised) factor scores are only estimates of the true factor scores with mean zero but variance equal to the

squared multiple correlation (SMC) of the factors with the variables. SMC could therefore be regarded as the reliability of the factor scores used for canonical analysis. SMC's ranged from (a) 0.98 to 1.00 for the twelve factors of planning system, (b) 0.80 to 0.93 for the five factors of organisational structure, and (c) 0.90 to 0.96 for the eight factors of perceived environmental uncertainty.

Wimmer (1977) argued that "independent factor analyses are fine if the researcher wants factors chosen independently of each other. It is not a good procedure if one wants to explain as much of one data from the other." Kuylan and Verhallen (1981) provided the reason for canonical analysis. They confirmed that "a composite criterion variate may better reflect reality than a single criterion variable in a separate regression analysis." Green and Tull (1970) and Horton, Russell and Moore (1968) suggested that it is better to use canonical analysis in conjunction with other multivariate techniques. Alpert and Peterson (1972) recommended that one "might factor analyse variables to remove multicollinearity within variable sets prior to canonical analysis. Moreover, other techniques could be used to validate tentative conclusions reached through an exploratory canonical analysis, to determine if other ways of analysing the data produce comparable conclusions".

Alpert and Peterson (1972) suggested that 'since canonical correlations tend to be unstable, it is wise to estimate correlations and weights with one-sample and cross-validate them with a second sample... However, when the sample is small, cross-validation may use more information than it contributes'. Owing to the relatively small sample size, the cross-validation approach was not used. They also

stated that 'while the canonical correlation reflect an upward bias without cross-validation, the redundancy indices are still accurate estimates of the proportion of variance in a group of variables predictable from a second set of variables'.

3.4.4.4 Test of Propositions

The propositions deduced in the first section of this chapter were based on the "range of practicality". The range of response, in terms of the perceived environmental uncertainty, was reviewed in order to ensure that the assumed range during proposition development was appropriate. The actual distribution of perceived environmental uncertainty was between 18.75 (33.5%) and 41.33 (73.8%), with the mean as 31.4 (56.1%) on the scale of the level of uncertainty. The percentage indicates the score relative to the highest possible score (56) on the overall scale of perceived environmental uncertainty and indicates the validity of the assumed range during the development of the proposed relationships. The results of the detail questionnaire were used to test the various propositions.

3.4.5 Primary and Secondary Objectives

Analysis of the possibility of non-respondent bias indicated that the differences in the results of the detail questionnaire and the results of the abridged questionnaire were due to the difference in the composition of the two samples with respect to size. The results of the detail questionnaire were more indicative of larger organisations (TOP100=1) and the results of the abridged questionnaire were more

indicative of smaller organisations (TOP100=2).

To determine if there were any noteworthy differences and to finally satisfy the primary and secondary objectives of the research, cross-tabulation analysis and analysis of variance were used to compare the results of the detail questionnaire with the results of the abridged questionnaire and with the combined results of the two questionnaires (Appendix VII). The variables were categorised as low or high at their respective median values.

3.5 SUMMARY

Three sets of propositions were derived, for prospector organisations, from related concepts, theories and findings, for empirical verification in South African industrial organisations listed on Johannesburg Stock Exchange. The required information was collected using survey methodology and thereafter combined with the financial information obtained from the Bureau of Financial Analysis (Figure 3.3). After coding the research data, the research variables were reviewed and analysed for their appropriateness, in terms of their degree of reliability and validity, and the possible existence of selection and non-respondent bias (Figure 3.4). Thereafter, parametric and non-parametric techniques used to test the statistical significance and the strength of the proposed relationships were considered.

CHAPTER 4 : RESEARCH RESULTS AND DISCUSSION OF RESULTS

Having determined the reliability and the validity of the research variables, the first section of the chapter reviews the overall results, the findings of the various analytical techniques and collectively considers the two aspects for the confirmation or the rejection of the deduced proposition. The detail, abridged and combined results are then compared to determine the existance of primary and secondary relationships outlined in the introductory chapter. Lastly, the implications and significance of the findings are considered.

4.1 RESEARCH RELATIONSHIPS

The observed overall research results are tabulated with the outcome of the three analytical techniques, for each of the four hypothesised relationships, in the following sub-sections, and discussed. Only the significance of the interaction effects, with and without covariates, and the significance and the redundancy of the first "most significant" canonical function, based on partial correlations, have been shown. The overall research results and the results of the two types of organisations, small and large, are shown in Appendix VI. The number of observations, the mean value of return on capital employed and the standard deviation thereof are tabulated within the 2x2 tables for each cell. The analytical techniques used to determine the significance and strength of the proposed relationships were considered in the previous chapter.

4.1.1 Perceived Environmental Uncertainty, Planning System and Financial Performance

The research results of the proposed relationship between perceived environmental uncertainty (PEU), planning system (PS) and financial performance (FP), are depicted, in a two-way analysis of variance framework, in table 4.1.1.

TABLE 4.1.1 : RESEARCH RESULTS
PEU, PS AND FP

FP (ROCE)		PEU	
		LOW	HIGH
PS	LOW	High Financial Performance (30.08%) III	Low Financial Performance (25.39%) II
	HIGH	Low Financial Performance (25.16%) IV	High Financial Performance (38.53%) I

CHI / *FET PHI	0.729 -0.071	0.423* 0.194
PEU * PS = ROCE (ROTA)	WITHOUT COVARIATES WITH COVARIATES	0.1251 (0.7528) 0.8256 (0.8019)
PR > F REDUNDANCY	0.5715 0.5207	------ 0.4781

4.1.1.1 Research Results

The overall results (Table 6.1) shows that, when the perceived environmental uncertainty is low, the mean return on capital employed is higher when the planning system is less sophisticated. There is a 4.92% difference in performance when the planning system is less and more sophisticated. When the perceived

environmental uncertainty is high, the mean return on capital employed is higher when the planning system is more sophisticated. There is a 13 14% difference in performance when the planning system is more and less sophisticated.

The results of both, small and large, organisations presents a similar picture as the overall results. However, smaller organisations appear to perform better under high perceived environmental uncertainty if they have a more sophisticated system of planning and larger organisations appear to perform better under low perceived environmental uncertainty if they have a less sophisticated system of planning. The difference in ROCE between high PEU and high PS, and low PEU and low PS equals 12.64% for small organisations. The difference in ROCE between low PEU and low PS, and high PEU and high PS equals 1.44% for large organisations. The difference in ROCE, given high PEU and high PS for small organisations and low PEU and low PS for large organisation, is equal to 21.10%.

4.1.1.2 Analysis of Results

Cross-tabulation analysis (Table 6.2) shows that the relationship between planning system and financial performance is positive for overall results, small organisations, organisations with low capital intensity and young organisations. However, when the perceived environmental uncertainty is low, the relationship is negative, with the exception of capital intensiveness. The relationship between planning system and financial performance is negative for large organisations, organisations with high capital intensity and old organisations, irrespective

of the level (low or high) of perceived environmental uncertainty. The relationship between perceived environmental uncertainty and planning system is positive for all groups. Chi-square and fisher's exact 2-tail test indicates that none of the relationships are significant.

The results of the factorial analysis of variance (Table 6.3) indicates that only the overall model result, with covariates and ROCE as the measure of performance, has a noteworthy significance ($p < 0.1$). Because none of the interaction effects (PEU*PS) were found to be significant, the higher significance of the above relationship was due to the significance of the relationship between capital intensity and ROCE.

Canonical analysis of the factor derived variables of perceived environmental uncertainty and planning system, with partial variables, generated eight insignificant canonical functions (Table 6.4.1). Roy's Greatest Root, an upper bound test statistic, however, indicated that the overall multivariate relationship was significant ($F=4.2$, $p<0.0007$). The important contributing variables of the two sets and their loadings, for the first most significant function indicates that the increase in uncertainty with regard to the competitors' actions; suppliers' prices, quality and product design; and economical and socio-political climate appear to result in greater financial control, greater technocratic response, lower acceptance of planning and lower customer responsiveness.

Canonical analysis of the factor derived variables of planning system and financial performance, with partial variables, generated two insignificant canonical functions, for low and high levels of

perceived environmental uncertainty (Table 6.4.2). The important contributing variables of the planning system and their loadings, for the first most significant function indicates that when perceived environmental uncertainty is low financial performance appears to be maximised by increasing the involvement in internal analysis, resource allocation and technocratic response; and by decreasing the involvement in specific external analysis and the acceptance of planning. When perceived environmental uncertainty is high, financial performance appears to be maximised by increasing the involvement in financial control, internal analysis and general external analysis; and by decreasing the involvement in specific external analysis, resource allocation and technocratic response.

4.1.1.3 Test of Propositions

Although the research results appears to support the proposed relationship between perceived environmental uncertainty, planning system and financial performance (table 3.1.1), the analyses indicates that the research results were not significant and could have been due to chance. Therefore, the proposed relationships have been rejected.

4.1.2 Perceived Environmental Uncertainty, Organisational Structure and Financial Performance

The research results of the proposed relationship between perceived environmental uncertainty (PEU), organisational structure (OS) and financial performance (FP), are depicted, in a two-way analysis

of variance framework, in table 4.1.2.

TABLE 4.1.2 : RESEARCH RESULTS
PEU, OS AND FP

FP (ROCE)		PEU	
		LOW	HIGH
OS	LOW	Low Financial Performance (25.04%) III	Low Financial Performance (31.24%) II
	HIGH	High Financial Performance (30.55%) IV	High Financial Performance (36.40%) I

CHI / *FET PHI	0.431 0.161	0.217 0.329
PEU * OS = ROCE (ROTA)	WITHOUT COVARIATES WITH COVARIATES	0.9760 (0.5809) 0.7505 (0.5311)
PR > F REDUNDANCY	0.6927 0.1991	------- 0.7806

4.1.2.1 Research Results

The overall results (Table 7.1) shows that, when the perceived environmental uncertainty is low, the mean return on capital employed is higher when the organisational structure is more organic. There is a 5.51% difference in performance when the organisational structure is more and less organic. When the perceived environmental uncertainty is high, the mean return on capital employed is higher when the oryanisational structure is more organ c. There is a 5.16% difference in performance when the organisational structure is more and less organic.

The results of smaller organisations presents a similar picture as the overall results. That is, the average return on capital employed is higher when the organisational structure is more organic, irrespective of the level of perceived environmental uncertainty. The results of the larger organisations presents a picture which is opposite of the overall results. That is, the average return on capital employed is higher when the organisational structure is less organic, irrespective of the level of perceived environmental uncertainty.

Smaller orgarisations appear to perform better if they have a more organic structure in a more uncertain environment while larger organisations appear to perform better if they have a less organic structure in a less uncertain environment. The difference in ROCE, given high PEU and high OS for small organisations and low PEU and low OS for large organisation, is equal to 14.87%.

4.1.2.2 Analysis of Results

Cross-tabulation analysis (Table 7.2) shows that the relationship between perceived environmental uncertainty and organisational structure is negative for all groups, with the exception of capital intensity. The relationship between organisational structure and financial performance (ROCE) is positive for all groups, with the exception of 'younger' organisations. Only the relationship between organisational structure and financial performance is significant when the overall results (phi=0.25,chi=0.063) and the results of "older" organisations (phi=0.51,chi=0.012) are considered.

The results of the factorial analysis of variance (Table 7.3) indicates that only the model result of LTP=2, without covariates and ROCE as the measure of performance, has a noteworthy significance ($p<0.04$). None of the interaction effects were found to be significant. The overall model significance for LTP=2 was as a result of the significance of the relationship between OS and ROCE and not as the result of the significance of the impact of the interaction (PEU*OS) on ROCE. It indicates that there is a positive and significant relationship between organisational structure (degree of organicness) and financial performance when planning is informal. The introduction of covariates, possibly organisational age, reduces the significance of the relationship. The correlation between organisational size and organisational age was significant (rho=0.36, tau b=0.27, $p<0.01$).

Canonical correlation analysis of the factor derived variables of perceived environmental uncertainty and organisational structure, with partial variables, generated five insignificant canonical functions (Table 7.4.1). Roy's Greatest Root, an upper bound test statistic, however, indicated that the overall multivariate relationship was significant ($F=2.8$, $p<0.0184$). The important contributing variables of the two sets and their loadings, for the first most significant function indicates that the increase in economical and socio-political and technological uncertainty appear to result in higher degree of formalisation (as reversed), greater low-level discretion (as reversed) and lower degree of complexity (as reversed). The increase in uncertainty with regard to financial and capital markets and suppliers' price, quality and product design appear to result in lower degree of formalisation (as reversed),

lower low-level discretion (as reversed) and higher degree of complexity (as reversed).

Canonical correlation analysis of the factor derived variables of organisational structure and financial performance, with partial variables, generated two insignificant canonical functions, for low and high levels of perceived environmental uncertainty (Table 7.4.2). The important contributing variables of the organisational structure and their loadings, for the first most significant function indicates that when perceived environmental uncertainty is low, it appears that financial performance is maximised by increasing the degree of formalisation (as reversed), by increasing top management control (as reversed) and by decreasing complexity (as reversed). When perceived environmental uncertainty is high, it appears that financial performance is maximised by increasing the degree of formalisation (as reversed), by decreasing complexity (as reversed), by decreasing low-level discretion (as reversed) and by decreasing top management control (as reversed).

4.1.2.3 Test of Propositions

Although the research results appears to support the proposed relationship between perceived environmental uncertainty, organisational structure and financial performance (table 3.1.2), the analyses indicates that the research results were not significant and could have been due to chance. Therefore, the proposed relationships have been rejected.

4.1.3 Environmental Volatility, Perceived Environmental Uncertainty and Financial Performance

The research results of the proposed relationship between environmental volatility (EV/EVFD), perceived environmental uncertainty (PEU) and financial performance (FP), are depicted, in a two-way analysis of variance framework, in table 4.1.3.

4.1.3.1 Research Results

The overall results (Table 8.1A) indicates that, when the environmental volatility (EV) is low, the mean return on capital employed is higher when the perceived environmental uncertainty is low. There is a 1.98% difference in performance when the uncertainty is low and high. When the environmental volatility (EV) is high, the mean return on capital employed is higher when the perceived environmental uncertainty is high. There is a 13.14% difference in performance when the uncertainty is high and low.

The overall results (Table 8.1B) indicates that, when the environmental volatility (EVFD) is low, the mean return on capital employed is higher when the perceived environmental uncertainty is high. There is a 5.51% difference in performance when the uncertainty is high and low. When the environmental volatility (EVFD) is high, the mean return on capital employed is higher when the perceived environmental uncertainty is low. There is only 0.56% difference in performance when the uncertainty is low and high.

The two measures of environmental volatility generated quite different results. EV shows that the higher the

TABLE 4.1.3 : RESEARCH RESULTS

1. EV, PEU AND FP

FP (ROCE)		EV	
		LOW	HIGH
U	LOW	High Financial Performance (27.91%) III	Low Financial Performance (28.14%) II
	HIGH	Low Financial Performance (25.93%) IV	High Financial Performance (41.28%) I

CHI / *FET PHI	0.682 -0.084	0.682 -0.084
EV * PEU = ROCE (ROTA)	WITHOUT COVARIATES WITH COVARIATES	0.1830 (0.5473) 0.1224 (0.3737)
PR > F REDUNDANCY	0.7409 0.1773	------ 0.4690

2. EVFD, PEU & FP

FP (ROCE)		EVFD	
		LOW	HIGH
PEU	LOW	Low Financial Performance (31.47%) III	High Financial Performance (25.96%) II
	HIGH	High Financial Performance (36.98%) IV	Low Financial Performance (25.40%) I

CHI / *FET PHI	1.000* -0.025	0.381* -0.232
EVFD*PEU = ROCE (ROTA)	WITHOUT COVARIATES WITH COVARIATES	0.6189 (0.3233) 0.5849 (0.4497)
PR > F REDUNDANCY	0.4183 0.6785	0.9135 0.4080

environmental volatility and the higher the perceived environmental uncertainty, the higher the financial performance of an organisation. EVFD shows that the lower the environmental volatility and the higher the perceived environmental uncertainty, the higher the financial performance of an organisation.

4.1.3.2 Analysis of Results

Cross-tabulation analysis (Table 8.2) shows that the relationship between EV and perceived environmental uncertainty is positive and the relationship between EVFD and perceived environmental uncertainty is negative. The relationship between perceived environmental uncertainty and financial performance, for both low and high degrees of EV, is negative. The relationship between perceived environmental uncertainty and financial performance, for both low and high degrees of EVFD, is negative, with the exception of larger organisations. Only the relationship between EVFD and perceived environmental uncertainty was significantly negative (phi=-0.33,chi=0.02).

The results of the factorial analysis of variance (Table 8.3) indicates that the overall model result, with covariates, and ROCE as the measure of performance, has a noteworthy significance of 0.0868 for EV and 0.0468 for EVFD. The model result for LTP=1, without covariates and ROCE as the measure of financial performance, has a noteworthy significance of 0.0599. None of the interaction effects were found to be significant. The overall model significance, with covariates, for EV and EVFD, were as a result of the significance of their relationships with ROCE and not as the result of the significance of the impact of

their interactions (EV*PEU, EVFD*PEU) on ROCE. The organisational size and capital intensity enhanced the significance of the relationship between EV and ROCE, while the organisational size and age enhanced the significance of the relationship between EVFD and ROCE. The overall model significance for LTP=1 was as a result of the significance of the relationship between EV and ROCE and not as the result of the significance of the impact of the interaction (PEU*EV) on ROCE.

Canonical analysis of the factor derived variables of environmental volatility (EV and EVFD) and perceived environmental uncertainty, with partial variables, generated one insignificant function (Table 8.4.1). Canonical analysis of the factor derived variables of perceived environmental uncertainty and financial performance, with partial variables, generated two insignificant functions, for low and high levels of environmental volatility (EV and EVFD) (Table 8.4.2).

4.1.3.3 Test of Propositions

Although the research results, using the normal measure (EV) of environmental volatility, appears to support the proposed relationship between environmental volatility, perceived environmental uncertainty, and financial performance (table 3.1.3), the analyses indicates that the research results were not significant and could have been due to chance. Therefore, the proposed relationships have been rejected

4.1.4 Organisational Structure and Planning System

The research results of the proposed relationship between organisational structure (OS) and planning system (PS), are depicted in table 4.1.4.

TABLE 4.1.4 : RESEARCH RESULTS
OS AND PS

PEU AND OS : CHI = 0.564, PHI = -0.083	
HIGH PEU	LOW PEU
LOW OS ↕ HIGH PS	HIGH OS ↕ LOW PS
HIGH PEU	LOW PEU
PEU AND PS : CHI = 0.149, PHI = 0.209	

CHI / *FET PHI	0.001 -0.459	
	WITHOUT C VARIATES	WITH COVARIATES
PR > F	0.(27	0.2041
REDUNDANCY	0.1239 CUM.	0.1264 CUM.

4.1.4.1 Research Results

All the results (Table 9.1) shows that the average degree of sophistication of the planning system is higher when the structure of an organisation is less organic. For less organic organisations, the degree of sophistication of the planning system is higher when it is larger, when its capital intensity is higher and when it is older. For more organic organisations, the degree of sophistication of the planning system is higher when it is smaller, when its capital intensity is higher and when it is older.

It appears that irrespective of the organisational structure, there is a greater tendency for organisations to develop sophisticated system of planning when they are larger in size, when they have a high capital intensity and when they are much older.

4.1.4.2 Analysis of Results

Cross-tabulation analysis (Table 9.2) for the overall results indicates that the relationship between organisational structure and planning system is negative and highly significant (phi=-0.46,chi=0.001). The relationship, although negative, is not significant for smaller organisations, for organisations with low capital intensity and for "younger" organisations. The relationship is highly significant for larger organisations (fet=0.001), organisations with high capital intensity (fet=0.01) and older organisations (fet=0.002).

Canonical correlation analysis (Table 9.3) of the factor derived variables of organisational structure and planning system, with partial variables, generated five insignificant canonical functions. The important contributing variables of the two sets and their loadings, for the first most significant function indicates that greater customer responsiveness, greater internal and specific external analysis, higher resistance to planning (as reversed), higher production orientation, lower financial control and lower resource allocation appear to be associated with higher degree of formalisation (as reversed), greater low-level discretion (as reversed), lower degree of complexity (as reversed) and lower top-management control (as reversed).

4.2 PRIMARY AND SECONDARY OBJECTIVES

The results of the detail questionnaire are compared with the results of the abridged questionnaire and the combined results of the two questionnaires in Appendix VII. The variables were categorised as low or high for detail, abridged and combined results at their respective medians. Only the median values of organisational size were significantly different.

4.2.1 Primary Objective

The primary objective of this research was to determine if South African industrial companies have structured themselves appropriately, in terms of organisational structure and system of planning, to be able to deal with the increasing environmental uncertainty. Three relationships were to be investigated to satisfy the primary objective, (a) perceived environmental uncertainty and planning system, (b) perceived environmental uncertainty and organisational structure, and (c) organisational structure and planning system.

Of the three relationships, only the relationship between organisational structure and planning system, of the detail results, was found to be significant. However, when the control variables were incorporated, the relationship changed to insignificant (Table 10). The comparison of detail, abridged and combined results indicates that South African industrial corporations listed on Johannesburg Stock Exchange, have not structured themselves appropriately, in terms of organisational structure and system of planning, to be able to deal with the increasing environmental uncertainty.

4.2.2. Secondary Objective

The secondary objective of this research was to determine if the appropriately structured companies have performed better than their inappropriately structured counterparts. Three relationships were to be investigated to satisfy the secondary objective, (a) perceived environmental uncertainty, organisational structure and financial performance. (b) perceived environmental uncertainty, planning system and financial performance, and (c) environmental volatility, perceived environmental uncertainty and financial performance. The third relationship was a criterion relationship to validate the perceived environmental uncertainty instrument.

None of the proposed relationships were found to be statistically significant (Table 4.3). Therefore, based on the responses received, it can be concluded that the appropriately structured companies have not performed better than their inappropriately structured counterparts.

4.3 IMPLICATIONS AND SIGNIFICANCE OF RESULTS

The research propositions deduced for empirical verification were based on the "prospector" configuration, which was regarded as more suitable for uncertain environment. None of the proposed relationships, listed in table 4.3, were found to be statistically significant. It therefore implies that the South African industrial companies listed on Johannesburg Stock Exchange are "defenders" (Table 2.3.3.5).

TABLE 4.3 : STATISTICAL SIGNIFICANCE OF RESEARCH PROPOSITIONS

(1) PEU, PS AND FP (Table 3.1.1)
I : The higher the perceived environmental uncertainty and the more sophisticated the system of planning, the higher the financial performance. II : The higher the perceived environmental uncertainty and the less sophisticated the system of planning, the lower the financial performance. III : The lower the perceived environmental uncertainty and the less sophisticated the system of planning, the higher the financial performance. Probability : Not Significant. (Table 4.1.1) The propositions are therefore rejected.
(2) PEU, OS AND FP (Table 3.1.2)
I : The higher the perceived environmental uncertainty and the more organic the structure, the higher the financial performance. II : The higher the perceived environmental uncertainty and the less organic the structure, the lower the financial performance. III : The lower the perceived environmental uncertainty and the less organic the structure, the higher the financial performance. Probability : Not Significant. (Table 4.1.2) The propositions are therefore rejected.
(3) EV, PEU AND FP (Table 3.1.3)
I : The higher the environmental volatility and the higher the perceived environmental uncertainty, the higher the financial performance. II : The higher the environmental volatility and the lower the perceived environmental uncertainty, the lower the financial performance. III : The lower the environmental volatility and the lower the perceived environmental uncertainty, the higher the financial performance. Probability : Not Significant. (Table 4.1.3) The propositions are therefore rejected.

The responding organisations were highly mechanistic, as depicted by the profile of the organisational structure (Figure 1, Appendix V). Their planning system was more formalised (66% of the companies had written long-term plans covering more than three years) and more sophisticated, as depicted by the profile of planning system (Figure 2, Appendix V). Cross-tabulation analysis of the detail results, indicated that the relationship between organisational structure (degree of organicness) and planning system (degree of sophistication) was negative and highly significant (chi=0.001,phi=-0.459).

Larger organisations were significantly less organic (Table 2.3) and had lower perceived environmental uncertainty (Table 3.3) and lower financial performance (Table 4.3). Companies with written long-term plans (LTP=2) and companies classified as members of TOP100 (TOP100=2) had significantly lower perceived environmental uncertainty (Table 3.2), were significantly less organic (Table 2.2) and achieved significantly lower financial performance (Table 4.2). The relationship between organisational structure and planning system was found to be significantly negative (Table 9.2).

Smaller organisations were significantly more organic (Table 2.3) and had higher perceived environmental uncertainty (Table 3.3) and higher financial performance (Table 4.3). Companies with no written long-term plans (LTP=1) and companies not classified as members of TOP100 (TOP100=1) had significantly higher perceived environmental uncertainty (Table 3.2). were significantly more organic (Table 2.2) and achieved significantly higher financial performance (Table 4.2). The relationship between organisational structure and planning system was found to be

insignificant (Table 9.2).

Based on the two organisational configurations developed in chapter two (Table 2.3.3.5), smaller organisations appear to be "prospectors", while larger organisations appear to be "defenders". Smaller organisations appear to prefer uncertain environment while larger organisations appear to prefer certain environment. Smaller organisations appear to be more organic with problem-orientated informal planning and more profitable. Larger organisations appear to be more mechanistic with cost-orientated formal planning and less profitable.

Because "defender" organisations were characterised as having "stability" as a dominating force, in their attempt to deal with environmental uncertainty, and that larger organisations were significantly less organic, the direction of causality of the relationship between planning system and organisational structure, for large organisations, appears to be from organisational structure to planning system. That is, the less organic the structure of an organisation, the more sophisticated and formal the system of planning is likely to be.

It appears that "defender" organisations use planning system for "boundary spanning". Leifer and Huber's (1977) findings supported the role of boundary spanning (boundary spanning activity) as a mediator (mediation activity) between environmental influences and organisational structure. It appears that formalised planning system is used by larger organisations as a mediator, between environmental influences and organisational structure, by reducing the perceived environmental uncertainty and environmental volatility. It appears that "defender"

organisations use technocratic or power response to deal with environmental uncertainty. However, when the potential control on the source of uncertainty decreases, the "defender" organisations may be unable to cope with changes and may eventually become unprofitable.

4.4 SUMMARY

The research results and the outcome of the analyses thereof, for each of the four proposed relationships, were considered in the chapter. None of the propositions were found to be statistically significant and they were therefore rejected. The research propositions were based on "prospector" configuration, which was regarded as more appropriate for uncertain environment. The overall results, therefore, implied that the responding organisations were "defenders".

Significant differences between smaller and larger organisations indicated that smaller organisations were likely to be "prospectors" and larger organisations were likely to be "defenders". It appeared that larger organisations used formalised planning system as a mediator between environmental influences and organisational structure. It appears that "defender" organisations use technocratic or power response to deal with environmental uncertainty. However, when the potential control on the source of uncertainty decreases, the "defender" organisations may be unable to cope with changes and may eventually become unprofitable.

CHAPTER 5 : CONCLUSION

This concluding chapter outlines the overall study, reviews its various limitations, presents the contribution to knowledge and suggests a multi-phased process for further research.

5.1 SUMMARY

The primary purpose of this research was to determine if South African industrial companies have structured themselves appropriately, in terms of organisational structure and system of planning, to be able to deal with increasing environmental uncertainty. The secondary objective of this research was to determine if the appropriately structured companies have performed better than their inappropriately structured counterparts. The two research objectives were combined into a research model with external (environmental volatility) and internal (perceived environmental uncertainty) measures of environmental uncertainty and a number of other categorical and continuous variables as controls.

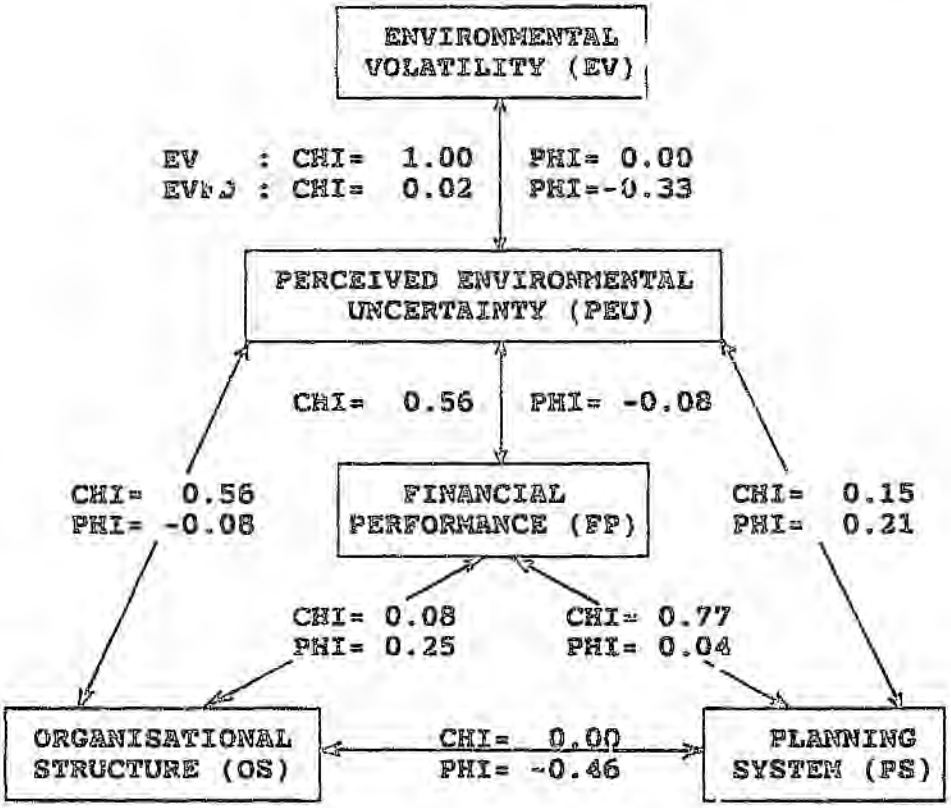
Based on the extensive review of literature, a theoretical framework to deal with environmental uncertainty was developed. It was extended, in terms of the predominant force utilised by organisations to deal with environmental uncertainty and change, into two configurations. The prospector configuration was regarded as more appropriate for uncertain environment. The defender configuration was regarded as more appropriate for certain environment.

Research propositions were deduced from the prospector configuration for, (a) perceived environmental uncertainty, planning system and financial performance, (b) perceived environmental uncertainty, organisational structure and financial performance, and (c) environmental volatility, perceived environmental uncertainty and financial performance.

The measurement instruments, for the operationalisation of the theoretical concepts, and the survey methodology to test the propositions in South African industrial organisations listed on Johannesburg Stock Exchange were discussed in chapter three. The descriptive statistics, response profile, impact of categorical and continuous variables, factor analysis and construct validation, reliability analysis and ordinal distortion, external validity, respondent or selection bias, and non-respondent bias were reviewed for each of the research variables.

After the establishment of the appropriateness of the research variables, parametric and non-parametric techniques were used to establish the actual relationship between the research variables. The deductions from the various techniques were then synthesised to test the propositions for each of the research relationships. The results were then reviewed in order to answer the research problems and satisfy the primary and secondary objectives of the research. The summary of the results of the cross-tabulation analyses are shown in figure 5 and tabulated in Appendix VII. None of the proposed relationships were found to be statistically significant when the detail, abridged or the combined results were considered.

Organisational size was found to have a significant impact on organisational structure, perceived



FET = Fisher's Exact Test		CHI/FET*	PHI
LOW PEU	PS & ROCE OS & ROCE	0.72 0.43	-0.07 0.16
HIGH PEU	PS & ROCE OS & ROCE	0.42* 0.22	0.19 0.33
LOW EV HIGH EV	PEU & ROCE PEU & ROCE	0.68 0.68	-0.08 -0.08
HIGH EVFD HIGH EVFD	PEU & ROCE PEU & ROCE	1.00 0.38	-0.03 -0.23

EV is a normal measure and EVFD is the first difference measure of Environmental Volatility.

FIGURE 5 : SUMMARY OF RESULTS

environmental uncertainty and financial performance. Small organisations appeared to be "prospectors" and large organisations appeared to be "defenders". It appeared that larger organisations used formalised planning system as a mediator between environmental influences and organisational structure. It appears that "defender" organisations use technocratic or power response to deal with environmental uncertainty. However, when the potential control on the source of uncertainty decreases, the "defender" organisations may be unable to cope with changes and may eventually become unprofitable.

5.2 LIMITATIONS OF THE STUDY

Only the larger industrial companies which were listed on the Johannesburg Stock Exchange were considered. Unlisted companies were not included in the research population. Mail questionnaire as a survey tool has a number of limitations. Two of the limitations are possible lack of response and the inability to check the response given (Bailey,1987). It, however, enables one to solicit a great deal of information economically for hypothesis testing. Further in-depth research is recommended to validate the findings of this study by using an interview approach with open-ended questions.

In social sciences the measurement instruments are not as clear, concise and accurate as physical sciences. The measurement of abstract concepts almost always present a problem of the validity and the reliability of the chosen measures (Kerlinger,1973). Considerable care was taken in the selection and the development of the appropriate measurements for the study.

The effect of organisational culture on the organisational structure and the system of planning was not directly considered. The study considered only financial parameters in the determination of organisational performance. The process or intangible benefits (King,1983) were ignored. They are recommended for further research.

The structuring dimensions of organisational structure was used as compared to the structural dimensions (Dalton, Todor, Spendolini, Fielding and Porter, 1980, p.51). The components of the planning system, as developed by Venkatraman, Ramanujam and Camillus (1984), were used to determine the degree of sophistication of the planning system. No attempt was made to determine the strategic content of the organisations' plans. Only the state uncertainty was considered as differentiated by Milliken (1987, pp.133-143). The effect or response uncertainty was not explicitly incorporated. It was assumed that an organisation will be able to determine the effect of environmental uncertainty and respond to it timeously by appropriately structuring itself. Planning system should enable it to reduce the effect uncertainty and the organisational structure should enable it to reduce response uncertainty.

Bourgeois (1980, p.25) classified Business Policy research into primary and secondary levels. The primary level is concerned with "Domain Definition" while the secondary level is concerned with "Domain Navigation". He argued that the domain definition strategies are enacted at the general environmental level and that the domain navigation strategies are carried out in the organisation's task environment. This study considered the organisation's task environment in congruence with the determination of

planning system at the domain navigation level.

"Predominant emphasis on individual and situational differences rather than similarities. Strong deterministic bias that largely ignores the importance of managerial choice. Determinism masks the complexity with which environmental, organisational and technological variables are related. Correlation analysis, even when collected on a longitudinal basis, leaves underlying organisational and managerial processes to be inferred" (Miles and Snow, 1978) .

Organisations appear to respond to environmental changes and align themselves over a number of years (Chandler, 1962). The benefits of the appropriate alignment may only be visible after a further few years. The total elapsed time from the change in environment to the benefits of the alignment endeavours may be as much as fifteen years. The cross-sectional analysis which looks at the variables at a given point may therefore be unable to adequately test the deduced propositions. The evolution of planning in South African companies, as considered in the introductory chapter, over the last two decades may provide some understanding. A longitudinal study is recommended for further research.

5.3 CONTRIBUTION TO KNOWLEDGE

The contribution to knowledge of this research can be divided into three aspects. The theoretical aspect highlights academic relevance with a new approach. The practical aspect highlights situation relevance with new evidence in Corporate Planning in the South African environment. The analytical aspect highlights statistical relevance with new and improved analysis.

5.3.1 Theoretical Aspects

An emphasis on the planning system for strategic formulation and implementation as opposed to the considerable amount of research done in the formulation of strategies for profit maximisation. "Strategy making is a recurring organisational phenomenon and as such lends itself to a scientific method of inquiry where repeated measures can be taken of the same construct and variance can be analysed" (Bourgeois,1980). "While strategy content is certainly crucial to organisational performance, knowledge about the process through which managements determine strategies in the first place should be considered equally pressing" . "There seem to be only two studies to examine the impact of environmental uncertainty on long-range planning conducted by organisations" (Javidan, 1984). "Very few studies have considered the third-link between environment and strategy" (Miller, 1983).

"A number of recent developments seems to be moving the field towards a theoretical convergence, and the outline of a general theory of organisations may be emerging. The source of this growing synthesis lies primarily in the area of Strategic Management" (Miles and Snow, 1983). The co-alignment (Bourgeois,1985) and convergence of Organisational Theory Literature and Business Policy Literature was used to develop a theoretical framework to deal with environmental uncertainty and extended, in terms of the predominant force used by organisations to deal with environmental uncertainty and change, into two configurations - prospector and defender.

The investigation of planning system and organisational structure linkage as opposed to the

strategy and structure linkage (Chandler, 1962). Additional evidence supporting or refuting the accepted relationships between organisational structure, planning system, perceived environmental uncertainty and financial performance. The determination of the impact of organisational size, capital intensity, organisational diversity and organisational age on planning system, organisational structure and perceived environmental uncertainty.

5.3.2 Practical Aspects

The evolution of planning in South African industrial companies. The solution to the following two research problems : (a) have South African industrial companies structured themselves appropriately, in terms of organisational structure and system of planning, to be able to deal with increasing environmental uncertainty?, and (b) have the appropriately structured companies performed better than their inappropriately structured counterparts?

The determination of the greatest uncertainty generating sub-component in the South African environment. The determination of the predominant structural characteristics and the degree of sophistication of planning system in South African industrial organisations.

5.3.3 Analytical Aspects

The utilisation of Likert type scale for ordinal measurements. The utilisation of factor analysis and scaling to convert discrete variables into continuous variables and the utilisation thereof for parametric

multivariate analysis. The utilisation of both parametric and non-parametric techniques to verify ordinal distortions and tap the higher sophistication of multivariate parametric techniques.

The consideration of environmental volatility as a criterion measure for perceived environmental uncertainty and other extraneous variables for control. The validation of the measure of planning system developed for the determination of the effectiveness of planning on performance (Ramanujam and Venkatraman, 1987). The validation of the measure of perceived environmental uncertainty developed by Miles and Snow (1978) and used by Ireland, Hitt, Bettis and De Porras (1987) in the Latin American environment. The validation of the measure of organisational structure developed by Robbins (1983).

5.4 SUGGESTIONS FOR FURTHER RESEARCH

A multi-phased research process with the corporate participation in a 'PIMS' type of data base all incorporating organisational developmental stages, modes of planning, organisational structure, culture, industry growth and the other likely characteristics of prospector and defender organisations is recommended.

Various criteria should be developed, tested and finalised to determine the industries with high and low perceived environmental uncertainty. Once the industries have been classified, the organisations should be separated into a number of organisational development stages, ranging from small to large. The larger organisations should be further sub-divided

into two groups, corporate level and business-unit level.

Small to large organisations, within the high and low perceived environmental uncertainty industries, should then be studied for general characteristics using a course-grained, cross-sectional and longitudinal approach. Which is then followed by the detail study of a few selected companies in the various categories using a fine-grained, cross-sectional and longitudinal approach. Thereafter, the research results should be synthesised to determine key "attributes" of successful responses to uncertainty, which could then be used for theoretical development and ultimately for management education.

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APPENDIX I
RESEARCH POPULATION

TABLE 1 : RESEARCH POPULATION

SECTORS	NUMBER	%
1 Beverage, Hotels & Leisure	18	4.9
2 Building & Construction	29	7.9
3 Chemicals & Oil	9	2.5
4 Clothing, Footwear & Textiles	40	10.9
5 Electronics, Electrical & Battery	46	12.6
6 Engineering	42	11.4
7 Fishing	5	1.4
8 Food	16	4 4
9 Furniture & Household Goods	18	4.9
10 Motor	17	4.6
11 Paper and Packaging	22	6.0
12 Pharmaceutical and Medical	13	3.5
13 Printing and Publishing	10	2.7
14 Retailers and Wholesalers	59	16.1
15 Steel and Allied	4	1.1
16 Sugar	3	0.8
17 Tobacco and Match	6	1.6
18 Transportation	10	2.7
TOTAL	367	100.0

TABLE 2 : RESPONSES BY SECTOR

SECTORS	"D"	"A"	"T"	%
Beverage, Hotels & Leisure	4	0	4	4.9
Building & Construction	4	3	7	8.6
Chemicals & Oil	2	0	2	2.5
Clothing, Footwear & Textiles	1	3	4	4.9
Electronics, Electrical & Battery	4	3	7	8.6
Engineering	7	3	10	12.4
Fishing	0	1	1	1.2
Food	5	1	6	7.4
Furniture & Household Goods	3	0	3	3.7
Motor	3	2	5	6.2
Paper and Packaging	2	4	6	7.4
Pharmaceutical and Medical	0	3	3	3.7
Printing and Publishing	0	1	1	1.2
Retailers and Wholesalers	8	6	14	17.4
Steel and Allied	2	1	3	3.7
Sugar	1	1	2	2.5
Tobacco and Match	0	0	0	0.0
Transportation	2	1	1	3.7
TOTAL	48	33	81	100.0

KEY : "D" - Response to Detail Questionnaire
: "A" - Response Abridged Questionnaire
: "T" - Total Response
: % - Percentage of the Total

LISTED INDUSTRIAL COMPANIES ON
JOHANNESBURG STOCK EXCHANGE
(FEBRUARY 1990)

SECTOR	CODE	COMPANY
1	1	AMALGAMATED BEVERAGE INDUSTRIES LTD.
1	2	DALYS LTD.
1	3	DISTILLERS CORPORATION (SA) LTD.
1	4	ENTERCOR HOLDINGS LTD.
1	5	INTERLEISURE LTD.
1	6	KAROS HOTELS LTD.
1	7	KERSAF INVESTMENTS LTD.
1	8	OAKFIELDS THOROUGHBREDS LTD.
1	9	PLEASURE FOODS LTD.
1	10	SOUTHERN SUN HOTEL HOLDINGS LTD.
1	11	SPUR HOLDINGS LTD.
1	12	SPUR STEAK RANCHES LTD.
1	13	STELLENBOSCH FARMERS' WINERY GROUP LTD.
1	14	SUN INTERNATIONAL (BOPHUTHATSWANA) LTD.
1	15	SUNCRUSH LTD.
1	16	THE SOUTH AFRICAN BREWERIES LTD.
1	17	TRANSKEI SUN INTERNATIONAL LTD.
1	18	UNION WINE LTD.
2	1	ANGLO-ALPHA LTD.
2	2	BASIL READ HOLDINGS LTD.
2	3	BASIL STARKE GROUP LTD.
2	4	BASIL STARKE INVESTMENTS LTD.
2	5	BLUE CIRCLE LTD.
2	6	BOUMAT LTD.
2	7	BUILDING MATERIAL MANUFACTURERS LTD.
2	8	CONCOR LTD.
2	9	EVERITE GROUP LTD.
2	10	EVERITE HOLDINGS LTD.
2	11	GRINAKER HOLDINGS LTD.
2	12	GROUP FIVE HOLDINGS LTD.
2	13	GROUP FIVE LTD.
2	14	GYPSUM INDUSTRIES LTD.
2	15	ILCO HOMES LTD.
2	16	ITALTILE LTD.
2	17	LTA LTD.
2	18	MASONITE (AFRICA) LTD.
2	19	OTIS ELEVATOR COMPANY LTD.
2	20	OVER HOLDINGS LTD.
2	21	PORT RAND HOLDINGS LTD.
2	22	PRETORIA PORTLAND CEMENT COMPANY LTD.
2	23	SHOREDITS HOLDINGS LTD.
2	24	SOLID DOORS GROUP HOLDINGS LTD.
2	25	STOCKS & STOCKS HOLDINGS LTD.
2	26	SUPREME INDUSTRIAL HOLDINGS LTD.
2	27	S.M.GOLDSTEIN LTD.
2	28	THE YORK TIMBER ORGANISATION LTD.
2	29	ZOZO HOLDINGS LTD.
3	1	AECI LTD.

3	2	CHEMICAL SERVICES LTD.
3	3	GAZANKULU GOLD HOLDINGS LTD.
3	4	OMNIA HOLDINGS LTD.
3	5	PROTEA CHEMICALS LTD.
3	6	SASOL LTD.
3	7	SENTRACHEM LTD.
3	8	STAALCHEM LTD.
3	9	TREK BELEGGINGS BPK.
3	10	WAYNE MANUFACTURING LTD.
4	1	ABHOLD LTD.
4	2	ALGNIS KNIWEAR HOLDINGS LTD.
4	3	AFRICAN & OVERSEAS ENTERPRISES LTD.
4	4	AMALGAMATED SHOES LTD.
4	5	ARONTEX HOLDINGS LTD.
4	6	ARWA GROUP LTD.
4	7	BOLTON FOOTWEAR LTD.
4	8	BURLINGTON INDUSTRIES LTD.
4	9	COASTAL CLOTHING MANUFACTURERS LTD.
4	10	CONSHU HOLDINGS LTD.
4	11	CONSOLIDATED FRAME TEXTILES LTD.
4	12	CUTRITE INVESTMENTS LTD.
4	13	DA GAMA TEXTILE LTD.
4	14	DEBONAIR GROUP LTD.
4	15	DELSWA LTD.
4	16	ENSIGN CLOTHING LTD.
4	17	FRAME GROUP HOLDINGS LTD.
4	18	GLODINA HOLDINGS LTD.
4	19	GUBB & INGGS LTD.
4	20	HOUSE OF MONATIC LTD.
4	21	JAFF-DELSWA INVESTMENTS LTD.
4	22	LENCO HOLDINGS LTD.
4	23	MERITEX HOLDINGS LTD.
4	24	NINIAN & LESTER HOLDINGS LTD.
4	25	PROGRESS INDUSTRIES LTD.
4	26	REX TRUEFORM CLOTHING COMPANY LTD.
4	27	ROMATEX LTD.
4	28	SEARDEL CONSOLIDATED HOLDINGS LTD.
4	29	SEARDEL INVESTMENT CORPORATION LTD.
4	30	SILVEROAK INDUSTRIES LTD.
4	31	STERLING CLOTHING LTD
4	32	STREBEL GROUP LTD.
4	33	S.A. BIAS BINDING MANUFACTURERS LTD.
4	34	TEXTILE MILLS (1947) HOLDINGS LTD.
4	35	THE LEEGALL CLOTHING COMPANY LTD.
4	36	TOWLES,EDGAR JACOBS LTD.
4	37	TRANSVAAL CLOTHING INDUSTRIES LTD.
4	38	TRIMTEX HOLDINGS LTD.
4	39	UNISPIN HOLDINGS LTD.
4	40	VEKA LTD.
5	1	ABERDARE CABLES AFRICA LTD.
5	2	ABS HOLDINGS LTD.
5	3	ADPROM HOLDINGS LTD.
5	4	ADVANCED TECHNICAL SYSTEMS LTD.
5	5	AFRICAN CABLES LTD.
5	6	ALLIED ELECTRONICS CORPORATION LTD.

5 7 ALLIED TECHNOLOGIES LTD.
5 8 ANBEECO INVESTMENT HOLDINGS LTD.
5 9 AUDIODECK HOLDINGS LTD.
5 10 AUTOPAGE HOLDINGS LTD.
5 11 CENTRAL AFRICAN CABLES LTD.
5 12 COMPUTERMATIC HOLDINGS LTD.
5 13 CONTROL INSTRUMENTS GROUP LTD.
5 14 CORPORATE TECHNOLOGY LTD.
5 15 CRB HOLDINGS LTD.
5 16 DARMAG LTD.
5 17 DATAKOR LTD.
5 18 DELTA ELECTRICAL INDUSTRIES LTD.
5 19 DIMENSION DATA HOLDINGS LTD.
5 20 ELCENTRE CORPORATION LTD.
5 21 ELCENTRE GROUP HOLDINGS LTD.
5 22 ELEX ELECTRONICS LTD.
5 23 FEMCO TECHNOLOGY HOLDINGS LTD.
5 24 FINTECH LTD.
5 25 GRINTEK LTD.
5 26 H & J SUPREME CABLE. ELECTRONICS LTD.
5 27 JASCO ELECTRONICS HOLDINGS LTD.
5 28 KOPP ELECTRONICS LTD.
5 29 MULTISOURCE HOLDINGS LTD.
5 30 NU-WORLD HOLDINGS LTD.
5 31 OHIO GROUP LTD.
5 32 POWER TECHNOLOGIES LTD.
5 33 PUNCH LINE HOLDINGS LTD.
5 34 Q DATA LTD.
5 35 REUNERT LTD.
5 36 SILTEK LTD.
5 37 SPESCOM ELECTRONICS [illegible].
5 38 SPL LTD.
5 39 SUPALEK HOLDINGS LTD.
5 40 TECHNOLOGY SYSTEMS INTERNATIONAL LTD
5 41 TEDELEX LTD.
5 42 THE MOVIE CAMERA COMPANY LTD.
5 43 TR SERVICES HOLDINGS LTD.
5 44 VENTRON CORPORATION LTD.
5 45 VIDEO LAB HOLDINGS LTD.
5 46 YELLAND TECHNOLOGY HOLDINGS LTD.
6 1 ABERCOM GROUP LTD
6 2 AFRICAN OXYGEN LTD.
6 3 ASSOCIATED ENGINEERING (SA) LTD.
6 4 BEARING MAN LTD.
6 5 BERZACK BROTHERS HOLDINGS LTD.
6 6 BERZACK-ILLMAN INVESTMENT CORP. LTD
6 7 BUFFALO CORPORATION LTD.
6 8 CHUBB HOLDINGS LTD.
6 9 CLAUDE NEON LTD.
6 10 CLYDE INDUSTRIAL CORPORATION LTD.
6 11 DANECH INDUSTRIAL CORPORATION
6 12 DANECH MINING SUPPLIES LTD.
6 13 DANGLO LTD.
6 14 DORBYL LTD.
6 15 EDWARD L. BATEMAN LTD.

6 16 FENNER GROUP LTD.
6 17 FRALEX LTD.
6 18 FRASER ALEXANDER LTD.
6 19 GENREC HOLDINGS LTD.
6 20 GOLDFIELDS INDUSTRIAL CORPORATION LTD.
6 21 HAGGIE LTD.
6 22 HUDACO INDUSTRIES LTD.
6 23 LANDLOCK LTD.
6 24 MASTERBORE LTD.
6 25 METER SYSTEMS LTD.
6 26 METKOR GROUP LTD.
6 27 MYNKAR HOLDINGS LTD.
6 28 NATIONAL TRADING HOLDINGS LTD.
6 29 NEI AFRICA HOLDINGS LTD.
6 30 NORTHERN ENGINEERING INDUSTRIES AFRICA
6 31 NTC LTD.
6 32 ROBOR INDUSTRIAL HOLDINGS LTD.
6 33 SAFETY TECHNOLOGIES LTD.
6 34 SCHARRIGHUISEN HOLDINGS LTD.
6 35 SMITH MINING EQUIPMENT LTD.
6 36 SONDOR INDUSTRIES LTD.
6 37 STANDARD ENGINEERING LTD.
6 38 THE CEMENTATION COMPANY (AFRICA) LTD.
6 39 TITACO CONSOLIDATED INVESTMENT LTD.
6 40 T.P.N. INVESTMENTS LTD.
6 41 UNIHOLD LTD.
6 42 VALARD LTD.
7 1 WB HOLDINGS LTD
7 2 NAMIBIAN SEA PRODUCTS LTD.
7 3 NATAL OCEAN TRAWLING LTD.
7 4 OCEANA FISHING GROUP LTD.
7 5 SOUTH WEST AFRICA FISHING INDUSTRIES LTD
8 1 BEVERAGE & CONSUMER INDUSTRY HOLDINGS LTD
8 2 BRENNER MILLS LTD.
8 3 CADBURY SCHWEPPES (SA) LTD
8 4 CROWN FOOD HOLDINGS LTD.
8 5 C.G.SMITH FOODS LTD.
8 6 FEDFOOD LTD.
8 7 GANTS HOLDINGS LTD.
8 8 IRVIN & JOHNSON LTD.
8 9 KANHYM INVESTMENTS LTD
8 10 LEBOWA BAKERIES LTD.
8 11 MACADAMS BAKERY SUPPLIES HOLDINGS LTD.
8 12 MIELIE-KIP LTD.
8 13 RAINBOW CHICKEN LTD.
8 14 THE IMPERIAL COLD STORAGE & SUPPLY CO.
8 15 THE PREMIER GROUP LTD.
8 16 TIGER OATS LTD.
9 1 AMALGAMATED RETAIL LTD.
9 2 ASSOCIATED FURNITURE COMPANIES LTD.
9 3 BARNETTS GROUP LTD.
9 4 ELLERINE HOLDINGS LTD.
9 5 FURNITURE FAIR LTD.
9 6 FURNTECH LTD.
9 7 GOMMAGOMMA HOLDINGS LTD.

9	8	GRANT ANDREWS HOLDINGS LTD.
9	9	JD GROUP LTD.
9	10	MORKELS LTD.
9	11	OCEAN APPLIANCE CORPORATION LTD.
9	12	PICARDI APPLIANCES LTD.
9	13	PRESTIGE GROUP LTD.
9	14	PRICEFURN HOLDINGS LTD.
9	15	ROMANO FURNITURE LTD.
9	16	SAM STEELE HOLDINGS LTD.
9	17	TAFELBERG FURNITURE STORES LTD.
9	18	THE RUSFURN GROUP LTD.
10	1	BRIAN PORTER HOLDINGS LTD.
10	2	COMBINED MOTOR HOLDINGS
10	3	CURRIE MOTORS (1946) LTD.
10	4	DUKEL HOLDINGS LTD.
10	5	GENTYRE INDUSTRIES LTD.
10	6	MARKET MOTOR GROUP LTD.
10	7	MARTIN JONKER HOLDINGS LTD.
10	8	MCCARTHY GROUP LTD.
10	9	METAIR INVESTMENTS LTD.
10	10	SAFICON INVESTMENTS LTD.
10	11	SAKER'S FINANCE & INVESTMENT CORP. LTD.
10	12	SPARECO HOLDINGS LTD.
10	13	TIGER WHEELS HOLDINGS LTD.
10	14	TOYOTA SOUTH AFRICA LTD.
10	15	VEKTRA CORPORATION PLC.
10	16	WESCO INVESTMENTS LTD.
10	17	VAALTRUCAR LTD.
11	1	AFCOM GROUP LTD.
11	2	AFCOM PACKAGING & INDUSTRIAL CORPORATION
11	3	ALEX WHITE HOLDINGS LTD.
11	4	ARIES PACKAGING LTD.
11	5	BOWLER METCALF LTD.
11	6	CANADIAN OVERSEAS PACKAGING INDUSTRIES
11	7	CARLTON PAPER CORPORATION LTD.
11	8	CLEGG HOLDINGS LTD.
11	9	COATES BROTHERS (SA) LTD.
11	10	CONSOL LTD.
11	11	CTP HOLDINGS LTD.
11	12	GRAPHTEC HOLDINGS LTD.
11	13	HARWILL INVESTMENTS LTD.
11	14	HORTORS LTD.
11	15	KOHLER LTD.
11	16	METAL CLOSURES GROUP (SOUTH AFRICA) LTD.
11	17	NAMPAK LTD.
11	18	PRESS SUPPLIES HOLDINGS LTD.
11	19	SAPPI LTD.
11	20	SUN PACKAGING HOLDINGS LTD.
11	21	SUN PACKAGING INVESTMENTS LTD.
11	22	TRANSPACO LTD.
12	1	ADCOCK INGRAM LTD.
12	2	CLINIC HOLDINGS LTD.
12	3	CREST HOLDINGS LTD.
12	4	GENERAL OPTICAL COMPANY LTD.
12	5	IEM PRODUCTS LTD.

12 6 KEMTRADE HOLDINGS LTD.
12 7 MEDI-CLINIC CORPORATION LTD.
12 8 NORISTAN HOLDINGS LTD.
12 9 PRESIDENT MEDICAL INVESTMENTS LTD.
12 10 SALTERS-FISHER MEDICAL HOLDINGS LTD.
12 11 SOUTH AFRICAN DRUGGISTS LTD.
12 12 THE UNION COLD STORAGE OF SA LTD.
12 13 TWINS PHARMACEUTICALS LTD.
13 1 ARGUS HOLDINGS LTD.
13 2 CAXTON LTD.
13 3 DISPATCH MEDIA LTD.
13 4 LITHOSAVER SYSTEMS LTD.
13 5 MATHIESON & ASHLEY HOLDINGS LTD.
13 6 PENROSE HOLDINGS LTD.
13 7 PERSKORGROEP LTD.
13 8 THE PUBLISHING CORPORATION OF SA LTD.
13 9 TIMES MEDIA LTD.
13 10 VADERLAND BELEGGINGS BPK.
14 1 AROMA LIQUOR HOLDINGS LTD.
14 2 ARTHUR KAPLAN JEWELLERY HOLDINGS LTD.
14 3 AUTOQUIP GROUP LTD.
14 4 BERGERS GROUP LTD.
14 5 BID CORPORATION LTD.
14 6 BOYMANS LTD.
14 7 CASHBUILD LTD.
14 8 CLICKS STORES LTD.
14 9 CNA GALLO LTD.
14 10 CONCORDE TRAVEL HOLDINGS LTD.
14 11 CURNOW M&G LTD.
14 12 DECOR INVESTMENT HOLDINGS LTD.
14 13 DIAL A MOVIE LTD.
14 14 DROP-INN GROUP HOLDINGS LTD.
14 15 EDGARS STORES LTD.
14 16 FLEISHMANS STORES LTD.
14 17 FOCUS HOLDINGS LTD.
14 18 FOSCHINI LTD.
14 19 FRASERS CONSOLIDATED LTD.
14 20 FRASERS LTD
14 21 GRESHAM INDUSTRIES LTD.
14 22 HI-SCORE HOLDINGS LTD.
14 23 HOMEMAKERS HOLDINGS LTD.
14 24 INDEPENDENT FASHION HOLDINGS LTD.
14 25 INTERHOLD LTD.
14 26 I.B.JOFFE LTD.
14 27 KIMET LTD.
14 28 LEWIS FOSCHINI INVESTMENT COMPANY LTD.
14 29 M & S SPITZ FOOTWEAR HOLDINGS LTD.
14 30 MAS HOLDINGS LTD.
14 31 MASHOLD CONSOLIDATED INVESTMENT HOLDINGS
14 32 METRO GROUP LTD.
14 33 MIDAS LTD.
14 34 MILSTAN HOLDINGS LTD.
14 35 NORTHS INDUSTRIES LTD.
14 36 OK BAZAARS (1929) LTD.
14 37 PENNYPINCHERS HOLDINGS LTD.

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14   38 PEP STORES LTD.
14   39 PEPGRO LTD.
14   40 PEPKOR LTD.
14   41 PICK 'N PAY HOLDINGS LTD.
14   42 PICK 'N PAY STORES LTD.
14   43 REDGWOODS HOLDINGS LTD.
14   44 SANLIC HOLDINGS LTD.
14   45 SCORE FOOD HOLDINGS LTD.
14   46 SCORE-CLICKS HOLDINGS LTD.
14   47 SHIELD TRADING CORPORATION LTD.
14   48 SHOPRITE HOLDINGS LTD.
14   49 SPECTRUM INDUSTRIAL LTD.
14   50 SPRINGTEX LTD.
14   51 STORECO LTD.
14   52 TELJOY HOLDINGS LTD.
14   53 THE STERN DIAMOND ORGANISATION LTD.
14   54 TRABILD GROUP HOLDINGS LTD.
14   55 TRADEGRO LTD.
14   56 VADEK PAINTS LTD.
14   57 WALTONS CONSOLIDATED INVESTMENT HOLDINGS
14   58 WALTONS STATIONERY COMPANY LTD.
14   59 WOOLTRU LTD.
15    1 CONSOLIDATED METALLURGICAL INDUSTRIES
15    2 HIGHVELD STEEL & VANADIUM CORPORATION
15    3 ISCOR LTD.
15    4 USKO LTD
16    1 CROOKES BROTHERS LTD.
16    2 LONRHO SUGAR CORPORATION LTD.
16    3 THE TONGAAT-HULETT GROUP LTD.
17    1 REMBRANDT CONTROLLING INVESTMENTS LTD.
17    2 REMBRANDT GROUP LTD.
17    3 TECHNICAL AND INDUSTRIAL INVESTMENTS LTD
17    4 TECHNICAL INVESTMENT CORPORATION LTD.
17    5 THE LION MATCH COMPANY LTD.
17    6 UTICO HOLDINGS LTD.
18    1 CARGO CARRIERS LTD.
18    2 LASER TRANSPORT HOLDINGS LTD.
18    3 LONGRAIL LTD.
18    4 MOBILE INDUSTRIES LTD.
18    5 PRESTO TRANSPORT HOLDINGS LTD.
18    6 PUTCO LTD.
18    7 RACY GROUP HOLDINGS LTD.
18    8 SURE GROUP HOLDINGS LTD.
18    9 TRENCOR LTD.
18   10 UNITRANS LTD.
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APPENDIX II

1. DETAIL QUESTIONNAIRE

2. BFA CODES AND DEFINITIONS

University of the Witwatersrand
Graduate School of Business Administration

The Chief Executive / Senior Management

Dear Sir ,

May 1990

DEALING WITH UNCERTAINTY

South African organisations have experienced an unusual degree of hardship and uncertainty over the last few years. After the considerable growth experienced by organisations in previous decades there has been a sudden reversal. The increased turbulence coupled with long-term uncertainty forced most of the successful conglomerates to review the mission of their businesses, to review their core activities, to review productivity and efficiency, and to review possible divestment and rationalisation. Instead of dealing with uncertainty, organisations seems to have become apprehensive of new developments.

I am trying to determine the solution to the following problem through a doctoral research programme :

HAVE SOUTH AFRICAN INDUSTRIAL COMPANIES STRUCTURED THEMSELVES EFFECTIVELY IN TERMS OF ORGANISATIONAL STRUCTURE AND SYSTEM OF PLANNING, TO BE ABLE TO DEAL WITH THE INCREASING ENVIRONMENTAL UNCERTAINTY ?

The attached questionnaire is being sent to a selected number of organisations to enable me to address the research problem. There is no right or wrong answer. The overall findings are more important than the specific aspects of a given company, however, the accuracy and the completeness of the information provided by you will be critical to the overall findings.

The findings, considering the contribution of industrial organisations towards the Gross Domestic Product, will be of paramount importance to South African economy and South Africa as a whole.

I would appreciate the return of the completed questionnaire as soon as possible. Please note that the confidentiality of the information provided by yourself is maintained through the required content of the questionnaire and the ethics, standards of academic researchers.

You are welcome to contact me at the above address for further clarification or findings. The questionnaire has been designed to be simple and unambiguous so that the minimum amount of your time is taken.

The findings will be provided to you when the project is completed and is approved by the University.

I sincerely thank you for your assistance .
Yours faithfully,

R.B.DAYA.
Enclosure:

NOTE :
The success of this research and my achieving the doctorate is dependent on your response. Kindly oblige to my request.

University of the Witwatersrand
Graduate School of Business Administration

The Chief Executive / Senior Management

Dear Sir, June 1980

DEALING WITH UNCERTAINTY - REMINDER

You may have already received a covering letter with a short questionnaire. You may not have had the opportunity to complete it. Kindly complete this VITAL questionnaire at your earliest convenience and return it in the self-addressed envelope enclosed.

If you wish, you can photocopy your responses so that it may be easier for you to compare it against the summary, which will be posted to you on the completion of this research project.

Please ignore this letter if you have already completed and returned the questionnaire. I have enclosed another questionnaire in the event you may not have received the previous one or you may have misplaced it.

Thank you for your contribution. My success depends on your support.

Yours faithfully,

R.B.DAYA.
Enclosure:

MAIL QUESTIONNAIRE

(A) GENERAL

NAME OF YOUR COMPANY (optional) : .....

UNDER WHICH J.S.E SECTOR IS IT LISTED ? : .....
(e.g. Chemical & Oil, Food)

Please circle your position in the company.
e.g 07...Management Accountant

01 .... Chairman of the Board
02 .... Chief Executive / Managing Director
03 .... Financial Director
04 .... Planning Director / Manager
05 .... Other (Please Specify) .....

(1) How many unique divisions or business units in different markets does your organisation have ? (e.g. 1,3,5,8) .....

How many of these divisions or business units are related ? (e.g. 1,2) .....

(2) Does your company prepare a written long-term plan covering at least three years ? YES / NO

If so, what time period does it cover (years)? .....

How long has your company prepared a long-term plan (years) ? .....

(B) PLANNING SYSTEM

Please rate the change in each of the following items over the last five years in your organisation as a whole . Circle the number that best depict the change.

e.g Number of employees.

significant decrease -3....-2....-1....0...(1)...2....3 significant increase

(1) RESOURCES PROVIDED TO THE PLANNING FUNCTION

(a) Number of planners.

significant decrease -3....-2....-1....0....1....2....3 significant increase

(b) Time spent by chief executive officer in strategic planning.

significant decrease -3....-2....-1....0....1....2....3 significant increase

(c) Involvement of staff managers in strategic planning.

significant decrease -3....-2....-1....0....1....2....3 significant increase

(d) Resources provided to strategic planning.

significant decrease -3....-2....-1....0....1....2....3 significant increase

(2) RESISTANCE TO PLANNING

(a) Overall emphasis on strategic planning.

significant decrease -3....-2....-1....0....1....2....3 significant increase

(b) Involvement of line managers in strategic planning.

significant decrease -3....-2....-1....0....1....2....3 significant increase

(c) Acceptance of the outputs of the strategic planning exercise by top management.

significant decrease -3....-2....-1....0....1....2....3 significant increase

(d) Resistance to planning in general.

significant decrease -3....-2....-1....0....1....2....3 significant increase

(e) Threats to the continuation of strategic planning.

significant decrease -3....-2....-1....0....1....2....3 significant increase

(3) ATTENTION TO INTERNAL FACTORS

(a) Internal strengths and weaknesses.

significantly less emphasis -3....-2....-1....0....1....2....3 significantly more emphasis

(b) Past performance.

significantly less emphasis -3....-2....-1....0....1....2....3 significantly more emphasis

(c) Reasons for past failures.

significantly less emphasis -3....-2....-1....0....1....2....3 significantly more emphasis

(A) ATTENTION TO EXTERNAL FACTORS

(a) General economic and business conditions.

significantly less emphasis -3....-2....-1....0....1....2....3 significantly more emphasis

(b) Regulatory and political issues.

significantly less emphasis -3....-2....-1....0....1....2....3 significantly more emphasis

(c) Competitive trends.

significantly less emphasis -3....-2....-1....0....1....2....3 significantly more emphasis

(4) ATTENTION TO EXTERNAL FACTORS

(d) Supplier trends.
significantly less emphasis -3....-2....-1....0....1....2....3 significantly more emphasis

(e) Customer/end user preferences.
significantly less emphasis -3....-2....-1....0....1....2....3 significantly more emphasis

(f) Technological trends.
significantly less emphasis -3....-2....-1....0....1....2....3 significantly more emphasis

(5) FUNCTIONAL COVERAGE

(a) Marketing function.
significantly less emphasis -3....-2....-1....0....1....2....3 significantly more emphasis

(b) Production function.
significantly less emphasis -3....-2....-1....0....1....2....3 significantly more emphasis

(c) Finance function.
significantly less emphasis -3....-2....-1....0....1....2....3 significantly more emphasis

(d) Personnel function.
significantly less emphasis -3....-2....-1....0....1....2....3 significantly more emphasis

(e) Purchasing function.
significantly less emphasis -3....-2....-1....0....1....2....3 significantly more emphasis

(f) Research and development function.
significantly less emphasis -3....-2....-1....0....1....2....3 significantly more emphasis

(Data processing and information system function.
significantly less emphasis -3....-2....-1....0....1....2....3 significantly more emphasis

(6) USE OF TECHNIQUES

(a) Portfolio approaches (BCG etc).
significant decrease -3....-2....-1....0....1....2....3 significant increase

(b) PIMS models.
significant decrease -3....-2....-1....0....1....2....3 significant increase

(c) Financial models (Profitability, Cashflow).
significant decrease -3....-2....-1....0....1....2....3 significant increase

(d) Zero-based budgeting.
significant decrease -3....-2....-1....0....1....2....3 significant increase

(e) Value-based planning.
significant decrease -3....-2....-1....0....1....2....3 significant increase

(f) Project management techniques.(PERT etc)
significant decrease -3....-2....-1....0....1....2....3 significant increase

(g) Stakeholder analysis.
significant decrease -3....-2....-1....0....1....2....3 significant increase

(h) Scenario/Delphi techniques.
significant decrease -3....-2....-1....0....1....2....3 significant increase

(6) USE OF TECHNIQUES

(i) Forecasting and trend analysis.

significant decrease -3...-2...-1...0...1...2...3 significant increase

(7) CAPABILITY OF THE SYSTEM

(a) Ability to anticipate surprises and crises.

much deterioration -3...-2...-1...0...1...2...3 much improvement

(b) Flexibility to adapt to unanticipated changes.

much deterioration -3...-2...-1...0...1...2...3 much improvement

(c) Mechanism for identifying new business opportunities.

much deterioration -3...-2...-1...0...1...2...3 much improvement

(d) Role in identifying key problem areas.

much deterioration -3...-2...-1...0...1...2...3 much improvement

(e) Tool for managerial motivation.

much deterioration -3...-2...-1...0...1...2...3 much improvement

(f) Capacity to generate new ideas.

much deterioration -3...-2...-1...0...1...2...3 much improvement

(g) Ability to communicate top management's expectations down the line.

much deterioration -3...-2...-1...0...1...2...3 much improvement

(h) Tool for management control.

much deterioration -3...-2...-1...0...1...2...3 much improvement

(i) Capacity to foster organisational learning.

much deterioration -3...-2...-1...0...1...2...3 much improvement

(j) Ability to communicate line management's concern to top management.

much deterioration -3...-2...-1...0...1...2...3 much improvement

(k) Mechanism for integrating diverse functions and operations.

much deterioration -3...-2...-1...0...1...2...3 much improvement

(l) Basis for enhancing innovation.

much deterioration -3...-2...-1...0...1...2...3 much improvement

(C) ORGANIZATIONAL STRUCTURE

Please circle your response to each of the following items as they apply to your organisation as a whole.

e.g How many employees are there ?

(i) very few
(ii) small number
(iii) moderate number
(iv) large number
(v) great number

(1) DIVISION OF LABOUR

(a) How many different job titles are there ?

(i) very few
(ii) small number
(iii) moderate number
(iv) large number
(v) great number

(1) DIVISION OF LABOUR

(b) What proportion of employees hold advanced degrees or have many years of specialised training ?

(i) 0-10 %
(ii) 11-20 %
(iii) 21-50 %
(iv) 51- 75 %
(v) 76-100 %

(c) How many vertical levels separate the chief executive from those employees working on output in the largest division ?

(i) 1 or 2
(ii) 3 to 5
(iii) 6 to 8
(iv) 9 to 12
(v) more than 12

(d) What is the average number of levels for your organisation as a whole ?

(i) 1 or 2
(ii) 3 to 5
(iii) 6 to 8
(iv) 9 to 12
(v) more than 12

(e) How many separate geographic locations does your organisation have in total ?

(i) 1 or 2
(ii) 3 to 5
(iii) 6 to 8
(iv) 9 to 12
(v) more than 12

(f) What is the average distance of these separate units from your company's head office ?

(i) less than 100km
(ii) 101-300km
(iii) 301-600km
(iv) 601-900km
(v) more than 900km

(g) What proportion of the organisation's total work force are located at these separate units ?

(i) less than 10 %
(ii) 11-25 %
(iii) 26-60 %
(iv) 61-80 %
(v) more than 80 %

(2) RULES, PROCEDURES AND POLICIES

(a) Written job descriptions are available for.

(i) operative employees only
(ii) operative employees and first-line supervisors
(iii) operative, first-line and middle management
(iv) operative, first-line, middle and upper management
(v) all employees including senior management

(b) Where written job descriptions exist , how closely are employees supervised to ensure compliance with standards set in the job description ?

(i) very loose
(ii) loose
(iii) moderately close
(iv) close
(v) very close

(c) How much latitude are employees allowed from the standards ?

(i) a great deal
(ii) a large amount
(iii) a moderate amount
(iv) very little
(v) none

(d) What percentage of non-managerial employees are given written operating instructions or procedures for their jobs ?

(i) 0-20 %
(ii) 21-40 %
(iii) 41-60 %
(iv) 61-90%
(v) more than 90%

(e) Of those managerial employees given written instructions or procedures , to what extent are they followed ?

(i) none
(ii) little
(iii) some
(iv) a great deal
(v) a very great deal

(f) To what extent are supervisors and middle managers free from rules, procedures , and policies when they make decisions ?

(i) a very great deal
(ii) a great deal
(iii) some
(iv) little
(v) none

(2) RULES, PROCEDURES AND POLICIES

(g) What percentage of all the rules and procedures that exist within the organisation are in writing ?

(i) 0-20 %
(ii) 21-40 %
(iii) 41-60 %
(iv) 61- 80 %
(v) 81-100 %

(3) DECISION-MAKING

(a) How much direct involvement does top management have in gathering the information input that they will use in making decisions ?

(i) none
(ii) little
(iii) some
(iv) a great deal
(v) a very great deal

(b) To what degree does top management participate in the interpretation of the information input ?

(i) 0-20 %
(ii) 21-40 %
(iii) 41-60 %
(iv) 61- 80 %
(v) 81-100 %

(c) To what degree does top management directly control the execution of the decision ?

(i) 0-20 %
(ii) 21-40 %
(iii) 41-60 %
(iv) 61- 80 %
(v) 81-100 %

(d) How much discretion does the typical first line supervisor have over establishing his or her unit's budget ?

(i) a very great deal
(ii) a great deal
(iii) some
(iv) little
(v) none

(e) How much discretion does the typical first line supervisor have over determining how his or her unit's performance will be calculated ?

(i) a very great deal
(ii) a great deal
(iii) some
(iv) little
(v) none

(f) How much discretion does the typical first line supervisor have over hiring and firing personnel ?

(i) a very great deal
(ii) a great deal
(iii) some
(iv) little
(v) none

(g) How much discretion does the typical first line supervisor have over personnel rewards (salary increases, promotion etc.) ?

(i) a very great deal
(ii) a great deal
(iii) some
(iv) little
(v) none

(h) How much discretion does the typical first line supervisor have over purchasing of equipment and supplies ?

(i) a very great deal
(ii) a great deal
(iii) some
(iv) little
(v) none

(i) How much discretion does the typical first line supervisor have over establishing a new project or program ?

(i) a very great deal
(ii) a great deal
(iii) some
(iv) little
(v) none

(j) How much discretion does the typical first line supervisor have over establishing how work expectations are to be handled ?

(i) a very great deal
(ii) a great deal
(iii) some
(iv) little
(v) none

(D) ENVIRONMENTAL UNCERTAINTY

Please rate the characteristics or behaviour of the various factors on the degree of their predictability as they would apply to your organisation as a whole . Circle one.

e.g. Inflation Rate:

highly unpredictable -5...-2...-1...0...(1)...2...3 highly predictable

(1) SUPPLIER OF YOUR RAW MATERIAL AND COMPONENTS

(a) their price changes.

highly unpredictable -3...-2...-1...0...1...2...3 highly predictable

(b) quality changes.

highly unpredictable -3...-2...-1...0...1...2...3 highly predictable

(c) design changes.

highly unpredictable -3...-2...-1...0...1...2...3 highly predictable

(d) introduction of new materials or components.

highly unpredictable -3...-2...-1...0...1...2...3 highly predictable

(2) COMPETITORS' ACTIONS

(a) their price changes.

highly unpredictable -3...-2...-1...0...1...2...3 highly predictable

(b) product quality changes.

highly unpredictable -3...-2...-1...0...1...2...3 highly predictable

(c) product design changes.

highly unpredictable -3...-2...-1...0...1...2...3 highly predictable

(d) introduction of new products.

highly unpredictable -3...-2...-1...0...1...2...3 highly predictable

(3) CUSTOMERS

(a) demand for existing product.

highly unpredictable -3...-2...-1...0...1...2...3 highly predictable

(b) demand for new products.

highly unpredictable -3...-2...-1...0...1...2...3 highly predictable

(4) THE FINANCIAL AND CAPITAL MARKET

(a) Interest rate changes.

(i) short-term debt.

highly unpredictable -3...-2...-1...0...1...2...3 highly predictable

(ii) long-term debt.

highly unpredictable -3...-2...-1...0...1...2...3 highly predictable

(b) Changes in financial instruments available.

(i) short-term debt.

highly unpredictable -3...-2...-1...0...1...2...3 highly predictable

(ii) long-term debt.

highly unpredictable -3...-2...-1...0...1...2...3 highly predictable

(c) Availability of credit.

(i) short-term debt.

highly unpredictable -3...-2...-1...0...1...2...3 highly predictable

(ii) long-term debt.

highly unpredictable -3...-2...-1...0...1...2...3 highly predictable

(5) GOVERNMENT REGULATIONS

(a) changes in policies on pricing.
highly unpredictable -3....-2....-1....0....1....2....3 highly predictable

(b) changes in policies on product quality.
highly unpredictable -3....-2....-1....0....1....2....3 highly predictable

(c) changes in policies regarding financial practices.
highly unpredictable -3....-2....-1....0....1....2....3 highly predictable

(d) changes in policies on labour.
highly unpredictable -3....-2....-1....0....1....2....3 highly predictable

(e) changes in policies affecting marketing methods.
highly unpredictable -3....-2....-1....0....1....2....3 highly predictable

(f) changes in policies on accounting procedures.
highly unpredictable -3....-2....-1....0....1....2....3 highly predictable

(6) ACTIONS OF LABOUR UNIONS

(a) changes in wages, hours and conditions.
highly unpredictable -3....-2....-1....0....1....2....3 highly predictable

(b) changes in their attitudes.
highly unpredictable -3....-2....-1....0....1....2....3 highly predictable

(c) changes in grievance procedures.
highly unpredictable -3....-2....-1....0....1....2....3 highly predictable

(7) ECONOMIC AND SOCIO-POLITICAL CLIMATE

(a) changes in economic climate.
highly unpredictable -3....-2....-1....0....1....2....3 highly predictable

(b) changes in socio-political climate.
highly unpredictable -3....-2....-1....0....1....2....3 highly predictable

(8) TECHNOLOGY

(a) changes in technology (product,process etc.)
highly unpredictable -3....-2....-1....0....1....2....3 highly predictable

(b) substitution by the new technology for the old.
highly unpredictable -3....-2....-1....0....1....2....3 highly predictable

(E) FINANCIAL PERFORMANCE

Please record the following key performance areas for your organisation as a whole, in rand millions, for the last five years.

RAND MILLIONS	85/6	86/7	87/8	88/9	89/90
(1) Net Sales (2) Value Added (3) Profit Before Interest and Tax (4) Profit Before Tax					

RAND MILLIONS	85/6	86/7	87/8	88/9	89/90
(5) Capital Expenditure (6) R & D Expenditure (7) Plant and Equipment (8) Total Assets (9) Capital Employed (10) Number of Employees (x 1000)					
(11) Return on Sales (%) (12) Return on Capital Employed (%) (13) Return on Value Added (%)					

DEFINITION OF FINANCIAL TERMS

(1) Net Sales = Gross Sales - Intergroup Sales.
(2) Value Added = Net Sales - Cost of Sales.
(3) Profit Before Interest and Tax = Exclude Income from Investment and Subsidiaries.
(4) Profit Before Tax = Include Income from Investment and Subsidiaries.
(5) Capital Expenditure = Expenditure on Replacement of Assets, Expansion of Facilities and New Projects.
(6) Research and Development Expenditure.
(7) Plant & Equipment = At Cost or Valuation.
(8) Total Assets = Fixed + Current + Investments + Intangibles (Goodwill, etc.).
(9) Capital Employed = Total Assets - Current Liabilities.
(10) Total Employees = Permanent, Casual and Seasonal (year-end).
(11) Return on Sales = (3)/(1) * 100.
(12) Return on Capital Employed = (3)/(8) * 100.
(13) Return on Value Added = (4)/(2) * 100.

The above information will be treated in the utmost confidence. Should you wish to take advantage of the offer of the results of this research EITHER forward your company's name and address under separate cover and so ensure your anonymity OR fill in the details below.

Company Name : .....

Address : .....
.....
.....
.....

Telephone No. .....

Attention of .....

THANK YOU VERY MUCH FOR YOUR TIME AND EFFORT.
YOUR CONTRIBUTION IS VITAL FOR THIS RESEARCH PROJECT.
THANK YOU. THANK YOU. THANK YOU.

BFA CODES AND DEFINITIONS

1. (30)51 - TURNOVER

This figure represents the total turnover as reflected in the financial statements of the company or group.

2. (30)73 - PROFIT BEFORE INTEREST AND TAXATION

This represents the net profit for the year including profits and losses of an extraordinary nature, but before deducting interest paid on borrowed funds and before providing for taxation for the year.

3. (30)75 - PROFIT BEFORE TAXATION

This is the net profit for the year, including profits and losses of an extraordinary nature, and all interest paid, but before providing for taxation for the year.

4. (30)12 - COST OF OTHER FIXED ASSETS

This item contains all other fixed assets, apart from land and buildings, at the original cost price or at the most recent revaluation thereof. Included therein are inter alia machinery and plant, vehicles, office equipment, furniture and fittings and any other assets which are used on a long term basis in conducting the business of the organisation.

5. (30)40 - TOTAL ASSETS

This figure represents the total of all assets employed by the company or group, with the exclusion of intangible assets and cost of control of subsidiaries.

6. (30)37 - TOTAL CURRENT LIABILITIES

This is the total of all current liabilities : short-term borrowings, creditors, bank overdraft, provision for taxation and dividends.

7. (30)40 LESS (30)37 - CAPITAL EMPLOYED

This figure represents the total of all assets employed by the company or group LESS the total of all current liabilities

APPENDIX III

ABRIDGED QUESTIONNAIRE

University of the Witwatersrand
Graduate School of Business Administration

The Chief Executive / Senior Management

Dear Sir, August 1980

DEALING WITH UNCERTAINTY - ABRIDGED

You may have already received a covering letter with a short questionnaire. You may have also received a reminder letter. You may not have had the time to comply with the request.

In view of the pressures of business and the seemingly fewer hours everyday, I have enclosed an abridged questionnaire which will not take more than ten minutes of your time.

Kindly return your response in the self-addressed envelope enclosed. Your response is vital to this research project.

Thank you for your contribution.

My success depends on your support.

Yours faithfully,

K.B.DAYA.
Enclosure:

ABRIDGED MAIL QUESTIONNAIRE
DEALING WITH UNCERTAINTY

(A) GENERAL

(1) Name of your company (optional) : .....

(2) Under which J.S.E sector is it listed ? : .....

(3) Please circle your position in the company.
- 01 .... Chairman of the Board
- 02 .... Chief Executive / Managing Director
- 03 .... Financial Director
- 04 .... Planning Director / Manager
- 05 .... Other (Please Specify) .....

(4) How many unique divisions or business units in different markets does your organisation have?.....
How many of these divisions or business units are related?.....

(5) Does your company prepare a written long-term plan covering at least three years? YES / NO
How long has your company prepared a long-term plan (years)?.....

(B) PLANNING SYSTEM

Please rate the change in each of the following items over the last five years in your organisation as a whole . Circle the number that best depict the change.

(1) RESOURCES PROVIDED TO THE PLANNING FUNCTION : Number of planners, time spent by chief executive officer in strategic planning, involvement of staff managers in strategic planning and resources provided to strategic planning.

significant decrease -3....-2....-1....0....1....2....3 significant increase

(2) RESISTANCE TO PLANNING : Overall emphasis on strategic planning, involvement of line managers in strategic planning, acceptance of the outputs of the strategic planning exercise by top management, resistance to planning in general and threats to the continuation of strategic planning.

significant decrease -3....-2....-1....0....1....2....3 significant increase

(3) ATTENTION TO INTERNAL FACTOI : Internal strengths and weaknesses, past performance and reasons for past failures.

significantly less emphasis -3....-2....-1....0....1....2....3 significantly more emphasis

(4) ATTENTION TO EXTERNAL FACTORS : General economic and business conditions, regulatory and political issues, competitive trends, supplier trends, customer/end user preferences and technological trends.

significantly less emphasis -3. ..-2....-1....0....1....2....3 significantly more emphasis

(5) FUNCTIONAL COVERAGE : Marketing function, production function, finance function, personnel function, purchasing function, research and development function, and data processing and information system function.

significantly less emphasis -3....-2....-1....0....1....2....3 significantly more emphasis

(6) USE OF TECHNIQUES : Portfolio approaches (BCG etc), PIMS models, financial models (Profitability, Cashflow), zero-based budgeting, value-based planning, project management techniques (PERT etc), stakeholder analysis, scenario/delphi techniques and forecasting and trend analysis.

significant decrease -3....-2....-1....0....1....2....3 significant increase

(7) CAPABILITY OF THE SYSTEM : Ability to anticipate surprises and crises, flexibility to adapt to unanticipated changes, mechanism for identifying new business opportunities, role in identifying key problem areas, tool for managerial motivation, capacity to generate new ideas, ability to communicate top management's expectations down the line, tool for management control, capacity to foster organisational learning, ability to communicate line management's concern to top management, mechanism for integrating diverse functions and operations and basis for enhancing innovation.

much deterioration -3....-2....-1....0....1....2....3 much improvement

(C) ORGANIZATIONAL STRUCTURE

Please circle your response to each of the following items as they apply to your organisation as a whole.

(1) What proportion of employees hold advanced degrees or have many years of specialised training ?
- (i) 0-10 %
- (ii) 11-20 %
- (iii) 21-50 %
- (iv) 51- 75 %
- (v) 76-100 %

(2) How many vertical levels separate the chief executive from those employees working on output in the largest division ?
- (i) 1 or 2
- (ii) 3 to 5
- (iii) 6 to 8
- (iv) 9 to 12
- (v) more than 12

(3) How many separate geographic locations does your organisation have in total ?
- (i) 1 or 2
- (ii) 3 to 5
- (iii) 6 to 8
- (iv) 9 to 12
- (v) more than 12

(4) Written job descriptions are available for,
- (i) operative employees only
- (ii) operative employees and first-line supervisors
- (iii) operative, first-line and middle management
- (iv) operative, first-line, middle and upper management
- (v) all employees including senior management

(5) Where written job descriptions exist, how clearly are employees supervised to ensure compliance with standards set in the job description ?
- (i) very loose
- (ii) loose
- (iii) moderately close
- (iv) close
- (v) very close

(6) How much latitude are employees allowed from the standards ?
- (i) a great deal
- (ii) a large amount
- (iii) a moderate amount
- (iv) very little
- (v) none

(7) To what extent are supervisors and middle managers free from rules, procedures , and policies when they make decisions ?
- (i) a very great deal
- (ii) a great deal
- (iii) some
- (iv) little
- (v) none

(8) How much direct involvement does top management have in gathering the information input that they will use in making decisions ?
- (i) none
- (ii) little
- (iii) some
- (iv) a great deal
- (v) a very great deal

(9) To what degree does top management participate in the interpretation of the information input ?
- (i) 0-20 %
- (ii) 21-40 %
- (iii) 41-60 %
- (iv) 61- 80 %
- (v) 81-100 %

(10) To what degree does top management directly control the execution of the decision ?
- (i) 0-20 %
- (ii) 21-40 %
- (iii) 41-60 %
- (iv) 61- 80 %
- (v) 81-100 %

(D) ENVIRONMENTAL UNCERTAINTY

Please rate the characteristics o behaviour of the various factors on the degree of their predictability as they would apply to your organisation as a whole . Circle one.

(1) SUPPLIER OF YOUR RAW MATERIAL AND COMPONENTS : Their price changes, quality changes, design changes and the introduction of new materials or components.

highly unpredictable -3....-2....-1....0....1....2....3 highly predictable

(2) COMPETITORS' ACTIONS : Their price changes, product quality changes, product design changes and introduction of new products.

highly unpredictable -3....-2....-1....0....1....2....3 highly predictable

(3) CUSTOMERS : Demand for existing product and demand for new products.

highly unpredictable -3....-2....-1....0....1....2....3 highly predictable

(4) THE FINANCIAL AND CAPITAL MARKET : Interest rate changes, changes in financial instruments available and availability of credit.

highly unpredictable -3....-2....-1....0....1....2....3 highly predictable

(5) GOVERNMENT REGULATIONS : Changes in policies on pricing, changes in policies on product quality, changes in policies regarding financial practices, changes in policies on labour, changes in policies affecting marketing methods, and changes in policies on accounting procedures.

highly unpredictable -3....-2....-1....0....1....2....3 highly predictable

(6) ACTIONS OF LABOUR UNIONS : Changes in wages, hours and conditions, changes in their attitudes and changes in grievance procedures.

highly unpredictable -3....-2....-1....0....1....2....3 highly predictable

(7) ECONOMIC AND SOCIO-POLITICAL CLIMATE : Changes in economic climate and changes in socio-political climate.

highly unpredictable -3....-2....-1....0....1....2....3 highly predictable

(8) TECHNOLOGY : Changes in technology (product,process etc.) and substitution by the new technology for the old.

highly unpredictable -3....-2....-1....0....1....2....3 highly predictable

The above information will be treated in the utmost confidence. Should you wish to take advantage of the offer of the results of this research EITHER forward your company's name and address under separate cover and so ensure your anonymity OR fill in the details below.

Company Name : .....
Address : .....
.....
.....
.....

Telephone No. .....
Attention of .....

THANK YOU VERY MUCH FOR YOUR TIME AND EFFORT.
YOUR CONTRIBUTION IS VITAL FOR THIS RESEARCH PROJECT.
THANK YOU. THANK YOU. THANK YOU.

DATA CODING STRUCTURE

(A) GENERAL

Sector and Company Code : Precoded on Return Label

Respondent 01 : Chairman of the Board
02 : Chief Executive/Managing Director
03 : Financial Director
04 : Planning Manager/Director
05 : Accountant
06 : Human Resource/Manpower Manager
07 : General Manager
08 : Information System Director

Preparation of Written Long-Term Plan :
01 = YES, 02 = NO

TOP100 : 01 = YES, 02 = NO

(B) Planning System :

Normal coding for the seven components, excluding questions (d) and (e) of the Resistance component which were reverse coded.

	Normal	Reverse
Significant decrease (-3) :	1	7
Slight decrease (-2) :	2	6
Decrease (-1) :	3	5
No change (0) :	4	4
Increase (1) :	5	3
Slight increase (2) :	6	2
Significant increase (3) :	7	1

(C) Organisational Structure :

Reverse coding for all the three components.

(i) : 5 (ii) : 4
(iii) : 3 (iv) : 2
(v) : 1

(D) Perceived Environmental Uncertainty :

Reverse coding for all the six components.

Highly unpredictable (-3) : 7
Slightly unpredictable (-2) : 6
Unpredictable (-1) : 5
Normal (0) : 4
Predictable (1) : 3
Slightly predictable (2) : 2
Highly predictable (3) : 1

SAS VARIABLES

GENERAL

SECTOR	Stock Exchange Sector
CODE	Company
FOUNDED	Year Founded
RESPOND	Position of the Respondent
DIVERS	Organisational Diversity
LTP	Preparation of Long-Term Plan
TOP100	Classified as TOP100 on Stock Exchange

FINANCIAL VARIABLES - FOR 5 YEARS

SALES (1-5)	Net Sales
PBIT (1-5)	Profit Before Interest and Tax
PBT (1-5)	Profit Before Tax
PNE (1-5)	Cost Other Fixed Assets
ASSET (1-5)	Total Assets
CE (1-5)	Capital Employed

PLANNING SYSTEM VARIABLES

RES (1-4)	Resources	4 questions
RESIS (1-5)	Resistance	5 questions
INT (1-3)	Internal Factors	3 questions
EXT (1-6)	External Factors	6 questions
FUNC (1-7)	Functional Coverage	7 questions
TECH (1-9)	Techniques Used	9 questions
SYS (1-12)	System Capability	12 questions

Component Variables : RES, RESIS, INT, EXT, FUNC, TECH, SYS

Overall Variable : PS

ORGANISATIONAL STRUCTURE VARIABLES

COMP (1-7)	Complexity	7 questions
FORM (1-7)	Formalisation	7 questions
CENT (1-10)	Centralisation	10 questions

Component Variables : COMP, FORM, CENT

Overall Variable : OS

SAS VARIABLES (CONT.)

PERCEIVED ENVIRONMENTAL UNCERTAINTY VARIABLES		
SUPP (1-4)	Supplier	4 questions
COMPET (1-4)	Competitor	4 questions
CUST (1-2)	Customer	2 questions
FIN (1-6)	Financial	6 questions
GOV (1-6)	Government	6 questions
LAB (1-3)	Labour	3 questions
ESP (1-2)	Economic & Socio-Political	2 questions
TEQ (1-2)	Technology	2 questions

Component Variables : SUPP, COMPET, CUST, FIN, GOV, LAB, ESP, TEQ

Overall Variable : PEU

FINANCIAL PERFORMANCE VARIABLES	
ROS	Return on Sales
ROCE	Return on Capital Employed
[illegible]	Return on Total Assets
[illegible]	Growth in Sales
GIP	Growth in Profit
GIA	Growth in Assets

ENVIRONMENTAL VOLATILITY	
SVOL	Sales Volatility
SVOLFD	Sales Volatility - First Differences
PVOL	Profit Volatility
PVOLFD	Profit Volatility - First Differences
TECVOL	Technological Volatility
EV	Overall Environmental Volatility
EVFD	Overall Environmental Volatility using first differences

CONTINUOUS CONTROL VARIABLES	
SIZE	Organisational Size
LEVTEC	Capital Intensity
AGE	Organisational Age

GENERAL VARIABLES

OBS	SECTOR	FOUNDED	RESPOND	DIVERS	LTP	TCP100
1	1	70	3	1	1	1
2	1	57	1	1	1	2
3	1	84	3	1	1	1
4	1	73	4	1	2	2
5	10	36	2	1	1	1
6	10	48	5	1	1	2
7	10	95	2	11	2	2
8	11	46	3	5	1	1
9	11	68	2	11	1	1
10	14	73	1	1	2	2
11	14	78	3	1	2	2
12	14	55	5	2	2	2
13	14	46	4	1	1	1
14	14	37	2	4	2	1
15	14	46	2	5	1	1
16	14	36	3	6	1	1
17	14	36	2	4	1	1
18	15	60	2	2	2	1
19	15	28	2	1	1	1
20	16	92	4	4	1	1
21	18	59	8	1	2	2
22	18	36	2	1	1	1
23	2	82	3	5	2	2
24	2	41	4	4	1	1
25	2	69			2	1
26	2	42	1	2	1	2
27	3	50	7	11	1	1
28	3	68	6	2	1	1
29	4	20	4	3	1	1
30	5	86	1	2	1	2
31	5	46	1	31	1	1
32	5	81	1	1	2	2
33	5	51	2	3	1	1
34	6	35	2	1	1	2
35	6	87	2	3	2	2
36	6	37	2	6	2	1
37	6	64	2	1	1	1
38	6	87	2	4	2	2
39	6	48	5	1	2	2
40	6	68	2	8	1	2
41	8	82	3	11	1	1
42	8	12	2	2	1	2
43	8	2	6	1	1	1
44	8	13	2	4	1	1
45	8	55	2	1	1	1
46	9	37	6	6	1	1
47	9	86	2	6	1	1
48	9	87	1	1	2	2

PLANNING SYSTEM VARIABLES

OBS	FUNC1	FUNC2	FUNC3	FUNC4	FUNC5	FUNC6	FUNC7
1	4	4	5	4	4	4	5
2	6	3	6	5	3	2	6
3	5	3	5	6	5	4	4
4	6	6	6	6	6	6	6
5	5	4	4	6	4	4	6
6	5	6	6	5	5	4	5
7	7	7	7	7	7	7	7
8	5	5	5	7	4	5	5
9	5	5	4	5	5	5	5
10	6	7	7	6	6	5	7
11	6	4	6	6	6	4	7
12	5	5	6	5	5	4	5
13	4	4	4	5	5	5	5
14	6	4	7	5	5	6	7
15	5	6	5	5	6	5	6
16	6	4	6	5	5	5	5
17	7	6	7	7	7	7	7
18	5	4	4	6	4	4	5
19	6	5	6	6	6	6	6
20	5	4	3	5	5	4	6
21	6	6	5	5	5	3	3
22	5	5	6	7	5	4	6
23	6	5	5	5	5	4	5
24	4	4	4	4	4	6	5
25	4	4	4	4	4	4	5
26	7	7	7	7	7	7	7
27	5	5	5	4	6	7	6
28	5	4	6	5	5	5	6
29	5	5	4	6	4	5	6
30	7	4	6	6	5	4	6
31	6	7	7	6	7	5	6
32	5	5	4	4	4	5	4
33	7	7	7	7	7	7	7
34	7	6	6	7	4	3	6
35	6	6	5	6	5	4	5
36	5	6	5	4	4	4	4
37	4	4	4	4	4	4	4
38	5	4	6	5	4	5	5
39	5	5	5	4	4	4	6
40	4	5	4	5	5	5	5
41	5	5	6	6	5	6	6
42	2	6	5	3	5	6	4
43	7	3	6	5	2	3	7
44	6	4	6	5	4	4	5
45	7	6	6	7	5	6	5
46	5	4	6	6	6	2	6
47	6	4	7	7	6	5	6
48	4	4	6	5	6	4	5

PLANNING SYSTEM VARIABLES

OBS	TECH1	TECH2	TECH3	TECH4	TECH5	TECH6	TECH7	TECH8	TECH9
1	4	4	5	4	4	4	4	5	5
2	4	4	7	2	2	4	4	4	4
3	6	4	6	4	4	4	6	4	5
4	4	4	3	1	5	6	6	5	5
5	4	4	4	4	4	4	4	4	5
6	4	4	7	4	4	4	4	4	5
7	5	4	7	7	4	7	7	4	5
8	5	4	6	4	6	3	5	3	5
9	5	4	4	4	4	4	5	4	5
10	4	4	4	4	4	6	6	4	6
11	4	4	5	4	4	4	4	4	6
12	4	4	5	4	4	4	4	4	5
13	1	1	4	3	4	2	7	7	7
14	4	4	7	4	5	6	5	6	7
15	6	4	5	5	5	4	5	5	4
16	6	5	6	7	6	6	5	5	6
17	5	4	7	5	6	6	7	7	6
18	4	4	5	4	4	4	4	5	4
19	5	4	5	5	5	6	6	5	6
20	6	4	5	4	7	5	5	6	2
21	4	4	5	4	4	4	4	5	4
22	4	4	6	5	5	4	5	4	0
23	4	4	6	4	4	5	4	5	5
24	4	4	4	5	4	4	5	4	5
25	4	4	4	4	4	4	4	4	4
26	6	5	7	7	7	7	7	7	7
27	2	4	5	4	5	4	5	5	4
28	4	5	5	4	4	4	4	5	0
29	6	0	5	0	0	0	0	5	6
30	4	4	6	7	7	4	4	4	7
31	4	4	7	7	6	6	4	6	6
32	4	4	5	5	4	4	4	4	5
33	5	5	7	7	7	7	7	7	6
34	4	4	5	7	4	4	4	6	4
35	5	5	5	4	4	4	4	4	5
36	4	4	5	6	5	4	4	4	4
37	4	4	5	5	4	4	4	4	4
38	4	6	7	4	4	6	4	4	5
39	4	4	5	4	4	4	5	4	0
40	4	4	4	4	4	4	5	5	5
41	6	6	5	5	6	5	6	5	5
42	0	0	4	4	4	4	4	0	6
43	7	5	7	5	6	5	7	0	6
44	5	0	4	4	4	4	4	5	4
45	5	5	6	4	4	4	6	6	6
46	4	3	6	5	4	4	3	4	5
47	4	4	6	6	4	4	4	6	4
48	4	4	6	4	5	4	4	4	6

PLANNING SYSTEM VARIABLES

OBS	SYS1	SYS2	SYS3	SYS4	SYS5	SYS6	SYS7	SYS8	SYS9	SYS10	SYS11	SYS12
1	5	5	6	5	5	5	4	5	5	4	5	5
2	5	5	5	6	5	3	4	4	5	5	5	5
3	5	5	5	5	4	5	4	4	4	4	5	5
4	5	5	5	5	5	6	7	6	5	5	5	5
5	4	6	4	4	5	4	5	4	4	6	4	4
6	5	5	4	6	0	4	5	7	5	5	4	4
7	5	5	6	7	5	5	5	5	6	7	6	5
8	5	6	5	6	3	5	5	3	4	3	2	5
9	5	5	4	5	4	5	5	4	5	4	4	4
10	6	7	7	6	6	7	6	5	5	5	5	6
11	6	6	6	6	6	6	6	6	6	6	6	5
12	5	5	5	5	5	5	4	5	4	5	4	4
13	6	6	6	6	5	7	6	4	5	4	6	6
14	5	4	5	5	5	5	6	6	5	4	6	6
15	4	6	6	5	4	5	4	4	5	5	5	5
16	5	6	6	6	6	7	5	5	5	4	5	5
17	6	6	6	7	7	6	7	5	6	6	6	7
18	4	5	4	4	4	4	4	4	4	4	4	4
19	5	5	5	5	5	6	6	6	6	6	5	6
20	6	5	5	5	5	6	5	5	5	4	4	4
21	3	3	3	5	5	5	5	6	4	4	4	4
22	6	5	4	6	5	6	6	5	5	6	5	4
23	5	6	5	5	5	4	4	4	4	4	4	3
24	5	5	5	4	6	5	4	4	4	4	5	4
25	4	4	4	4	4	4	4	4	4	4	4	4
26	4	6	5	7	6	7	5	6	7	6	5	6
27	5	6	7	4	5	6	4	6	4	4	5	6
28	5	5	6	5	6	5	5	6	4	5	4	5
29	5	6	6	6	5	5	6	5	4	5	5	5
30	6	6	7	7	7	6	6	7	6	6	6	6
31	6	6	5	5	6	6	4	6	6	5	4	6
32	4	4	6	5	4	5	5	4	4	4	4	5
33	7	7	7	7	7	7	7	7	6	7	7	7
34	5	5	6	5	5	4	5	5	4	5	5	4
35	5	5	5	4	5	5	6	5	4	5	5	4
36	4	5	4	6	6	4	6	5	5	5	5	6
37	4	5	6	6	6	7	6	5	6	5	4	4
38	5	6	6	5	6	7	5	6	4	4	5	5
39	4	4	4	5	4	4	5	4	4	5	4	4
40	5	5	5	5	5	5	5	4	4	4	4	4
41	5	5	5	6	5	5	5	5	5	5	5	5
42	3	3	4	3	4	3	5	5	4	4	3	3
43	5	6	5	3	4	6	5	6	4	6	6	3
44	6	5	4	5	6	4	5	5	5	5	4	4
45	2	6	5	6	7	6	6	6	6	5	5	5
46	6	6	5	6	6	5	6	5	4	5	5	4
47	6	6	5	6	6	6	7	6	7	6	5	5
48	5	6	4	5	5	4	4	6	5	5	4	4

ORGANISTIONAL STRUCTURE VARIABLES

OBS	COMP1	COMP2	COMP3	COMP4	COMP5	COMP6	COMP7
1	3	5	2	2	4	4	1
2	3	5	4	4	1	3	1
3	3	5	4	4	1	4	1
4	3	5	5	4	1	3	0
5	2	3	0	5	1	5	5
6	1	4	3	3	4	2	1
7	1	5	4	4	1	4	2
8	2	3	4	0	3	4	2
9	2	4	2	2	1	4	1
10	4	4	4	3	4	4	3
11	2	4	4	4	3	2	3
12	3	5	4	4	5	4	2
13	2	5	2	3	1	3	2
14	1	5	3	3	1	2	2
15	2	5	4	4	1	3	1
16	3	5	2	1	1	1	2
17	2	3	4	3	1	3	2
18	3	5	3	3	4	5	4
19	2	2	3	3	1	3	1
20	1	5	2	2	1	5	1
21	3	5	3	4	1	4	2
22	3	5	3	3	2	5	2
23	2	5	4	4	4	5	4
24	2	5	3	2	1	2	2
25	3	4	3	3	1	2	2
26	2	4	4	3	3	3	2
27	2	4	3	3	3	4	1
28	3	2	1	4	3	2	4
29	2	5	3	3	2	2	3
30	3	2	4	4	4	2	4
31	2	4	4	2	2	3	3
32	3	3	4	3	4	3	5
33	2	2	4	4	1	3	4
34	4	2	4	4	4	3	3
35	3	5	0	4	1	3	2
36	3	5	2	2	1	3	1
37	3	5	4	4	1	3	1
38	4	5	4	4	4	5	1
39	4	5	4	4	3	2	2
40	3	5	4	4	4	5	4
41	1	5	3	2	1	3	1
42	3	5	3	2	1	2	3
43	1	0	0	3	1	1	1
44	4	5	3	3	1	4	1
45	3	5	4	4	1	3	4
46	3	5	4	2	1	3	2
47	3	5	3	3	1	1	1
48	4	3	4	4	4	4	4

ORGANISTIONAL STRUCTURE VARIABLES

OBS	FORM1	FORM2	FORM3	FORM4	FORM5	FORM6	FORM7
1	4	2	2	2	2	3	2
2	1	3	3	2	3	2	2
3	3	3	3	3	2	3	4
4	1	4	5	5	5	4	3
5	1	3	3	5	2	4	4
6	2	2	3	5	2	2	2
7	4	2	3	4	3	3	5
8	2	2	3	4	3	3	3
9	2	3	3	4	3	3	2
10	1	3	2	4	2	3	2
11	0	0	0	0	0	0	5
12	1	3	2	3	2	3	3
13	1	3	3	5	5	3	3
14	3	3	4	5	3	4	3
15	1	3	3	5	2	2	1
16	1	3	3	3	3	2	1
17	1	3	3	2	2	4	1
18	4	3	2	4	2	4	2
19	1	2	3	4	2	3	1
20	2	2	3	3	3	3	3
21	2	4	4	5	3	2	2
22	1	2	2	2	3	2	2
23	4	4	3	5	4	3	4
24	2	3	3	3	2	2	2
25	1	3	3	3	2	3	3
26	1	2	2	3	2	1	1
27	1	3	2	1	2	3	2
28	1	1	2	2	2	2	1
29	3	3	2	3	3	3	2
30	3	3	3	5	2	3	2
31	3	3	3	2	2	3	2
32	3	5	3	5	2	3	3
33	1	2	2	1	1	2	1
34	3	4	3	5	2	2	3
35	3	4	3	4	3	2	4
36	1	2	3	3	3	3	2
37	1	3	4	1	2	3	1
38	5	0	0	0	0	0	5
39	4	4	3	5	2	2	4
40	0	0	0	0	0	0	0
41	1	2	3	3	2	3	3
42	1	3	3	3	3	4	3
43	3	2	0	0	0	0	0
44	3	4	3	5	3	4	4
45	2	2	3	5	2	2	1
46	5	0	0	4	3	4	2
47	3	2	2	2	2	3	3
48	5	5	5	5	3	4	4

OBS	CENT1	CENT2	CENT3	CENT4	CENT5	CENT6	CENT7	CENT8	CENT9	CENT10
1	2	2	2	3	2	2	2	2	2	2
2	3	3	3	2	.	3	3	3	3	3
3	3	2	3	3	1	3	3	2	2	3
4	2	2	1	3	3	4	4	5	5	5
5	2	2	3	3	3	2	2	2	2	2
6	4	2	4	2	2	2	2	3	2	3
7	4	2	2	2	2	2	2	3	3	3
8	3	2	3	3	3	3	4	4	3	4
9	4	4	2	4	3	4	4	3	3	3
10	2	2	1	5	3	2	3	1	3	4
11	1	1	1	4	4	5	5	5	4	4
12	2	3	3	2	2	3	3	1	1	2
13	3	1	3	3	4	4	3	2	3	3
14	4	2	2	3	3	3	2	3	2	3
15	2	2	3	2	3	3	3	1	2	4
16	1	1	3	3	3	2	3	2	3	3
17	2	1	2	3	3	3	3	4	3	3
18	2	2	2	1	2	1	1	1	2	2
19	2	2	2	4	4	4	4	4	4	4
20	3	3	2	3	2	3	2	2	3	2
21	4	3	2	3	3	2	2	1	2	2
22	3	2	3	3	2	3	3	2	2	3
23	3	3	2	3	3	3	2	2	2	3
24	3	2	1	2	2	4	3	2	2	2
25	3	3	4	3	3	3	3	3	3	3
26	2	2	3	3	3	2	3	2	3	2
27	2	1	3	3	4	3	4	3	3	4
28	3	2	3	4	2	2	3	3	3	3
29	2	2	1	3	2	3	3	3	3	4
30	2	2	2	4	4	4	4	3	3	4
31	2	2	2	3	2	3	3	1	3	3
32	3	3	4	3	3	3	4	3	2	4
33	2	1	2	3	4	4	3	3	3	4
34	2	2	1	4	3	3	4	1	1	4
35	3	2	2	3	3	3	2	2	2	2
36	4	2	4	3	3	5	5	4	1	4
37	1	1	1	3	3	5	4	2	3	3
38	1	1	3	4	4	3	3	2	1	3
39	2	2	2	3	3	3	3	3	3	3
40	2	1	1	3	3	4	3	3	3	3
41	3	1	2	3	3	4	3	3	4	4
42	2	2	3	4	4	4	4	3	2	2
43	3	3	2	2	2	2	2	2	1	3
44	3	1	3	3	3	3	3	2	2	4
45	2	2	3	3	2	3	1	1	1	3
46	3	3	5	3	3	4	3	1	2	2
47	3	4	3	3	3	2	3	2	2	3
48	1	1	2	2	2	4	3	3	2	3

PERCEIVED ENVIRONMENTAL UNCERTAINTY VARIABLES

OBS	SUPP1	SUPP2	SUPP3	SUPP4	COMPET1	COMPET2	COMPET3	COMPET4
1	3	3	3	2	2	2	2	4
2	6	6	6	6	3	3	3	3
3	2	3	3	2	2	3	3	3
4	2	2	2	2	3	2	3	2
5	4	3	3	3	1	3	3	1
6	4	5	3	3	3	4	6	6
7	1	1	2	4	2	4	4	4
8	3	2	2	2	3	2	2	5
9	3	3	4	4	5	4	3	3
10	5	4	3	3	4	3	2	1
11	3	2	2	5	3	5	5	5
12	3	3	3	3	3	3	4	4
13	2	2	2	2	2	2	2	2
14	4	4	6	5	5	5	5	5
15	6	4	4	4	7	7	7	7
16	5	5	5	6	3	2	2	3
17	3	2	2	2	2	3	3	2
18	2	3	3	2	3	2	2	3
19	3	4	4	4	4	4	4	4
20	0	0	0	0	0	0	0	0
21	5	2	2	3	5	5	3	3
22	2	2	3	3	3	2	2	2
23	4	5	5	4	6	6	5	5
24	4	4	4	4	5	5	5	4
25	3	3	3	3	3	3	3	3
26	5	3	1	3	3	4	4	3
27	3	4	4	4	5	4	4	2
28	4	2	2	3	3	3	3	5
29	3	2	5	5	5	6	5	6
30	3	3	3	3	6	4	4	4
31	2	5	5	5	6	5	5	6
32	2	2	4	4	3	4	6	6
33	1	1	1	1	5	6	6	5
34	2	5	5	3	2	5	5	3
35	3	4	4	4	3	4	4	3
36	3	4	2	2	2	2	2	2
37	3	3	3	3	3	3	3	3
38	3	6	3	6	3	6	5	2
39	2	2	2	3	3	3	3	2
40	3	3	4	4	3	4	3	3
41	5	3	3	3	3	3	3	3
42	4	4	4	4	6	5	4	5
43	3	4	6	3	3	3	2	3
44	2	1	4	2	2	4	4	5
45	5	5	4	4	2	4	4	4
46	3	4	3	4	5	5	4	6
47	3	4	4	4	6	4	4	4
48	3	4	6	5	3	3	3	4

PERCEIVED ENVIRONMENTAL UNCERTAINTY VARIABLES 11

OBS	CUST1	CUST2	FIN1	FIN2	FIN3	FIN4	FIN5	FIN6
1	2	4	3	3	3	3	1	2
2	2	2	6	6	6	6	6	6
3	1	2	2	3	2	2	2	2
4	2	3	3	3	4	4	3	3
5	4	4	4	4	4	4	4	4
6	2	3	5	3	4	4	3	3
7	4	4	3	3	3	3	3	3
8	3	3	4	5	2	3	2	5
9	3	3	5	5	3	3	3	3
10	1	5	3	2	4	5	3	5
11	2	2	6	5	5	5	2	2
12	3	5	3	4	3	4	3	4
13	4	2	2	2	2	2	2	2
14	3	4	3	7	3	4	2	4
15	1	6	6	6	5	4	1	2
16	5	6	5	5	5	5	5	5
17	2	2	2	3	2	2	2	2
18	5	4	4	4	5	4	4	4
19	4	4	4	4	4	3	3	3
20	0	0	3	6	5	5	3	4
21	5	4	5	5	2	2	2	2
22	2	4	3	2	2	2	2	2
23	5	6	6	4	4	4	6	5
24	4	2	4	5	6	5	4	4
25	3	3	3	3	3	3	3	3
26	1	2	3	2	3	4	2	2
27	1	2	2	1	2	2	2	2
28	2	3	3	5	4	4	1	2
29	3	5	3	3	2	2	2	3
30	2	3	2	5	3	3	3	3
31	2	3	3	2	3	3	2	2
32	4	6	3	4	3	4	3	4
33	2	5	5	3	5	3	3	3
34	3	5	2	2	4	3	2	2
35	3	5	3	2	4	4	3	2
36	5	6	3	3	3	3	2	2
37	3	5	6	6	4	4	3	3
38	3	5	5	4	6	7	6	7
39	3	2	5	6	5	5	6	6
40	2	3	3	3	3	3	3	3
41	3	3	3	3	3	3	2	3
42	4	4	5	5	4	4	4	4
43	3	3	5	5	5	5	3	3
44	2	3	2	3	3	3	3	3
45	3	3	3	7	3	7	3	7
46	4	5	3	3	3	3	3	2
47	2	6	6	5	3	5	5	5
48	2	2	4	3	4	3	3	3

OBS	GOV1	GOV2	GOV3	GOV4	GOV5	GOV6	LAB1	LAB2	LAB3
1	5	3	6	5	4	3	3	3	3
2	4	4	7	4	4	6	2	2	2
3	5	5	6	5	4	3	3	5	4
4	4	4	4	4	4	4	7	6	6
5	4	4	6	5	4	4	6	7	4
6	5	3	5	5	3	4	6	6	6
7	3	3	3	3	3	3	1	1	1
8	4	4	3	3	4	4	6	6	5
9	4	4	7	5	4	4	5	5	4
10	4	4	5	6	5	7	5	7	7
11	7	6	5	7	5	3	6	6	2
12	5	4	4	5	4	4	5	5	5
13	5	6	4	4	4	3	2	4	4
14	6	6	5	6	6	4	7	7	4
15	7	7	6	6	4	4	7	7	7
16	7	7	6	7	6	4	7	7	7
17	2	1	2	2	2	1	5	3	3
18	5	4	7	5	5	4	4	4	4
19	5	4	4	5	4	4	3	3	3
20	3	3	5	3	5	3	4	5	3
21	5	5	3	6	3	2	7	7	5
22	6	3	6	2	4	2	2	3	3
23	5	5	5	6	5	5	6	7	6
24	2	2	3	5	2	3	7	7	4
25	3	3	3	4	3	3	3	3	4
26	2	1	4	3	6	2	6	7	3
27	2	2	5	6	0	5	1	1	1
28	3	3	3	3	3	3	5	6	5
29	3	3	3	3	3	6	6	6	5
30	4	4	4	4	4	4	4	4	4
31	4	3	3	6	4	4	6	6	6
32	5	5	6	5	4	2	5	6	6
33	6	5	6	5	5	6	7	6	7
34	5	3	5	3	4	4	3	5	3
35	4	4	3	3	4	4	5	5	5
36	5	4	5	5	4	5	2	6	6
37	4	4	4	4	4	4	1	1	4
38	3	5	5	6	3	2	5	6	6
39	6	6	6	5	5	5	6	6	6
40	4	4	4	3	4	4	2	3	3
41	3	3	3	3	3	3	3	3	3
42	5	4	4	5	4	4	7	7	7
43	5	5	6	5	4	5	3	5	5
44	3	2	5	4	4	5	3	3	3
45	6	4	7	7	4	7	4	4	4
46	3	5	3	3	5	4	5	5	4
47	4	4	5	5	7	4	5	6	5
48	7	4	7	6	7	5	4	4	4

PERCEIVED ENVIRONMENTAL UNCERTAINTY VARIABLES

OBS	ESP1	ESP2	TEQ1	TEQ2
1	4	5	2	3
2	7	7	5	5
3	3	6	3	3
4	7	7	5	5
5	5	5	1	1
6	3	5	5	3
7	7	7	2	2
8	3	3	3	3
9	6	6	5	5
10	5	7	4	4
11	6	7	5	5
12	5	5	4	3
13	5	5	4	4
14	7	7	4	5
15	6	7	4	2
16	6	5	4	3
17	3	2	2	2
18	5	6	3	4
19	5	5	3	3
20	3	5	3	5
21	6	7	3	3
22	2	2	3	3
23	5	6	4	4
24	6	7	5	6
25	3	3	3	3
26	6	7	4	5
27	4	5	4	2
28	3	5	2	2
29	5	6	5	5
30	5	6	3	3
31	3	6	3	3
32	5	6	3	3
33	5	6	3	3
34	2	2	4	3
35	5	5	4	4
36	6	6	3	3
37	7	7	4	4
38	7	7	3	5
39	6	6	5	5
40	3	5	2	3
41	6	7	3	3
42	6	6	4	4
43	5	6	5	5
44	3	3	3	3
45	6	6	3	3
46	6	6	2	2
47	5	6	4	4
48	6	7	4	4

FINANCIAL VARIABLES

OBS	SALES1	SALES2	SALES3	SALES4	SALES5	PBIT1	PBIT2	PBIT3	PBIT4	PBIT5
1	.	.	.	452	552	.	.	.	49	63
2	.	.	.	.	.	1	1	1	3	18
3	396	541	625	948	1309	93	170	145	311	372
4	.	5	9	63	81	.	1	1	4	5
5	865	1019	1309	1770	2385	28	25	44	67	104
6	89	122	176	253	309	18	9	15	29	31
7	68	171	205	285	467	4	6	9	13	46
8	300	403	504	637	738	54	64	65	114	151
9	1435	1734	2067	2526	3092	149	192	252	330	414
10	.	.	.	.	.	.	.	.	3	3
11	.	.	.	22	36	.	.	.	3	5
12	.	.	.	15	21	.	.	.	2	3
13	683	735	930	1178	1580	56	50	90	127	212
14	280	330	407	528	661	33	49	71	100	125
15	.	113	1376	2719	3144	.	1	29	66	84
16	2730	3710	4446	5558	6538	57	21	102	216	231
17	700	744	1103	1668	2096	72	69	96	148	204
18	662	816	850	1189	1614	105	142	105	272	581
19	3123	3902	4136	4820	5952	490	273	775	895	1414
20	1804	1948	2177	2622	3158	186	152	180	237	327
21	.	.	101	121	143	.	.	18	18	10
22	269	299	285	302	346	15	20	24	32	37
23	.	.	6	44	59	.	.	-2	7	5
24	230	230	292	326	373	36	16	29	14	40
25	.	493	457	510	1067	.	-11	-13	16	31
26	42	69	74	90	102	4	8	11	17	15
27	3394	3746	3203	3615	4094	1199	1440	1029	900	1289
28	675	656	681	765	1018	57	45	25	48	62
29	435	490	552	674	746	22	35	57	84	86
30	.	.	.	20	48	.	.	.	2	1
31	319	454	601	599	836	34	34	41	47	75
32	.	.	25	88	260	.	.	3	9	6
33	727	945	1244	1565	2154	114	135	168	211	267
34	.	.	.	.	.	6	6	5	6	7
35	.	.	300	320	410	.	.	12	10	34
36	294	327	392	439	587	40	36	49	55	79
37	398	421	445	601	764	22	32	30	43	65
38	.	.	.	11	17	.	.	.	3	4
39	.	.	10	13	18	.	.	2	4	6
40	74	55	94	117	159	-4	4	9	13	22
41	4026	4951	5900	6864	8586	388	320	388	556	715
42	.	.	.	91	115	.	.	.	8	12
43	1263	1367	1623	1666	1878	33	27	51	62	75
44	2311	2445	2690	3204	4150	197	171	226	305	425
45	.	.	.	454	554	.	.	.	66	82
46	469	518	627	694	760	-11	-14	-16	39	54
47	.	.	392	730	934	.	.	32	60	88
48	.	.	.	23	29	.	.	.	2	2

OBS	PBT1	PBT2	PBT3	PBT4	PBT5	PNE1	PNE2	PNE3	PNE4	PNE5
1	.	.	.	46	58	.	.	.	161	187
2	1	1	1	2	18	0	1	.	.	.
3	84	161	137	303	352	135	140	162	229	288
4	.	1	1	3	3	.	1	2	21	24
5	21	19	38	62	95	11	11	11	14	18
6	17	8	14	28	27	26	36	40	78	89
7	2	4	7	11	32	5	5	4	5	6
8	43	55	59	110	146	160	182	192	212	243
9	108	160	232	307	355	591	614	663	802	966
10	.	.	.	3	3	.	.	.	1	2
11	.	.	.	2	5	.	.	.	1	2
12	.	.	.	1	3	.	.	.	2	3
13	36	34	79	116	187	19	20	39	77	246
14	30	46	56	94	111	43	47	58	75	111
15	.	1	25	55	63	.	59	72	105	119
16	-13	-41	52	159	142	236	269	285	344	394
17	69	66	96	129	179	111	135	165	186	239
18	50	102	99	265	574	849	871	888	888	1064
19	268	112	652	788	1314	2725	2938	3239	3421	3595
20	83	53	110	186	258	816	829	870	938	1024
21	.	.	16	17	9	.	.	75	89	131
22	6	8	20	32	37	312	340	383	416	582
23	.	.	-3	6	4	.	.	22	26	33
24	34	14	26	12	38	220	255	295	264	293
25	.	-16	-15	13	24	.	83	75	78	132
26	4	8	11	17	15	26	28	31	35	42
27	892	1203	978	876	1246	3946	4113	4238	4541	4932
28	56	44	24	48	61	44	47	54	58	65
29	11	28	54	82	79	185	189	202	234	273
30	.	.	.	2	0	.	.	.	1	19
31	29	24	32	41	61	76	130	133	141	134
32	.	.	3	8	2	.	.	1	5	8
33	109	124	152	193	225	126	207	229	302	317
34	5	5	5	6	6	2	3	3	3	5
35	.	.	9	6	27	.	.	13	19	21
36	31	27	41	41	60	46	48	53	61	70
37	9	26	28	38	58	56	56	58	62	53
38	.	.	.	3	3	.	.	.	1	1
39	.	.	2	4	6	.	.	1	2	3
40	-9	2	6	9	17	11	12	22	25	37
41	316	255	330	489	599	959	1103	1198	1413	1740
42	.	.	.	7	9	.	.	.	9	9
43	20	14	42	51	61	212	224	238	264	305
44	100	78	158	229	315	411	434	542	542	547
45	.	.	.	66	82	.	.	.	103	136
46	-30	-34	-32	23	38	52	63	62	73	88
47	.	.	19	45	67	.	.	21	21	24
48	.	.	.	1	2	.	.	.	2	2

OBS	ASSET1	ASSET2	ASSET3	ASSET4	ASSET5	CE1	CE2	CE3	CE4	CE5
1	0	0	0	259	305	0	0	0	149	176
2	10	17	18	57	30	4	13	16	54	30
3	652	827	1043	1450	1799	497	671	839	1023	1225
4	0	2	3	22	23	0	1	1	8	9
5	216	224	247	315	435	95	100	116	146	218
6	64	81	76	146	170	50	66	73	114	125
7	41	45	51	76	129	25	30	32	41	86
8	273	302	324	415	589	197	210	218	256	401
9	1128	1173	1325	1569	1855	792	818	869	915	1076
10	0	0	0	10	14	0	0	0	7	10
11	0	0	0	13	21	0	0	0	6	8
12	0	0	0	6	7	0	0	0	3	5
13	372	396	503	603	840	229	224	285	302	450
14	173	206	270	345	439	99	113	159	202	269
15	0	298	405	687	765	0	96	134	120	211
16	1031	1330	1472	2020	2374	375	578	509	791	895
17	330	368	594	637	820	235	253	363	386	419
18	885	943	948	1027	1534	673	766	777	774	1023
19	4612	5065	5363	5757	7592	4030	4215	4448	4906	6342
20	1633	1626	1585	1682	2345	1234	1210	1200	1241	1820
21	0	0	73	82	109	0	0	62	61	80
22	303	305	315	246	283	230	216	266	203	212
23	0	0	20	39	55	0	0	17	32	36
24	260	291	370	356	391	203	236	289	284	310
25	0	147	135	196	399	0	48	32	53	111
26	43	47	51	61	73	32	37	38	45	57
27	4741	4922	4560	4831	5690	3699	3708	3657	3991	4436
28	177	198	223	257	331	93	123	137	143	162
29	316	338	362	424	484	233	243	244	267	328
30	0	0	0	9	49	0	0	0	4	11
31	236	352	340	375	531	166	243	236	233	250
32	0	0	16	72	132	0	0	7	25	41
33	549	702	825	1008	1339	365	487	535	527	625
34	24	27	27	32	44	18	19	20	22	26
35	0	0	107	136	175	0	0	52	86	96
36	217	268	291	341	411	107	127	138	149	167
37	234	223	261	306	371	151	163	164	182	213
38	0	0	0	6	9	0	0	0	2	4
39	0	0	4	7	11	0	0	2	6	8
40	42	35	55	71	99	26	26	36	49	60
41	2464	2868	3008	3759	4230	1528	1706	1769	2098	2303
42	0	0	0	55	58	0	0	0	36	38
43	515	544	609	672	765	354	362	376	411	446
44	2203	2291	2468	2762	3167	1772	1905	1975	2152	2359
45	0	0	0	518	672	0	0	0	426	538
46	273	314	374	382	400	211	245	293	292	301
47	0	0	395	576	692	0	0	144	319	406
48	0	0	0	8	9	0	0	0	3	3

APPENDIX V
RESEARCH VARIABLES

LIST OF FIGURES AND TABLES

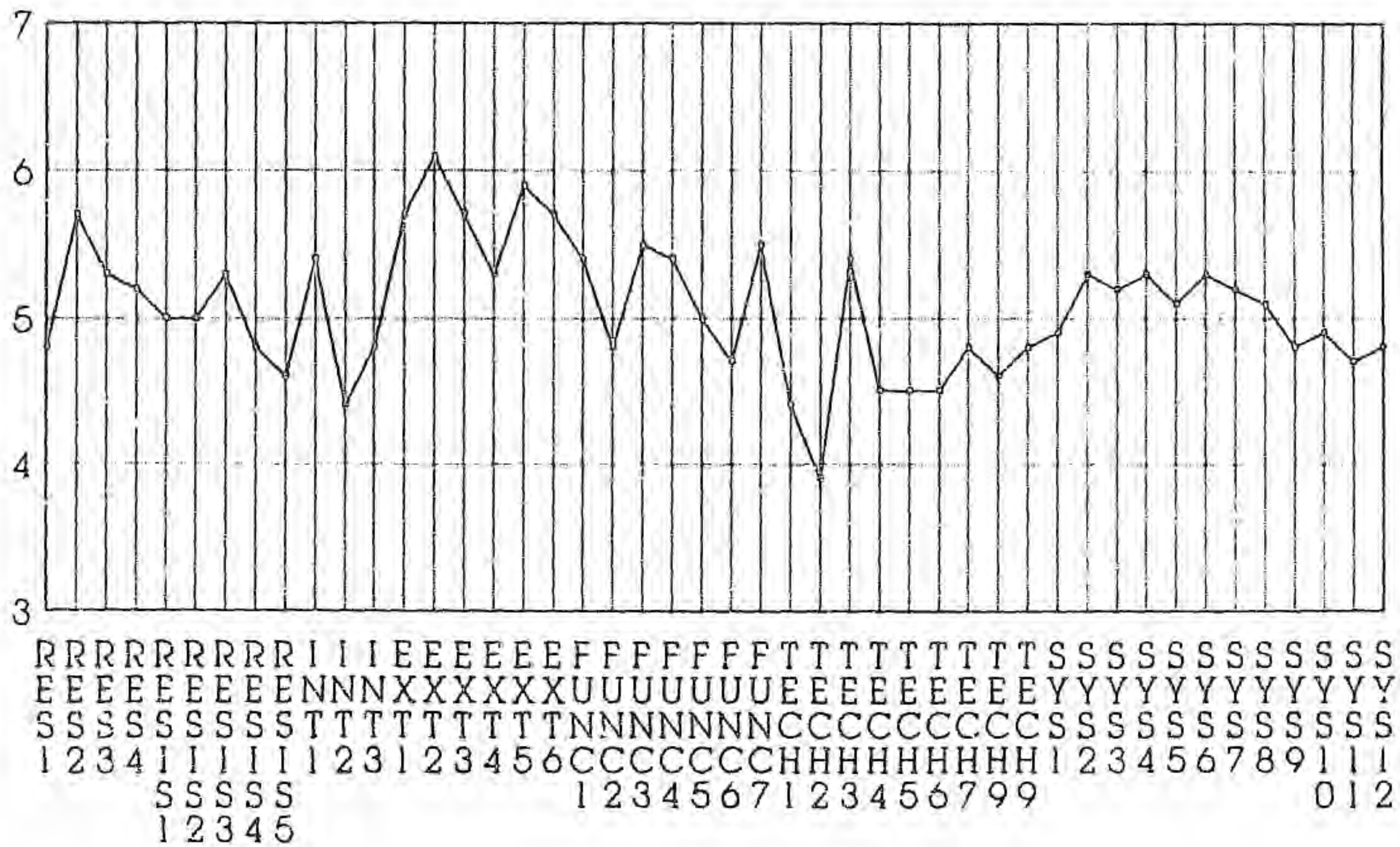
FIGURE	PS	OS	PEU	FP	EV
1. Profile	1	2	3	-	-

TABLE	PS	OS	PEU	FP	EV
1. Descriptive Statistics.	1.1	2.1	3.1	4.1	5.1
2. Impact of Categorical Variables.	1.2	2.2	3.2	4.2	5.2
3. Impact of Continuous Variables.	1.3	2.3	3.3	4.3	5.3
4. Correlation Coefficients.	1.4	2.4	3.4	4.4	5.4
5. Factor Pattern - Varimax Rotated.	1.5	2.5	3.5	4.5	5.5
6. Reliability Analysis.	1.6	2.6	3.6	-	-
7. External Validity.	1.7	2.7	3.7	-	-
8. Respondent Bias.	1.8	2.8	3.8	-	-
9. Non-respondent Bias.	1.9	2.9	3.9	-	-
10. Difference - Organisational Size.	-	2.10	-	-	-

FIGURE 1.

PROFILE OF PLANNING SYSTEM

RESPONDENT MEANS



1 = SIGNIFICANT DECREASE
4 = NO CHANGE
7 = SIGNIFICANT INCREASE

TABLE 1.1 : DESCRIPTIVE STATISTICS
PLANNING SYSTEM

	RES	RESIS	INT	EXT
N	48	48	48	48
MEAN	5.22	4.93	4.85	5.72
MEDIAN	5.25	5.20	4.67	5.83
MODE	4.75	5.40	4.67	5.83
RANGE	4.25	6.60	5.00	3.00
INTERQUARTILE RANGE	1.00	1.15	1.50	1.00
VARIANCE	0.73	1.08	1.00	0.54
STANDARD DEVIATION	0.86	1.04	1.00	0.74
COEFFICIENT OF VARIATION	16.41	21.10	20.60	12.89
SKEWNESS	-0.18	-2.25	0.04	-0.12
KURTOSIS	0.29	9.64	0.34	-0.43
T : MEAN = 0	42.25	32.83	33.63	53.76
PROB > |T|	0.01	0.01	0.01	0.01

	FUNC	TECH	SYS	PS
N	48	48	48	48
MEAN	5.20	4.60	5.05	35.56
MEDIAN	5.00	4.44	5.00	35.14
MODE	4.71	4.22	4.50	28.14
RANGE	3.00	4.22	3.25	18.71
INTERQUARTILE RANGE	0.96	0.83	0.83	4.63
VARIANCE	0.60	0.60	0.42	15.21
STANDARD DEVIATION	0.77	0.78	0.65	3.90
COEFFICIENT OF VARIATION	14.88	16.88	12.81	10.97
SKEWNESS	0.86	0.24	0.47	0.56
KURTOSIS	0.21	1.47	0.49	0.61
T : MEAN = 0	46.57	41.06	54.10	63.18
PROB > |T|	0.01	0.01	0.01	0.01

TABLE 1.2 : IMPACT OF CATEGORICAL VARIABLES ON PLANNING SYSTEM

SECTOR	N	MEAN	DIVERS	N	MEAN
1	4	35.027	1	19	35.016
2	4	33.840	2	6	34.125
3	2	34.116	3	3	38.767
4	1	35.728	4	6	37.158
5	4	40.750	5	3	35.187
6	7	33.635	6	4	35.975
8	5	34.695	8	1	31.398
9	3	35.303	11	4	36.862
10	3	37.023	31	1	41.358
11	2	34.712			
14	8	37.279			
15	2	34.509			
16	1	35.427			
18	2	33.346			

LTP	N	MEAN	TOP100	N	MEAN
1	32	36.178	1	29	35.926
2	16	34.338	2	19	35.014

VARIABLE	N	MODEL F =	PR > F	R-SQUARE
SECTOR	48	1.00	0.4691	0.2774
DIVERS	47	1.08	0.3995	0.1848
LTP	48	2.45	0.1246	0.0505
TOP100	48	0.62	0.4345	0.0133

TABLE 1.3 : IMPACT OF CONTINUOUS VARIABLES ON PLANNING SYSTEM

VARIABLE	N	PEARSON	PROB > |R|
SIZE	45	0.14936	0.3275
LEVTEC	45	-0.06279	0.6820
AGE	48	0.11775	0.4254

VARIABLE	N	SPEARMAN	PROB > |R|
SIZE	45	0.11436	0.4544
LEVTEC	45	0.01515	0.9213
AGE	48	0.14517	0.3249

VARIABLE	N	KENDALL TAU B	PROB > |R|
SIZE	45	0.08687	0.4002
LEVTEC	45	-0.00202	0.9844
AGE	48	0.09328	0.3547

TABLE 1.4 : CORRELATION COEFFICIENTS
PLANNING SYSTEM

COMPONENTS	1	2	3	4	5	6	7
(A) PEARSON							
1. RES	1.00	0.17	0.23	0.69*	0.61*	0.61*	0.68*
2. RESIS		1.00	-0.04	0.17	-0.01	-0.07	0.26
3. INT			1.00	0.38	0.43*	0.12	0.32*
4. EXT				1.00	0.58*	0.56*	0.67*
5. FUNC					1.00	0.66*	0.71*
6. TECH						1.00	0.60*
7. SYS							1.00
(B) SPEARMAN							
1. RES	1.00	0.45	0.21	0.70*	0.53*	0.61*	0.73*
2. RESIS		1.00	-0.06	0.41*	0.26	0.29*	0.48*
3. INT			1.00	0.37*	0.44*	0.20	0.26
4. EXT				1.00	0.53*	0.47*	0.67*
5. FUNC					1.00	0.59*	0.65*
6. TECH						1.00	0.53*
7. SYS							1.00
(C) KENDALL TAU B							
1. RES	1.00	0.37*	0.16	0.57*	0.41*	0.47*	0.56*
2. RESIS		1.00	-0.05	0.31*	0.20	0.24*	0.38*
3. INT			1.00	0.28*	0.33*	0.15	0.20
4. EXT				1.00	0.41*	0.37*	0.54*
5. FUNC					1.00	0.45*	0.50*
6. TECH						1.00	0.40*
7. SYS							1.00

* PROB > |R| = 0.05

MEAN INTER-ITEM PEARSON'S CORRELATION	
Resources	: 0.64502
Resistance	: 0.48191
Internal	: 0.55200
External	: 0.44125
Functional	: 0.40437
Techniques	: 0.28658
Capability	: 0.40592
Planning Syatem	: 0.26716

TABLE 1.5 : FACTOR PATTERN
PLANNING SYSTEM-VARIMAX ROTATED

VARIABLE	1	2	3	4
RES4	0.84739			
RES2	0.77240			
RES3	0.74263			
SYS3	0.58264			
FUNC7	0.55140			
EXT6	0.49266			
RES1	0.43530			
SYS2	0.39327			
TECH8		0.79546		
SYS4		0.70177		
EXT5		0.64199		
SYS12		0.52191		
FUNC5		0.50061		
SYS9		0.47681		
TECH5			0.83057	
TECH6			0.74361	
TECH7			0.71374	
TECH2			0.53968	
TECH4			0.53025	
FUNC3				0.74010
TECH3				0.68248
SYS8				0.64793
SYS10				0.50238
EIGENVALUE	4.715642	3.914042	3.612878	3.248239
%	12.85	10.66	9.84	8.85

VARIABLES	5	6	7	8
RESIS2	0.88270			
RESIS3	0.87227			
RESIS1	0.77412			
SYS1	0.43556			
INT1		0.80396		
INT3		0.80012		
INT2		0.76976		
FUNC6		0.47082		
EXT3			0.74449	
EXT4			0.72650	
TECH1				0.77175
FUNC1				0.64152
FUNC4				0.61010
EIGENVALUE	3.208451	3.115636	2.643937	2.617316
%	8.74	8.49	7.20	7.13

PLANNING SYSTEM VARIABLES

OBS	RES1	RES2	RES3	RES4	RESIS1	RESIS2	RESIS3	RESIS4	RESIS5
1	5	5	5	6	6	4	6	5	5
2	5	6	4	5	5	3	5	7	7
3	4	5	5	5	5	5	5	4	4
4	5	7	6	5	6	5	6	4	7
5	4	5	5	5	5	4	4	4	4
6	4	5	5	5	6	5	6	4	5
7	7	7	7	6	1	6	5	4	4
8	5	6	5	5	5	6	7	6	6
9	4	5	5	5	5	5	6	5	4
10	5	6	5	5	5	4	6	4	4
11	5	5	6	5	6	6	5	6	5
12	4	4	4	4	4	3	4	4	4
13	4	7	6	6	7	6	6	5	5
14	7	7	5	6	2	2	1	7	7
15	5	5	6	6	5	4	5	5	4
16	4	5	5	5	3	6	6	6	6
17	6	7	6	6	7	7	7	6	4
18	4	5	4	4	4	5	5	4	4
19	5	6	5	5	5	6	6	6	6
20	6	7	5	5	7	6	5	5	5
21	4	2	3	2	2	3	5	5	3
22	6	6	6	6	5	7	5	5	4
23	4	5	4	4	3	4	5	4	4
24	5	5	6	5	4	4	5	5	4
25	4	4	4	4	4	4	4	4	4
26	7	7	7	7	0	0	0	0	0
27	4	6	5	5	6	5	4	5	4
28	4	6	5	5	4	4	4	4	4
29	4	5	5	5	6	6	6	6	7
30	6	7	6	6	6	6	7	4	4
31	6	7	7	7	7	7	6	6	7
32	4	5	5	5	6	5	4	4	5
33	6	7	7	7	7	7	6	6	4
34	4	6	6	6	5	6	5	5	5
35	4	5	4	4	6	6	5	5	5
36	4	6	5	4	6	5	6	5	5
37	4	7	6	6	6	4	7	4	4
38	5	6	6	6	7	6	6	6	2
39	5	5	4	4	4	4	5	4	4
40	4	4	4	4	5	5	5	4	4
41	5	5	6	5	5	5	6	5	5
42	4	4	5	5	4	3	4	4	4
43	4	7	7	7	7	7	6	4	5
44	4	6	4	4	6	6	6	4	4
45	5	6	6	6	6	6	6	6	4
46	4	5	4	4	3	5	6	5	5
47	5	6	5	5	6	5	5	5	5
48	5	5	5	5	5	5	6	5	4

PLANNING SYSTEM VARIABLES

OBS	INT1	INT2	INT3	EXT1	EXT2	EXT3	EXT4	EXT5	EXT6
1	4	4	4	6	6	4	4	5	4
2	5	4	2	5	7	7	5	7	4
3	6	3	5	6	6	4	4	6	6
4	7	7	5	7	6	7	7	7	6
5	5	4	5	6	7	7	7	7	4
6	5	5	7	5	5	5	5	6	6
7	6	6	7	7	7	7	7	7	7
8	5	3	5	6	7	5	5	6	6
9	5	4	5	5	5	6	6	4	6
10	6	6	5	4	4	3	4	5	6
11	6	4	3	7	6	6	6	7	7
12	5	5	5	4	5	5	5	5	4
13	4	2	4	6	6	5	5	7	7
14	5	5	6	5	6	6	6	6	7
15	6	6	5	5	6	7	5	5	7
16	6	5	7	7	7	7	6	7	7
17	5	5	6	7	7	7	6	7	6
18	5	3	4	5	5	4	4	5	4
19	5	5	5	6	6	6	6	6	6
20	4	3	4	4	6	7	5	7	6
21	5	3	3	5	6	4	5	6	4
22	7	6	5	7	7	7	5	6	5
23	5	5	5	5	6	5	6	6	6
24	7	6	6	5	6	6	6	7	7
25	4	4	4	4	4	4	4	4	4
26	6	3	6	7	7	7	7	7	7
27	5	4	5	6	7	5	5	6	6
28	5	5	4	5	5	5	5	6	6
29	6	6	6	5	6	7	5	6	6
30	7	6	7	7	7	7	6	7	7
31	6	3	3	7	7	7	6	7	6
32	6	3	5	7	7	3	5	4	5
33	7	7	7	7	7	7	7	7	7
34	5	2	5	4	6	5	4	6	6
35	6	3	4	6	6	5	4	5	5
36	5	4	4	5	6	5	4	5	5
37	4	4	4	6	7	5	5	7	5
38	6	3	5	7	7	6	3	6	7
39	5	4	4	4	6	5	5	4	5
40	5	4	4	5	5	5	5	5	4
41	4	4	5	5	7	5	5	5	6
42	6	6	5	5	4	6	4	4	5
43	3	3	0	6	6	7	6	4	5
44	5	6	5	6	5	6	5	6	5
45	6	4	4	6	7	7	6	6	5
46	5	3	4	6	6	6	6	6	5
47	6	3	5	5	5	6	6	7	6
48	6	6	4	6	6	6	5	5	6

TABLE 1.5 (CONT.) : FACTOR PATTERN
PLANNING SYSTEM-VARIMAX ROTATED

VARIABLES	9	10	11	12
SYS5	0.72421			
SYS11	0.61685			
SYS7	0.45759			
SYS6	0.45665			
EXT2		0.77041		
EXT1		0.57145		
RESIS4			0.81840	
RESIS5			0.79539	
FUNC2				0.75690
EIGENVALUE	2.485196	1.986872	1.939356	1.710485
%	6.77	5.41	5.28	4.66

VARIABLES	13
TECH9	0.88290
EIGENVALUE	1.503565
%	4.10

FACTOR NAMES AND CODES
PS1 : Strategic Preparedness (SP)
PS2 : Customer Responsiveness (CR)
PS3 : Analytical Approach (AA)
PS4 : Financial Control (FC)
PS5 : Planning Acceptance (PA)
PS6 : Internal Analysis (IA)
PS7 : Specific External Analysis (SEA)
PS8 : Resource Allocation (RA)
PS9 : Integration Emphasis (IE)
PS10 : General External Analysis (GEA)
PS11 : Planning Resistance (PR)
PS12 : Production Orientation (PO)
PS13 : Technocratic Response (TR)

TABLE 1.6 : RELIABILITY
PLANNING SYSTEM - SUBSCALE AND OVERALL SCALE

SCALE	CRONBACH'S ALPHA PEARSON (a)	SPEARMAN (b)	ORDINAL DISTORTION (c)
RES	0.88	0.87	1.1%
RESIS	0.82	0.77	6.1%
INT	0.79	0.76	3.8%
EXT	0.83	0.83	0.0%
FUNC	0.83	0.83	0.0%
TECH	0.78	0.79	1.3%
SYS	0.89	0.89	0.0%
OVERALL : ALPHA	0.94	0.95	1.1%
: THETA	0.95		
: OMEGA	0.98	(c) = (|a-b|)/a*100	

TABLE 1.7 : EXTERNAL VALIDITY
PLANNING SYSTEM

VARIABLES	W NORMAL	PROB < W
RES	0.979735	0.709
RESIS	0.841186	<0.010
INT	0.964526	0.311
EXT	0.968380	0.388
FUNC	0.918268	<0.010
TECH	0.949736	0.070
SYS	0.982445	0.807
PS	0.971296	0.446

TABLE 1.8 : RESPONDENT BIAS
PLANNING SYSTEM - PS

RESPOND	N	MEAN
1	7	37.12
2	20	36.25
3	7	35.605
4	5	36.498
5	3	32.567
6	3	33.717
7	1	35.117
8	1	28.203

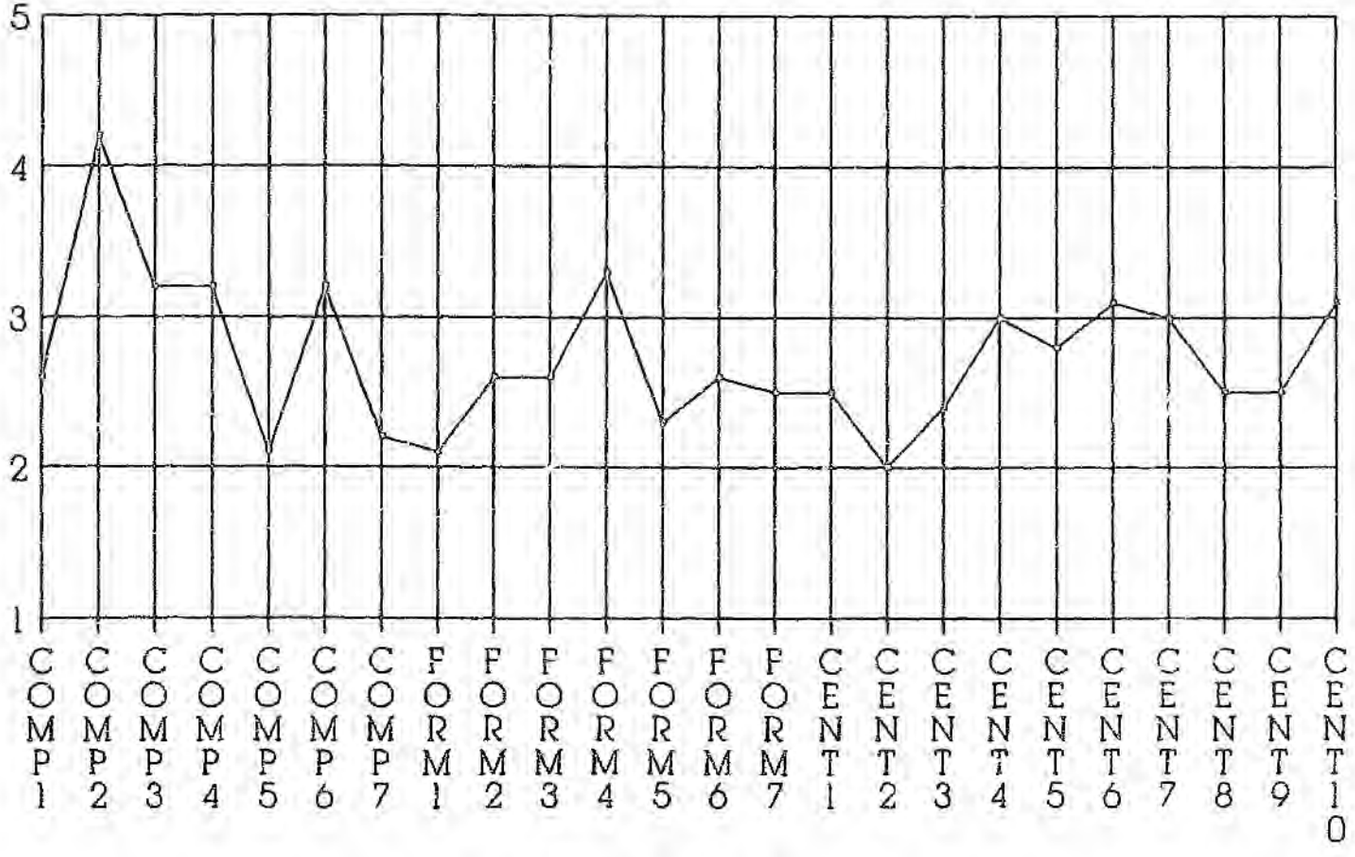
VARIABLE	N	MODEL F =	PR > F	R-SQUARE
RES	47	2.74	0.0207	0.3295
RESIS	47	0.80	0.5960	0.1249
INT	47	1.19	0.3323	0.1757
EXT	47	0.93	0.4932	0.1433
FUNC	47	0.58	0.7640	0.0950
TECH	47	1.01	0.4371	0.1534
SYS	47	0.88	0.5291	0.1365
PS	47	1.26	0.2948	0.1845

TABLE 1.9 : NON-RESPONDENT BIAS
PLANNING SYSTEM

MEAN	DETAIL	ABRIDGED	DIFFERENCE
RES	5.22	5.30	-0.08
RESIS	4.92	4.48	0.44
INT	4.85	5.70	-0.85
EXT	5.72	5.67	0.05
FUNC	5.20	5.15	0.05
TECH	4.60	4.85	-0.25
SYS	5.05	5.18	-0.13
PS	35.56	36.33	-0.77

SIGNIFICANCE	MODEL F =	PR > F	R-SQUARE
RES	0.17	0.6830	0.0021
RESIS	2.54	0.1150	0.0311
INT	13.38	0.0005 *	0.1448
EXT	0.03	0.8724	0.0003
FUNC	0.02	0.8902	0.0002
TECH	1.86	0.1767	0.0230
SYS	0.48	0.4902	0.0060
PS	0.71	0.4026	0.0089

FIGURE 2.
PROFILE OF ORGANISATIONAL STRUCTURE
RESPONDENT MEANS



1 = HIGHLY MECHANISTIC
5 = HIGHLY ORGANIC

TABLE 2.1 : DESCRIPTIVE STATISTICS
ORGANISATIONAL STRUCTURE

	COMP	FORM	CENT	OS
N	48	48	48	48
MEAN	2.94	2.58	2.69	8.21
MEDIAN	2.93	2.57	2.60	8.21
MODE	3.00	2.43	2.50	7.74
RANGE	3.14	4.43	1.90	6.67
INTERQUARTILE RANGE	0.71	0.86	0.55	1.03
VARIANCE	0.34	0.71	0.16	1.23
STANDARD DEVIATION	0.59	0.84	0.40	1.11
COEFFICIENT OF VARIATION	19.96	32.63	14.90	13.52
SKEWNESS	-0.30	-0.72	0.10	-0.70
KURTOSIS	1.42	1.42	0.17	-4.04
T : MEAN = 0	34.70	32.63	46.51	51.24
PROB > |T|	0.01	0.01	0.01	0.01

TABLE 2.2 : IMPACT OF CATEGORICAL VARIABLES
ON ORGANISATIONAL STRUCTURE

SECTOR	N	MEAN	DIVERS	N	MEAN
1	4	8.629	1	19	8.362
2	4	8.268	2	6	8.217
3	2	7.471	3	3	7.871
4	1	8.171	4	6	8.043
5	4	8.675	5	3	8.957
6	7	8.216	6	4	7.829
8	5	7.514	8	1	6.743
9	3	8.905	11	4	8.261
10	3	8.371	31	1	7.829
11	2	8.586			
14	8	8.014			
15	2	8.143			
16	1	7.643			
18	2	8.286			

LTP	N	MEAN	TOP100	N	MEAN
1	32	7.848	1	29	7.862
2	16	8.935	2	19	8.743

VARIABLE	N	MODEL F =	PR > F	R-SQUARE
SECTOR	48	0.39	0.9630	0.1303
DIVERS	47	0.50	0.8484	0.0953
LTP	48	12.78	0.0008	0.2174
TOP100	48	8.37	0.0058	0.1539

TABLE 2.3 : IMPACT OF CONTINUOUS VARIABLES ON ORGANISATIONAL STRUCTURE

VARIABLE	N	PEARSON	PROB > |R|
SIZE	45	-0.25905	0.0857
LEVTEC	45	-0.00388	0.9798
AGE	48	-0.29206	0.0440
VARIABLE	**N**	**SPEARMAN**	**PROB > |R|**
SIZE	45	-0.33495	0.0245
LEVTEC	45	-0.01502	0.9220
AGE	48	-0.13766	0.3508
VARIABLE	**N**	**KENDALL TAU B**	**PROB > |R|**
SIZE	45	-0.23369	0.0238
LEVTEC	45	-0.01113	0.9143
AGE	48	-0.09789	0.3320

TABLE 2.4 : CORRELATION COEFFICIENTS ORGANISATIONAL STRUCTURE

COMPONENTS	1	2	3
(A) PEARSON			
1. COMP	1.00	0.15	-0.25
2. FORM		1.00	-0.02
3. CENT			1.00
(B) SPEARMAN			
1. COMP	1.00	0.16	-0.28
2. FORM		1.00	-0.01
3. CENT			1.00
(C) KENDALL TAU B			
1. COMP	1.00	0.13	-0.21*
2. FORM		1.00	-0.00
3. CENT			1.00
* PROB > |R| = 0.05			

MEAN INTER-ITEM PEARSON'S CORRELATION	
Complexity	:0.19881
Formalisation	:0.38693
Centralisation	:0.29176
STRUCTURE	:0.17464

TABLE 2.5 : FACTOR PATTERN
ORGANISATIONAL STRUCTURE-VARIMAX ROTATED

VARIABLES	1	2	3	4
FORM3	0.88332			
FORM2	0.82250			
FORM4	0.79597			
FORM5	0.74523			
FORM6	0.68043			
CENT7		0.89815		
CENT5		0.64313		
CENT6		0.63978		
CENT10		0.62108		
CENT4		0.61646		
CENT8		0.59508		
COMP5			0.64326	
COMP7			0.56809	
COMP1			0.55719	
COMP4			0.41943	
FORM1			0.33985	
CENT3				0.59814
CENT2				0.54592
CENT1				0.51269
CENT9				-0.50774
EIGENVALUE	3.355816	3.305176	2.260092	1.807353
%	27.25	26.85	18.35	14.67

VARIABLES	5
COMP2	0.69893
FORM7	0.53750
COMP3	0.39358
COMP6	0.39289
EIGENVALUE	1.586112
%	12.88

FACTOR NAMES AND CODES
OS1 : Degree of Formalisation (DOF)
OS2 : Low Level Discretion (LLD)
OS3 : Degree of Complexity (DOC)
OS4 : Top Management Control (TMC)
OS5 : Complexity and Formalisation (CAF)

TABLE 2.6 : RELIABILITY
ORGANISATIONAL STRUCTURE - SUBSCALE AND OVERALL SCALE

SCALE	CRONBACH'S ALPHA PEARSON (a)	SPEARMAN (b)	ORDINAL DISTORTION (c)
FORM	0.63	0.64	1.6%
COMP	0.82	0.79	3.7%
CENT	0.80	0.80	0.0%
OVERALL : ALPHA	0.84	0.84	0.0%
: THETA	0.79		
: OMEGA	0.90	(c) = (|a-b|)/a*100	

TABLE 2.7 : EXTERNAL VALIDITY
ORGANISATIONAL STRUCTURE

VARIABLES	W : NORMAL	PROB < W
COMP	0.957032	0.161
FORM	0.957123	0.162
CENT	0.964176	0.304
OS	0.925393	<0.010

TABLE 2.8 : RESPONDENT BIAS
ORGANISATIONAL STRUCTURE - OS

RESPOND	N	MEAN
1	7	8.8776
2	20	8.1436
3	7	8.1510
4	5	8.3971
5	3	8.5952
6	3	6.4905
7	1	7.8571
8	1	8.6857

VARIABLE	N	MODEL F =	PR > F	R-SQUARE
COMP	47	1.59	0.1684	0.2216
FORM	47	0.93	0.4917	0.1434
CENT	47	0.27	0.9613	0.0465
OS	47	1.62	0.1576	0.2257

TABLE 2.9 : NON-RESPONDENT BIAS
ORGANISATIONAL STRUCTURE

MEAN	DETAIL	ABRIDGED	DIFFERENCE
COMP	2.94	3.66	-0.72
FORM	2.58	3.10	-0.52
CENT	2.69	2.34	0.35
OS	8.21	9.10	-0.89
SIGNIFICANCE	MODEL F =	PR > F	R-SQUARE
COMP	22.09	0.0001	0.2185
FORM	7.43	0.0079	0.0860
CENT	7.03	0.0097	0.0817
OS	9.15	0.0034	0.1038

TABLE 2.9.1 : ORGANISATIONAL SIZE
DIFFERENCE AND SIGNIFICANCE

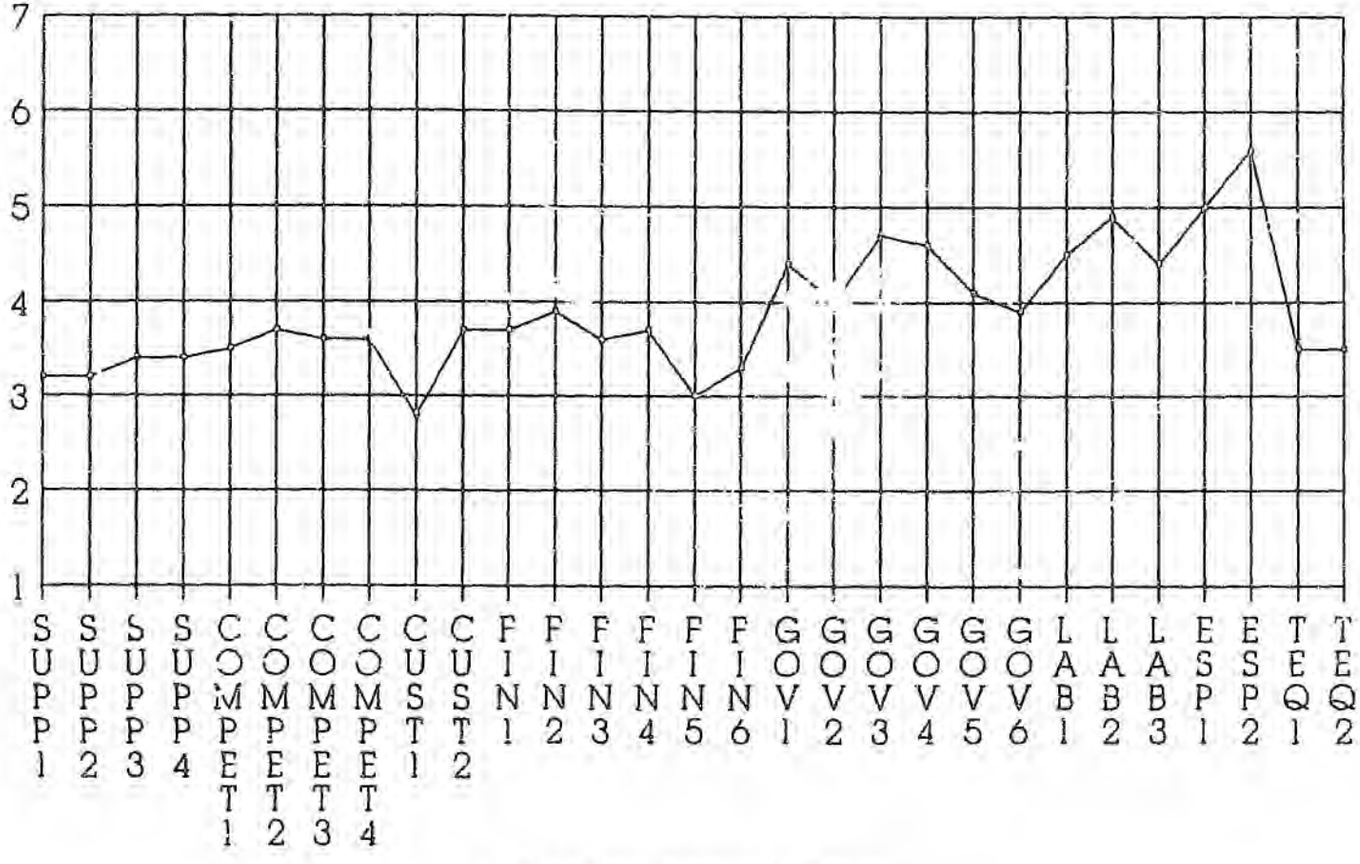
Sample	Average Size	TOP100=2 (Small)	TOP100=1 (Large)	Total N
Detail	1004.5	19	29	48
Abridged	361.2	25	8	33
Total		44	37	81
	Model F :	6.02		
	PR > F :	0.0165		
	R-Square :	0.0752		

TABLE 3.1 : DESCRIPTIVE STATISTICS
PERCEIVED ENVIRONMENTAL UNCERTAINTY

	SUPP	COMPET	CUST
N	48	48	48
MEAN	3.29	3.60	3.23
MEDIAN	3.38	3.50	3.00
MODE	3.00	2.50	3.00
RANGE	6.00	7.00	5.50
INTERQUARTILE RANGE	1.38	1.75	1.50
VARIANCE	1.17	1.55	1.29
STANDARD DEVIATION	1.08	1.24	1.13
COEFFICIENT OF VARIATION	32.80	34.59	35.13
SKEWNESS	-0.27	0.11	-0.12
KURTOSIS	1.32	0.89	0.42
T : MEAN = 0	21.12	20.03	19.72
PROB > |T|	0.01	0.01	0.01

	FIN	GOV	LAB
N	48	48	48
MEAN	3.55	4.29	4.62
MEDIAN	3.50	4.25	4.67
MODE	3.00	4.00	4.00
RANGE	4.33	4.50	6.00
INTERQUARTILE RANGE	1.46	1.25	2.58
VARIANCE	1.06	0.89	2.45
STANDARD DEVIATION	1.03	0.94	1.57
COEFFICIENT OF VARIATION	28.97	21.94	33.92
SKEWNESS	0.61	-0.16	-0.46
KURTOSIS	0.00	0.11	-0.49
T : MEAN = 0	23.92	31.58	20.42
PROB > |T|	0.01	0.01	0.01

FIGURE 3.
PROFILE OF ENVIRONMENTAL UNCERTAINTY
RESPONDENT MEANS



1 = HIGHLY PREDICTABLE
7 = HIGHLY UNPREDICTABLE

TABLE 3.1 (CONT.) : DESCRIPTIVE STATISTICS
PERCEIVED ENVIRONMENTAL UNCERTAINTY

	ESP	TEQ	PEU
N	48	48	48
MEAN	5.29	3.53	31.40
MEDIAN	5.50	3.50	32.08
MODE	5.50	3.00	25.08
RANGE	5.00	4.50	22.58
INTERQUARTILE RANGE	2.00	1.00	8.77
VARIANCE	1.85	0.97	32.30
STANDARD DEVIATION	1.36	0.99	5.68
COEFFICIENT OF VARIATION	25.70	27.93	18.10
SKEWNESS	-0.84	-0.56	-0.25
KURTOSIS	0.04	-0.22	-0.52
T : MEAN = 0	26.96	24.81	38.28
PROB > |T|	0.01	0.01	0.01

TABLE 3.2 : IMPACT OF CATEGORICAL VARIABLES ON PERCEIVED ENVIRONMENTAL UNCERTAINTY

SECTOR	N	MEAN	DIVERS	N	MEAN
1	4	29.667	1	19	31.285
2	4	33.271	2	6	31.347
3	2	24.458	3	3	33.889
4	1	35.417	4	6	35.375
5	4	31.792	5	3	36.528
6	7	31.679	6	4	35.375
8	5	31.883	8	1	25.250
9	3	34.222	11	4	27.562
10	3	29.250	31	1	32.250
11	2	30.667			
14	8	33.615			
15	2	31.125			
16	1	20.000			
18	2	27.875			

LTP	N	MEAN	TOP100	N	MEAN
1	32	30.279	1	29	30.241
2	16	33.635	2	19	33.162

VARIABLE	N	MODEL F =	PR > F	R-SQUARE
SECTOR	48	0.88	0.5834	0.2510
DIVERS	47	1.07	0.4034	0.1840
LTP	48	3.96	0.0527	0.0792
TOP100	48	3.17	0.0815	0.0645

TABLE 3.3 : IMPACT OF CONTINUOUS VARIABLES ON PERCEIVED ENVIRONMENTAL UNCERTAINTY

VARIABLE	N	PEARSON	PROB > |R|
SIZE	45	-0.15867	0.2979
LEVTEC	45	-0.19708	0.1944
AGE	48	-0.20192	0.1687

VARIABLE	N	SPEARMAN	PROB > |R|
SIZE	45	-0.30042	0.0450
LEVTEC	45	-0.21042	0.1653
AGE	48	-0.12893	0.2511

VARIABLE	N	KENDALL TAU B	PROB > |R|
SIZE	45	-0.20829	0.0439
LEVTEC	45	-0.14156	0.1708
AGE	48	-0.11670	0.2472

TABLE 3.4 : CORRELATION COEFFICIENTS
PERCEIVED ENVIRONMENTAL UNCERTAINTY

COMPONENTS	1	2	3	4	5	6	7
(A) PEARSON							
1. SUPP	1.00	0.42*	0.30*	0.38*	0.33*	0.15	0.34*
2. COMPET		1.00	0.30*	0.08	0.13	0.40*	0.24
3. CUST			1.00	0.17	0.24	0.30*	0.22
4. FIN				1.00	0.47*	0.33*	0.49*
5. GOV					1.00	0.34*	0.38*
6. LAB						1.00	0.24
7. ESP							1.00
8. TEQ	0.23	0.09	-0.15	0.42*	0.26	0.24	0.41*
(B) SPEARMAN							
1. SUPP	1.00	0.44*	0.20	0.39*	0.32*	0.25	0.32*
2. COMPET		1.00	0.20	0.12	0.02	0.38	0.18
3. CUST			1.00	0.21	0.20	0.29*	0.20
4. FIN				1.00	0.50*	0.40*	0.46*
5. GOV					1.00	0.33*	0.31*
6. LAB						1.00	0.26
7. ESP							1.00
8. TEQ	0.30*	0.09	-0.12	0.46*	0.26	0.29*	0.44*
(C) KENDALL TAU B							
1. SUPP	1.00	0.35*	0.14	0.29*	0.23*	0.19	0.25*
2. COMPET		1.00	0.15	0.10	0.03	0.29*	0.13
3. CUST			1.00	0.16	0.15	0.21	0.15
4. FIN				1.00	0.36*	0.29*	0.35*
5. GOV					1.00	0.23*	0.26*
6. LAB						1.00	0.21
7. ESP							1.00
8. TEQ	0.23*	0.07	-0.08	0.34*	0.22*	0.22*	0.34*

* PROB > |R| = 0.05

MEAN INTER-ITEM CORRELATION	
Supplier	: 0.55731
Competitor	: 0.66266
Customer	: 0.45817
Financial	: 0.55621
Government	: 0.40733
Labour union	: 0.73477
Eco-socio-political	: 0.81890
Technology	: 0.72956
Environmental Uncertainty	: 0.25341

TABLE 3.5 : FACTOR PATTERN
PERCEIVED ENVIRONMENTAL UNCERTAINTY-VARIMAX ROTATED

VARIABLES	1	2	3	4
FIN4	0.84351			
FIN6	0.81834			
FIN5	0.76755			
FIN3	0.69691			
FIN2	0.63052			
FIN1	0.50270			
COMPET3		0.91389		
COMPET2		0.87630		
COMPET4		0.80000		
COMPET1		0.63243		
GOV1			0.90745	
GOV2			0.69688	
GOV3			0.68469	
GOV5			0.57661	
GOV4			0.52404	
SUPP2				0.80356
SUPP3				0.72536
SUPP1				0.62171
SUPP4				0.61799
GOV6				0.39140
EIGENVALUE	3.773051	3.349044	2.978113	2.646188
%	17.96	15.95	14.18	12.60

VARIABLES	5	6	7	8
LAB2	0.90059			
LAB1	0.82733			
LAB3	0.74056			
ESP1		0.79083		
ESP2		0.75928		
TEQ2			0.80779	
TEQ1			0.79274	
CUST1				0.79840
CUST2				0.62312
EIGENVALUE	2.626076	2.213865	1.815773	1.600898
%	12.50	10.54	8.65	7.62

TABLE 3.6 : RELIABILITY
PERCEIVED ENVIRONMENTAL UNCERTAINTY - SUBSCALE AND OVERALL SCALE

SCALE	CRONBACH'S ALPHA PEARSON (a)	SPEARMAN (b)	ORDINAL DISTORTION (c)
SUPP	0.83	0.80	3.6%
COMPET	0.89	0.86	3.4%
CUST	0.63	0.59	6.3%
FIN	0.88	0.88	0.0%
GOV	0.80	0.80	0.0%
LAB	0.89	0.88	1.1%
ESP	0.90	0.91	1.1%
TEQ	0.84	0.82	2.4%
OVERALL : ALPHA	0.91	0.90	1.1%
: THETA	0.90		
: OMEGA	0.97	(c) = (|a-b|)/a*100	

TABLE 3.7 : EXTERNAL VALIDITY
PERCEIVED ENVIRONMENTAL UNCERTAINTY

VARIABLES	W : NORMAL	PROB < W
SUPP	0.975299	0.547
COMPET	0.974452	0.516
CUST	0.961005	0.240
FIN	0.957195	0.164
GOV	0.978872	0.677
LAB	0.946493	0.048
ESP	0.904413	<0.010
TEQ	0.939323	0.027
PEU	0.965354	0.327

TABLE 3.8 : RESPONDENT BIAS
PERCEIVED ENVIRONMENTAL UNCERTAINTY

RESPOND	N	MEAN
1	7	32.952
2	20	31.392
3	7	31.845
4	5	30.300
5	3	30.833
6	3	22.667
7	1	34.333
8	1	33.389

VARIABLE	N	MODEL F =	PR > F	R-SQUARE
SUPP	47	0.95	0.4773	0.1462
COMPET	47	0.27	0.9608	0.0467
CUST	47	1.54	0.1817	0.2169
FIN	47	0.62	0.7327	0.1008
GOV	47	0.67	0.6931	0.1078
LAB	47	1.34	0.2577	0.1940
ESP	47	0.43	0.8741	0.0724
TEQ	47	1.90	0.0956	0.2544
PEU	47	0.50	0.8286	0.0824

TABLE 3.9 : NON-RESPONDENT BIAS
PERCEIVED ENVIRONMENTAL UNCERTAINTY

MEAN	DETAIL	ABRIDGED	DIFFERENCE
SUPP	3.29	3.03	0.26
COMPET	3.60	3.34	0.26
CUST	3.23	2.97	0.26
FIN	3.55	3.47	0.08
GOV	4.29	4.03	0.26
LAB	4.62	4.47	0.15
ESP	5.29	5.25	0.04
TEQ	3.53	2.66	0.87
PEU	31.40	29.22	2.18

SIGNIFICANCE	MODEL F =	PR > F	R-SQUARE
SUPP	0.86	0.3559	0.0109
COMPET	0.67	0.4163	0.0085
CUST	1.11	0.2952	0.0140
FIN	0.05	0.8217	0.0007
GOV	0.79	0.3763	0.0100
LAB	0.12	0.7256	0.0016
ESP	0.02	0.8959	0.0002
TEQ	13.19	0.0005 *	0.1447
PEU	2.53	0.1156	0.0314

TABLE 4.1 : DESCRIPTIVE STATISTICS
FINANCIAL PERFORMANCE

	ROS	ROCE	ROTA
N	45	48	48
MEAN	11.18	30.82	15.05
MEDIAN	9.32	25.98	15.95
MODE	0.91	3.87	-2.01
RANGE	31.54	112.79	56.55
INTERQUARTILE RANGE	7.14	15.68	11.24
VARIANCE	52.82	389.11	93.51
STANDARD DEVIATION	7.27	19.73	9.67
COEFFICIENT OF VARIATION	65.01	64.01	64.23
SKEWNESS	1.28	2.19	1.65
KURTOSIS	1.56	6.94	5.41
T : MEAN = 0	10.32	10.82	10.79
PROB > |T|	0.01	0.01	0.01

	GIS	GIP	GIA
N	28	30	30
MEAN	33.63	49.33	24.15
MEDIAN	28.79	40.56	21.29
MODE	5.16	-162.50	-1.65
RANGE	141.54	587.50	55.31
INTERQUARTILE RANGE	21.42	51.73	21.31
VARIANCE	703.44	10054.10	183.64
STANDARD DEVIATION	26.52	100.27	13.55
COEFFICIENT OF VARIATION	78.87	203.27	56.13
SKEWNESS	3.01	1.66	0.40
KURTOSIS	12.21	7.38	-0.45
T : MEAN = 0	6.71	2.69	9.76
PROB > |T|	0.01	0.01	0.01

TABLE 4.2 : IMPACT OF CATEGORICAL VARIABLES ON FINANCIAL PERFORMANCE-ROCE

SECTOR	N	MEAN	DIVERS	N	MEAN
1	4	34.54	1	19	32.89
2	4	14.43	2	6	33.77
3	2	33.04	3	3	26.93
4	1	21.60	4	6	39.42
5	4	25.10	5	3	26.27
6	7	46.59	6	4	20.54
8	5	18.81	8	1	22.34
9	3	30.42	11	4	30.28
10	3	33.17	31	1	20.48
11	2	32.43			
14	8	40.40			
15	2	23.05			
16	1	16.14			
18	2	17.01			
LTP	N	MEAN	TOP100	N	MEAN
1	32	23.970	1	29	24.828
2	16	44.510	2	19	39.956

VARIABLE	N	MODEL F =	PR > F	R-SQUARE
		(A) ROS		
SECTOR	45	1.07	0.4140	0.3107
DIVERS	44	0.44	0.8878	0.0916
LTP	45	0.88	0.3524	0.0201
TOP100	45	0.04	0.8433	0.0009
		(B) ROCE		
SECTOR	48	1.06	0.4189	0.2894
DIVERS	47	0.37	0.9314	0.0717
LTP	48	15.01	0.0003	0.2461
TOP100	48	7.72	0.0079	0.1436
		(C) ROTA		
SECTOR	48	0.99	0.4851	0.2736
DIVERS	47	0.86	0.5603	0.1723
LTP	48	6.52	0.0141	0.1241
TOP100	48	5.05	0.0295	0.0988

TABLE 4.3 : IMPACT OF CONTINUOUS VARIABLES ON FINANCIAL PERFORMANCE

VARIABLE	N	PEARSON	PROB > |R|
		(A) ROS	
SIZE	45	0.00909	0.9527
LEVTEC	45	0.36220	0.0145
AGE	45	-0.11452	0.4538
		(B) ROCE	
SIZE	45	-0.25143	0.0957
LEVTEC	45	-0.29850	0.0464
AGE	48	-0.28063	0.0534
		(C) ROTA	
SIZE	45	-0.20938	0.1675
LEVTEC	45	-0.06849	0.6549
AGE	48	-0.12252	0.4067

TABLE 4.4 : CORRELATION COEFFICIENTS
FINANCIAL PERFORMANCE

COMPONENTS	1	2	3	4	5	6
			(A) PEARSON			
1. ROS	1.00	0.43*	0.72*	-0.03	0.14	0.03
2. ROCE		1.00	0.80*	0.40*	0.22	0.48*
3. ROTA			1.00	0.30	0.38*	0.40*
4. GIS				1.00	0.63*	0.80*
5. GIP					1.00	0.49*
6. GIA						1.00
			(B) SPEARMAN			
1. ROS	1.00	0.36*	0.74*	0.21	0.18	0.14
2. ROCE		1.00	0.79*	0.49*	0.22	0.52*
3. ROTA			1.00	0.43*	0.26	0.43*
4. GIS				1.00	0.50*	0.86*
5. GIP					1.00	0.43*
6. GIA						1.00
			(C) KENDALL TAU B			
1. ROS	1.00	0.26*	0.54*	0.17	0.15	0.12
2. ROCE		1.00	0.59*	0.39*	0.16	0.38*
3. ROTA			1.00	0.32*	0.18	0.30*
4. GIS				1.00	0.35*	0.69*
5. GIP					1.00	0.32*
6. GIA						1.00
			* PROB > |R| = 0.05			

TABLE 4.5 : FACTOR PATTERN
FINANCIAL PERFORMANCE-VARIMAX ROTATED

VARIABLES	1	2
GIS	0.92252	
GIA	0.83528	
GIP	0.59412	
ROTA		0.90022
ROCE		0.69337
ROS		0.67529
EIGENVALUE	2.288857	1.832123
%	55.54	44.46

TABLE 5.1 : DESCRIPTIVE STATISTICS
ENVIRONMENTAL VOLATILITY

	SVOL	PVOL	TECVOL	EV
N	45	48	45	45
MEAN	35.16	61.74	26 00	30.58
MEDIAN	30.24	46.13	15.66	24.14
MODE	9.44	0.00	3.55	8.29
RANGE	88.39	372.29	143.75	102.76
INTERQUARTILE RANGE	21.47	30.07	13.87	15.88
VARIANCE	418.83	4613.14	959.88	527.14
STANDARD DEVIATION	20.47	67.92	30.98	22.96
COEFFICIENT OF VARIATION	58.20	110.01	119.17	75.08
SKEWNESS	1.51	3.38	2.60	1.95
KURTOSIS	2.43	12.74	6.43	3.60
T : MEAN = 0	11.53	6.30	5.63	8.93
PROB > |T|	0.01	0.01	0.01	0.01

	SVOLFD	PVOLFD	EVFD
N	37	39	45
MEAN	69.58	254.54	43.84
MEDIAN	62.04	119.32	38.65
MODE	6.73	0.00	3.55
RANGE	268.39	2210.58	137.58
INTERQUARTILE RANGE	40.28	84.43	38.02
VARIANCE	2428.22	223459.00	894.82
STANDARD DEVIATION	49.28	472.71	29.91
COEFFICIENT OF VARIATION	70.82	185.72	68.24
SKEWNESS	2.34	3.28	1.15
KURTOSIS	7.75	10.16	1.43
T : MEAN = 0	8.59	3.36	9.83
PROB > |T|	0.01	0.01	0.01

Note : 'FD' denotes 'first differences'.

TABLE 5.2 . IMPACT OF CATEGORICAL VARIABLES ON ENVIRONMENTAL VOLATILITY-EV

SECTOR	N	MEAN	DIVERS	N	MEAN
1	3	33.92	1	16	28.20
2	4	41.59	2	6	31.14
3	2	11.45	3	3	19.89
4	1	15.04	4	6	23.90
5	4	50.94	5	3	77.32
6	6	25.20	6	4	24.56
8	5	14.65	8	1	30.61
9	3	23.78	11	4	29.44
10	3	44.71	31	1	27.07
11	2	24.44			
14	7	41.37			
15	2	25.28			
16	1	19.36			
18	2	14.00			

LTP	N	MEAN	TOP100	N	MEAN
1	30	28.037	1	29	26.072
2	15	35.668	2	16	38.752

VARIABLE	N	MODEL F =	PR > F	R-SQUARE
		(A) EV		
SECTOR	45	1.02	0.4572	0.2997
DIVERS	44	2.06	0.0677	0.3199
LTP	45	1.11	0.2986	0.0251
TOP100	45	3.31	0.0758	0.0715
		(B) EVFD		
SECTOR	45	1.63	0.1286	0.4066
DIVERS	44	0.99	0.4580	0.1851
LTP	45	(.06	0.8010	0.00[illegible]5
TOP100	45	0.01	0.9123	0.0003

TABLE 5.3 : IMPACT OF CONTINUOUS VARIABLES ON ENVIRONMENTAL VOLATILITY

VARIABLE	N	PEARSON	PROB > |R|
		(A) EV	
SIZE	45	-0.16658	0.2741
LEVTEC	45	-0.16418	0.2812
AGE	45	-0.18008	0.2365
		(B) EVFD	
SIZE	45	0.02430	0.8741
LEVTEC	45	0.28040	0.0621
AGE	45	-0.08812	0.5649

TABLE 5.4 : CORRELATION COEFFICIENTS ENVIRONMENTAL VOLATILITY

COMPONENTS	1	2	3	4	5
			(A) PEARSON		
1. SVOL	1.00	0.2.	0.58*		
2. PVOL		1.00	0.12		
3. TECVOL			1.00	-0.11	-0.15
4. SVOLFD				1.00	0.49*
5. PVOLFD					1.00
			(B) SPEARMAN		
1. SVOL	1.00	0.61*	0.64*		
2. PVOL		1.00	0.47*		
3. TECVOL			1.00	0.08	-0.22
4. SVOLFD				1.00	0.18
5. PVOLFD					1.00
			(C) KENDALL TAU B		
1. SVOL	1.00	0.45*	0.44*		
2. PVOL		1.00	0.35*		
3. TECVOL			1.00	0.02	-0.14
4. SVOLFD				1.00	0.13
5. PVOLFD					1.00
			* PROB > |R| = 0.05		

TABLE 5.5 : FACTOR PATTERN
ENVIRONMENTAL VOLATILITY

(A) EV

VARIABLES	1
SVOL	0.60338
PVOL	0.66169
TECVOL	0.24819
EIGENVALUE	0 98021

(B) EVFD

VARIABLES	1
SVOLFD	0.60919
PVOLFD	0.59679
TECVOL	-0.20903
EIGENVALUE	0.77096

APPENDIX VI
RESEARCH RELATIONSHIPS

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TABLE	PEU, PS & FP	PEU, OS & FP	EV, PEU & FP	OS & PS
1. Research Results.	6.1	7.1	8.1	9.1
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TABLE 6.1 : RESEARCH RESULTS
PERCEIVED ENVIRONMENTAL UNCERTAINTY (PEU), PLANNING SYSTEM (PS) AND FINANCIAL PERFORMANCE (FP)

(A) OVERALL

MEAN ROCE		PEU	
		LOW	HIGH
PS	LOW	N = 14.00 MEAN = 30.08 STD = 12.98	N = 09.00 MEAN = 25.39 STD = 20.41
	HIGH	N = 10.00 MEAN = 25.16 STD = 08.99	N = 15.00 MEAN = 38.53 STD = 27.46

(B) SIZE = LOW

MEAN ROCE		PEU	
		LOW	HIGH
PS	LOW	N = 06.00 MEAN = 34.93 STD = 14.75	N = 06.00 MEAN = 30.34 STD = 22.54
	HIGH	N = 05.00 MEAN = 25.72 STD = 10.37	N = 09.00 MEAN = 47.55 STD = 32.58

(C) SIZE = HIGH

MEAN ROCE		PEU	
		LOW	HIGH
PS	LOW	N = 08.00 MEAN = 26.45 STD = 11.07	N = 03.00 MEAN = 15.50 STD = 13.24
	HIGH	N = 05.00 MEAN = 24.60 STD = 08.58	N = 06.00 MEAN = 25.01 STD = 06.80

TABLE 6.2 : CROSSTABULATION ANALYSIS
PERCEIVED ENVIRONMENTAL UNCERTAINTY (PEU), PLANNING SYSTEM (PS) AND FINANCIAL PERFORMANCE (FP)

CHI=CHI-SQUARE PROB PHI=PHI COEFFICIENT		OVERALL N=48	SIZE=LOW N=26	SIZE=HIGH N=22
PEU * PS	CHI	0.149	0.462	0.387*
	PHI	0.209	0.144	0.277
PS * ROCE	CHI	0.773	0.462	1.000*
	PHI	0.042	0.144	-0.092
PS * ROCE	CHI	0.729	1.000*	1.000*
PEU = LOW	PHI	-0.071	-0.069	-0.098
PS * ROCE	CHI	0.423*	0.315*	1.000*
PEU = HIGH	PHI	0.194	0.327	0.000

CHI=CHI-SQUARE PROB PHI=PHI COEFFICIENT		OVERALL N=48	TEC=LOW N=25	TEC=HIGH N=23
PEU * PS	CHI	0.149	0.09[illegible]*	1.000*
	PHI	0.209	0.395	0.088
PS * ROCE	CHI	0.773	0.229*	1.000*
	PHI	0.042	0.272	-0.042
PS * ROCE	CHI	0.729	1.000*	1.000*
PEU = LOW	PHI	-0.071	0.289	-0.025
PS * ROCE	CHI	0.423*	0.277*	1.000*
PEU = HIGH	PHI	0.194	0.417	-0.048

CHI=CHI-SQUARE PROB PHI=PHI COEFFICIENT		OVERALL N=48	AGE=LOW N=26	AGE=HIGH N=22
PEU * PS	CHI	0.149	0.047*	1.000*
	PHI	0.209	0.438	0.022
PS * ROCE	CHI	0.773	0.408*	0.423*
	PHI	0.042	0.240	-0.194
PS * ROCE	CHI	0.729	0.491*	1.000*
PEU = LOW	PHI	-0.071	-0.356	-0.184
PS * ROCE	CHI	0.423*	0.103*	0.576*
PEU = HIGH	PHI	0.194	0.537	-0.214

* FISHER'S EXACT 2-TAIL TEST.

TABLE 6.3 : ANALYSIS OF VARIANCE PERCEIVED ENVIRONMENTAL UNCERTAINTY (PEU), PLANNING SYSTEM (PS) AND FINANCIAL PERFORMANCE (FP)

(A) ROCE

		WITHOUT COVARIATES	WITH COVARIATES
OVERALL	N F PR > F	48 1.30 0.2875	45 1.94 0.0984
LTP = 1	N F PR > F	32 1.54 0.2254	30 1.31 0.2937
LTP = 2	N F PR > F	16 1.67 0.2267	15 1.44 0.3080
TOP100 = 1	N F PR > F	29 1.13 0.3552	29 1.01 0.4438
TOP100 = 2	N F PR > F	19 1.94 0.1668	16 2.28 0.1280

(B) ROTA

		WITHOUT COVARIATES	WITH COVARIATES
OVERALL	N F PR > F	48 0.08 0.9690	45 0.38 0.8879
LTP = 1	N F PR > F	32 1.00 0.4060	30 0.67 0.6738
LTP = 2	N F PR > F	16 0.37 0.7727	15 0.58 0.7410
TOP100 = 1	N F PR > F	29 1.18 0.3390	29 0.92 0.5002
TOP100 = 2	N F PR > F	19 0.40 0.7555	16 0.81 0.5871

TABLE 6.4.1. : CANONICAL ANALYSIS PERCEIVED ENVIRONMENTAL UNCERTAINTY (PEU) AND PLANNING SYSTEM (PS)

N = 45	13 PS, 8 PEU AND 3 PARTIAL VARIABLES

FUNCTION	R	R^2	RATIO	F	PR>F
1	0.8132	0.6614	0.0423	0.8718	0.7729
2	0.7299	0.5327	0.1250	0.6869	0.9696
3	0.6072	0.3689	0.2676	0.5441	0.9966

VARIABLES	W	L	CL	CL^2	%
PEU					
1 : FIN	-0.1017	-0.1518	-0.1235	0.0152	1.94
2 : COMPET	0.3957	0.4830	0.3928	0.1543	19.72
3 : GOV	0.1281	0.1210	0.0984	0.0097	1.24
4 : SUPP	0.6852	0.7071	0.6442	0.4150	53.03
5 : LAB	0.1248	0.1883	0.1540	0.0237	3.03
6 : ESP	0.3661	0.4254	0.3459	0.1197	15.30
7 : TEQ	0.0335	0.0367	0.0298	0.0009	0.12
8 : CUST	0.2114	0.2581	0.2099	0.0441	5.64
PS					
1 : SR	-0.1180	-0.0855	-0.0696	0.0048	0.75
2 : CR	-0.3627	-0.3416	-0.2776	0.0772	12.14
3 : AA	-0.3819	-0.2711	-0.2205	0.0486	7.64
4 : FC	0.3861	0.3183	0.2588	0.0670	10.53
5 : PA	-0.4298	-0.3475	-0.2826	0.0799	12.56
6 : IA	0.1423	0.2421	0.1969	0.0388	6.10
7 : SEA	0.0811	-0.0708	-0.0575	0.0033	0.52
8 : RA	-0.1422	-0.0560	-0.0456	0.0021	0.33
9 : IE	-0.0634	-0.0134	-0.0109	0.0001	0.02
10 : GEA	0.2585	0.2686	0.2185	0.0477	7.50
11 : PR	0.2439	0.2120	0.1724	0.0297	4.67
12 : PO	-0.0860	-0.0274	-0.0223	0.0005	0.08
13 : TR	0.5056	0.5978	0.4862	0.2364	37.16

FUNCTION	VARIANCE		REDUNDANCY	
	PEU	PS	PEU	PS
1	0.1479	0.0740	0.0978	0.0489
2	0.1194	0.0750	0.0636	0.0399
3	0.1112	0.0677	0.0410	0.0250
8 (CUMULATIVE)	1.0000	0.6253	0.2990	0.1774

TABLE 6.4.2 : CANONICAL ANALYSIS
PERCEIVED ENVIRONMENTAL UNCERTAINTY (PEU), PLANNING SYSTEM (PS) AND FINANCIAL PERFORMANCE (FP)

(A) PEU = LOW

N = 19	13 PS, 2 PS AND 3 PARTIAL VARIABLES

FUNCTION	R	R^2	RATIO	F	PR>F
1	0.9353	0.9709	0.0040	1.1420	0.5715
2	0.9291	0.8632	0.1368	1.0520	0.5862

VARIABLES	W	L	CL	CL^2	%
PS					
1 : SR	0.7907	0.2721	0.2681	0.0719	6.75
2 : CR	-0.4824	-0.0334	-0.0329	0.0011	0.10
3 : AA	-0.4045	0.1080	0.1064	0.0113	1.06
4 : FC	0.2146	0.0489	0.0482	0.0023	0.22
5 : PA	-0.0124	-0.3581	-0.3528	0.1245	11.68
6 : IA	-0.3442	0.3931	0.3874	0.1500	14.08
7 : SEA	-0.5177	-0.3229	-0.3182	0.1012	9.50
8 : RA	1.0559	0.5133	0.5057	0.2558	24.01
9 : IE	0.2779	-0.2019	-0.1990	0.0396	3.72
10 : GEA	-0.0157	0.1521	0.1794	0.0322	3.02
11 : PR	0.2673	0.0710	0.0700	0.0049	0.46
12 : PO	-0.0561	0.2137	0.2106	0.0443	4.16
13 : TR	0.5707	0.4830	0.4759	0.2265	21.26
FP					
1 : GR	0.7672	0.8112	0.7993	0.6389	61.34
2 : PR	0.5864	0.6439	0.6345	0.4026	38.66

FUNCTION	VARIANCE		REDUNDANCY	
	PS	FP	PS	FP
1	0.0844	0.5363	0.0820	0.5207
2	0.0590	0.4637	0.0509	0.4002
2 (CUMULATIVE)	0.1434	1.0000	0.1329	0.9210

TABLE 6.4.2 (CONT.) : CANONICAL ANALYSIS PERCEIVED ENVIRONMENTAL UNCERTAINTY (PEU), PLANNING SYSTEM (PS) AND FINANCIAL PERFORMANCE (FP)

(B) PEU = HIGH

N = 9	13 PS, 2 PS AND 3 PARTIAL VARIABLES

FUNCTION	R	R^2	RATIO	F	PR>F
1	1.0000	1.0000	0.0000	-	-
2	1.0000	1.0000	0.0000	-	-

VARIABLES	W	L	CL	CL^2	%
PS					
1 : SR	0.5741	0.2029	0.2029	0.0412	1.61
2 : CR	0.1914	0.0330	0.0330	0.0011	0.04
3 : AA	-0.7471	0.2291	0.2291	0.0525	2.05
4 : FC	1.4581	0.7204	0.7204	0.5190	20.31
5 : PA	-0.4290	0.0049	0.0049	0.0000	0.00
6 : IA	0.0000	0.5858	0.5858	0.3432	13.43
7 : SEA	0.0000	-0.8284	-0.8284	0.6862	26.85
8 : RA	0.0000	-0.4124	-0.4124	0.1701	6.65
9 : IE	0.0000	-0.2282	-0.2282	0.0521	2.04
10 : GEA	0.0000	0.6110	0.6110	0.3733	14.60
11 : PR	0.0000	0.1747	0.1747	0.0305	1.19
12 : PO	0.0000	0.1887	0.1887	0.0356	1.39
13 : TR	0.0000	-0.5012	-0.5012	0.2512	9.83
FP					
1 : GR	1.1684	0.9436	0.9436	0.8904	93.13
2 : PR	-0.4001	0.2564	0.2564	0.0657	6.87

FUNCTION	VARIANCE		REDUNDANCY	
	PS	FP	PS	FP
1	0.1966	0.4781	0.1966	0.4781
2	0.1860	0.5219	0.1860	0.5219
2 (CUMULATIVE)	0.3827	0.1000	0.3827	0.1000

TABLE 7.1 : RESEARCH RESULTS PERCEIVED ENVIRONMENTAL UNCERTAINTY (PEU), ORGANISATIONAL STRUCTURE (OS) AND FINANCIAL PERFORMANCE (FP)

(A) OVERALL

MEAN ROCE		PEU	
		LOW	HIGH
OS	LOW	N = 11.00 MEAN = 25.04 STD = 08.43	N = 13.00 MEAN = 31.24 STD = 28.36
	HIGH	N = 13.00 MEAN = 30.55 STD = 13.44	N = 11.00 MEAN = 36.40 STD = 22.47

(B) SIZE = LOW

MEAN ROCE		PEU	
		LOW	HIGH
OS	LOW	N = 04.00 MEAN = 23.62 STD = 09.61	N = 06.00 MEAN = 40.56 STD = 40.79
	HIGH	N = 07.00 MEAN = 34.80 STD = 13.86	N = 09.00 MEAN = 40.73 STD = 21.74

(C) SIZE = HIGH

MEAN ROCE		PEU	
		LOW	HIGH
OS	LOW	N = 07.00 MEAN = 25.86 STD = 08.37	N = 07.00 MEAN = 23.25 STD = 07.75
	HIGH	N = 06.00 MEAN = 25.60 STD = 12.18	N = 02.00 MEAN = 16.99 STD = 18.41

TABLE 7.2 : CROSSTABULATION ANALYSIS PERCEIVED ENVIRONMENTAL UNCERTAINTY (PEU), ORGANISATIONAL STRUCTURE (OS) AND FINANCIAL PERFORMANCE (FP)

CHI=CHI-SQUARE PROB PHI=PHI COEFFICIENT		OVERALL N=48	SIZE=LOW N=26	SIZE=HIGH N=22
PEU * OS	CHI PHI	0.564 -0.083	1.000* -0.037	0.380* -0.245
OS * ROCE	CHI PHI	0.083 0.250	0.228* 0.283	0.662* 0.140
OS * ROCE PEU = LOW	CHI PHI	0.431 0.161	0.576* 0.214	1.000* 0.071
OS * ROCE PEU = HIGH	CHI PHI	0.217* 0.329	0.315* 0.327	1.000* 0.189

CHI=CHI-SQUARE PROB PHI=PHI COEFFICIENT		OVERALL N=48	TEC=LOW N=25	TEC=HIGH N=23
PEU * OS	CHI PHI	0.564 -0.083	0.414* -0.230	1.000* 0.016
OS * ROCE	CHI PHI	0.083 0.250	0.397* 0.238	0.657* 0.163
OS * ROCE PEU = LOW	CHI PHI	0.431 0.161	1.000* 0.083	1.000* 0.025
OS * ROCE PEU = HIGH	CHI PHI	0.217* 0.329	0.592* 0.289	0.500* 0.356

CHI=CHI-SQUARE PROB PHI=PHI COEFFICIENT		OVERALL N=48	AGE=LOW N=26	AGE=HIGH N=22
PEU * OS	CHI PHI	0.564 -0.083	0.973 -0.007	0.392 -0.175
OS * ROCE	CHI PHI	0.083 0.250	0.973 0.007	0.012 0.510
OS * ROCE PEU = LOW	CHI PHI	0.431 0.161	1.000* -0.069	0.266* 0.386
OS * ROCE PEU = HIGH	CHI PHI	0.217* 0.329	1.000* 0.071	0.088* 0.607

* FISHER'S EXACT 2-TAIL TEST.

TABLE 7.3 : ANALYSIS OF VARIANCE PERCEIVED ENVIRONMENTAL UNCERTAINTY (PEU), ORGANISATIONAL STRUCTURE (OS) AND FINANCIAL PERFORMANCE (FP)

(A) ROCE

		WITHOUT COVARIATES	WITH COVARIATES
OVERALL	N F PR > F	48 0.59 0.6218	45 1.52 0.1990
LTP = 1	N F PR > F	32 1.11 0.3600	30 1.24 0.3235
LTP = 2	N F PR > F	16 4.13 0.0408	15 1.77 0.2156
TOP100 = 1	N F PR > F	29 0.66 0.5850	29 0.79 0.5883
TOP100 = 2	N F PR > F	19 0.69 0.5745	16 2.13 0.1474

(B) ROTA

		WITHOUT COVARIATES	WITH COVARIATES
OVERALL	N F PR > F	48 0.34 0.7950	45 0.41 0.8685
LTP = 1	N F PR > F	32 1.00 0.4081	30 0.66 0.6852
LTP = 2	N F PR > F	16 0.97 0.4040	15 0.65 0.6702
TOP100 = 1	N F PR > F	29 0.97 0.4226	29 0.79 0.5865
TOP100 = 2	N F PR > F	19 0.38 0.7663	16 0.80 0.5950

TABLE 7.4.1 : CANONICAL ANALYSIS PERCEIVED ENVIRONMENTAL UNCERTAINTY (PEU) AND ORGANISATIONAL STRUCTURE (OS)

N = 45	5 OS, 8 PEU AND 3 PARTIAL VARIABLES

FUNCTION	R	R^2	RATIO	F	PR>F
1	0.6339	0.4019	0.3252	0.9496	0.5618
2	0.5147	0.2649	0.5437	0.7207	0.8399
3	0.3993	0.1594	0.7396	0.5512	0.9240

VARIABLES	W	L	CL	CL^2	%
PEU					
1 : FIN	0.6824	0.6636	0.4207	0.1770	43.96
2 : COMPET	0.1040	0.1246	0.0790	0.0062	1.54
3 : GOV	0.2370	0.2173	0.1377	0.0190	4.72
4 : SUPP	0.3858	0.3436	0.2178	0.0475	11.80
5 : LAB	-0.3157	-0.2400	-0.1521	0.0231	5.74
6 : ESP	-0.2974	-0.3683	-0.2335	0.0545	13.54
7 : TEC	-0.3764	-0.4321	-0.2739	0.0750	18.63
8 : CUST	-0.0808	-0.0277	-0.0176	0.0003	0.07
OS					
1 : DOF	-0.3781	-0.4070	-0.2580	0.0666	14.71
2 : LLD	-0.3939	-0.5092	-0.3228	0.1042	23.02
3 : DOC	0.7652	0.8344	0.5290	0.2798	61.81
4 : TMC	0.0705	0.0592	0.0375	0.0014	0.31
5 : CAF	0.1321	0.0406	0.0257	0.0007	0.15

FUNCTION	VARIANCE		REDUNDANCY	
	PEU	OS	PEU	OS
1	0.1252	0.2253	0.0503	0.0905
2	0.1241	0.1981	0.0329	0.0525
3	0.1240	0.1923	0.0198	0.0307
5 (CUMULATIVE)	0.6184	1.0000	0.1179	0.1971

TABLE 7.4.2 : CANONICAL ANALYSIS PERCEIVED ENVIRONMENTAL UNCERTAINTY (PEU), ORGANISATIONAL STRUCTURE (OS) AND FINANCIAL PERFORMANCE (FP)

(A) PEU = LOW

N = 19	5 OS, 2 PS AND 3 PARTIAL VARIABLES

FUNCTION	R	R^2	RATIO	F	PR>F
1	0.6392	0.4086	0.5083	0.7247	0.6927
2	0.3748	0.1405	0.8595	0.4086	0.7986

VARIABLES	W	L	CL	CL^2	%
OS					
1 : DOF	0.5094	0.4773	0.3051	0.0931	19.32
2 : LLD	0.0403	0.2699	0.1725	0.0298	6.18
3 : DOC	0.0352	0.2164	0.1383	0.0191	3.96
4 : TMC	0.3248	0.5775	0.3692	0.1363	28.28
5 : CAF	-0.7802	-0.7059	-0.4512	0.2036	42.25
FP					
1 : GR	-0.2089	-0.1344	-0.0859	0.0074	1.86
2 : PR	0.9937	0.9781	0.6252	0.3909	98.14

FUNCTION	VARIANCE		REDUNDANCY	
	OS	FP	OS	FP
1	0.2359	0.4873	0.0964	0.1991
2	0.1845	0.5127	0.0259	0.0720
2 (CUMULATIVE)	0.4204	1.0000	0.1223	0.2712

TABLE 7.4.2 (CONT.) : CANONICAL ANALYSIS PERCEIVED ENVIRONMENTAL UNCERTAINTY (PEU), ORGANISATIONAL STRUCTURE (OS) AND FINANCIAL PERFORMANCE (FP)

(B) PEU = HIGH

N = 9	5 OS, 2 PS AND 3 PARTIAL VARIABLES

FUNCTION	R	R^2	RATIO	F	PR>F
1	1.0000	1.0000	0.0000	-	-
2	1.0000	1.0000	0.0000	-	-

VARIABLES	W	L	CL	CL^2	%
OS					
1 : DOF	0.4527	0.5613	0.5613	0.3151	21.58
2 : LLD	-0.1726	-0.4460	-0.4460	0.1989	13.62
3 : DOC	-0.0691	0.0591	0.0591	0.0035	0.24
4 : TMC	-0.5588	-0.7963	-0.7963	0.6341	43.43
5 : CAF	-0.4105	-0.5554	-0.5554	0.3084	21.12
FP					
1 : GR	0.5907	0.8944	0.8944	0.8000	51.24
2 : PR	0.5406	0.8725	0.8725	0.7612	48.76

FUNCTION	VARIANCE		REDUNDANCY	
	OS	FP	OS	FP
1	0.2920	0.7806	0.2920	0.7806
2	0.0913	0.2194	0.0913	0.2194
2 (CUMULATIVE)	0.3833	1.0000	0.3833	1.0000

TABLE 8.1 : RESEARCH RESULTS ENVIRONMENTAL VOLATILITY (EV/EVFD), PERCEIVED ENVIRONMENTAL UNCERTAINTY (PEU) AND FINANCIAL PERFORMANCE (FP)

(A) EV

MEAN ROCE		EV	
		LOW	HIGH
PEU	LOW	N = 12.00 MEAN = 27.91 STD = 14.15	N = 12.00 MEAN = 28.14 STD = 08.82
	HIGH	N = 12.00 MEAN = 25.93 STD = 17.08	N = 12.00 MEAN = 41.28 STD = 30.50

(B) EVFD

MEAN ROCE		EVFD	
		LOW	HIGH
PEU	LOW	N = 09.00 MEAN = 31.47 STD = 14.17	N = 15.00 MEAN = 25.96 STD = 09.57
	HIGH	N = 17.00 MEAN = 36.98 STD = 28.09	N = 07.00 MEAN = 25.40 STD = 16.14

TABLE 8.2 : CROSSTABULATION ANALYSIS
ENVIRONMENTAL VOLATILITY (EV/EVFD), PERCEIVED ENVIRONMENTAL UNCERTAINTY (PEU) AND FINANCIAL PERFORMANCE (FP)

CHI=CHI-SQUARE PROB PHI=PHI COEFFICIENT		OVERALL N=48	SIZE=LOW N=26	SIZE=HIGH N=22
EV * PEU	CHI	1.000	0.951	1.000*
	PHI	0.000	0.012	0.017
PEU * ROCE	CHI	0.564	0.701*	0.674*
	PHI	-0.083	-0.103	-0.128
PEU * ROCE EV = LOW	CHI	0.682	0.627*	1.000*
	PHI	-0.084	-0.167	-0.089
PEU * ROCE EV = HIGH	CHI	0.682	1.000*	1.000*
	PHI	-0.084	-0.029	-0.168

CHI=CHI-SQUARE PROB PHI=PHI COEFFICIENT		OVERALL N=48	SIZE=LOW N=26	SIZE=HIGH N=22
EVFD * PEU	CHI	0.020	0.109*	0.387*
	PHI	-0.334	-0.370	-0.277
PEU * ROCE	CHI	0.564	0.701*	0.674*
	PHI	-0.083	-0.103	-0.128
PEU * ROCE EVFD = LOW	CHI	1.000*	0.516*	1.000*
	PHI	-0.025	-0.364	0.149
PEU * ROCE EVFD = HIGH	CHI	0.381*	1.000*	0.545*
	PHI	-0.232	-0.179	-0.261

* FISHER'S EXACT 2-TAIL TEST

TABLE 8.3 : ANALYSIS OF VARIANCE ENVIRONMENTAL VOLATILITY (EV/EVFD), PERCEIVED ENVIRONMENTAL UNCERTAINTY (PEU) AND FINANCIAL PERFORMANCE (FP)

(A) EV

ROCE=EV,PEU,EV*PEU		WITHOUT COVARIATES	WITH COVARIATES
OVERALL	N F PR > F	48 1.59 0.2054	45 2.02 0.0868
LTP = 1	N F PR > F	32 2.77 0.0599	30 1.58 0.1967
LTP = 2	N F PR > F	16 0.93 0.4549	15 0.64 0.6993
TOP100 = 1	N F PR > F	29 0.94 0.4362	29 0.78 0.5930
TOP100 = 2	N F PR > F	19 0.96 0.4349	16 2.00 0.1687

(B) EVFD

ROCE=EVFD,PEU,EVFD*PEU		WITHOUT COVARIATES	WITH COVARIATES
OVERALL	N F PR > F	48 1.04 0.3850	45 2.39 0.0468
LTP = 1	N F PR > F	32 1.02 0.3983	30 1.28 0.3048
LTP = 2	N F PR > F	16 2.13 0.1497	15 1.39 0.3232
TOP100 = 1	N F PR > F	29 0.42 0.7433	29 0.77 0.5989
TOP100 = 2	N F PR > F	19 1.02 0.4096	16 2.29 0.1274

TABLE 8.4.1 : CANONICAL ANALYSIS ENVIRONMENTAL VOLATILITY (EV) AND PERCEIVED ENVIRONMENTAL UNCERTAINTY (PEU)

N = 45	1 EV, 8 PEU AND 2 PARTIAL VARIABLES

FUNCTION	R	R^2	RATIO	F	PR>F
1	0.4455	0.1984	0.8016	1.0213	0.4398

VARIABLES	W	L	CL	CL^2	%
EV					
1	1.0000	1.0000	0.4455	0.1984	100.00
PEU					
1 : FIN	0.0182	0.0601	0.0268	0.0007	0.43
2 : COMPET	0.7615	0.6592	0.2937	0.0862	53.34
3 : GOV	0.1768	0.1374	0.0612	0.0037	2.29
4 : SUPP	-0.5543	-0.3818	-0.1701	0.0289	17.88
5 : LAB	0.0956	0.0523	0.0233	0.0005	0.31
6 : ESP	0.0404	0.0066	0.0030	0.0000	0.00
7 : TEQ	-0.2537	-0.1870	-0.0833	0.0069	4.27
8 : CUST	0.4979	0.4183	0.1863	0.0347	21.47

FUNCTION	VARIANCE		REDUNDANCY	
	EV	PEU	EV	PEU
1	1.0000	0.1019	0.1984	0.0202

TABLE 8.4.2 : CANONICAL ANALYSIS ENVIRONMENTAL VOLATILITY (EV), PERCEIVED ENVIRONMENTAL UNCERTAINTY (PEU) AND FINANCIAL PERFORMANCE (FP)

(A) EV = LOW

N = 15	2 PS, 8 PEU AND 3 PARTIAL VARIABLES

FUNCTION	R	R^2	RATIO	F	PR>F
1	0.9004	0.8109	0.0718	0.6827	0.7409
2	0.7875	0.6202	0.3798	0.6998	0.6870

VARIABLES	W	L	CL	CL^2	%
PEU					
1 : FIN	0.3653	0.2313	0.2083	0.0434	7.87
2 : COMPET	0.0007	-0.1474	-0.1327	0.0176	3.19
3 : GOV	0.2959	0.2560	0.2305	0.0531	9.63
4 : SUPP	-0.6686	-0.3266	-0.2941	0.0865	15.69
5 : LAB	0.0403	0.2573	0.2317	0.0537	9.74
6 : ESP	0.3649	0.2572	0.2316	0.0536	9.72
7 : TEQ	0.2677	0.1123	0.1011	0.0102	1.85
8 : CUST	0.9082	0.5364	0.4831	0.2333	42.31
FP					
1 : GR	1.0128	0.3415	0.3075	0.0946	26.67
2 : PR	-1.1550	-0.5663	-0.5100	0.2601	73.33

FUNCTION	VARIANCE		REDUNDANCY	
	EV	PEU	EV	PEU
1	0.0850	0.2187	0.0689	0.1773
2	0.0823	0.7813	0.0511	0.4846
2 (CUMULATIVE)	0.1674	1.0000	0.1200	0.6619

TABLE 8.4.2 (CONT.) : CANONICAL ANALYSIS ENVIRONMENTAL VOLATILITY (EV), PERCEIVED ENVIRONMENTAL UNCERTAINTY (PEU) AND FINANCIAL PERFORMANCE (FP)

(B) EV = HIGH

N = 13	2 FS, 8 PEU AND 3 PARTIAL VARIABLES

FUNCTION	R	R^2	RATIO	F	PR>F
1	1.0000	1.0000	0.0000	-	-
2	0.9591	0.9200	0.0800	1.6419	0.5393

VARIABLES	W	L	CL	CL^2	%
PEU					
1 : FIN	0.0147	-0.1810	-0.1810	0.0328	5.41
2 : COMPET	-0.5825	-0.2077	-0.2077	0.0432	7.12
3 : GOV	0.2949	0.0770	0.0770	0.0059	0.97
4 : SUPP	-1.0087	-0.6216	-0.6216	0.3864	63.68
5 : LAB	0.1673	0.2101	0.2101	0.0442	7.28
6 : ESP	0.6446	-0.1389	-0.1389	0.0193	3.18
7 : TEQ	-0.2163	-0.1887	-0.1887	0.0356	5.87
8 : CUST	-1.2366	-0.1985	-0.1985	0.0394	6.49
FP					
1 : GR	0.4630	0.3884	0.3884	0.1509	16.09
2 : PR	0.9245	0.8872	0.8872	0.7871	83.91

FUNCTION	VARIANCE		REDUNDANCY	
	EV	PEU	EV	PEU
1	0.0758	0.4690	0.0758	0.4690
2	0.0518	0.5310	0.0476	0.4385
2 (CUMULATIVE)	0.1276	1.0000	0.1235	0.9575

TABLE 9.1 : RESEARCH RESULTS
ORGANISATIONAL STRUCTURE (OS) AND PLANNING SYSTEM (PS)

MEAN PS	OS	
	LOW N = 24	HIGH N = 24
OVERALL	37.00	34.13
SIZE - Low - High	 35.93 37.76	 34.95 32.49
TECH - Low - High	 36.65 37.25	 33.90 34.52
AGE - Low - High	 36.30 37.59	 33.74 34.59

TABLE 9.2 : CROSSTABULATION ANALYSIS
ORGANISATIONAL STRUCTURE (OS) AND PLANNING SYSTEM (PS)

CHI=CHI-SQUARE PROB PHI=PHI COEFFICIENT		OVERALL N=48	SIZE=LOW N=26	SIZE=HIGH N=22
OS * PS	CHI	0.001	0.248*	0.001*
	PHI	-0.459	-0.256	-0.756

CHI=CHI-SQUARE PROB PHI=PHI COEFFICIENT		OVERALL N=48	TECH=LOW N=25	TECH=HIGH N=23
OS * PS	CHI	0.001	0.122*	0.010*
	PHI	-0.459	-0.333	-0.537

CHI=CHI-SQUARE PROB PHI=PHI COEFFICIENT		OVERALL N=48	AGE=LOW N=24	AGE=HIGH N=24
OS * PS	CHI	0.001	0.408*	0.002*
	PHI	-0.459	-0.240	-0.669

* FISHER'S EXACT 2-TAIL TEST

TABLE 9.3 : CANONICAL ANALYSIS ORGANISATIONAL STRUCTURE (OS) AND PLANNING SYSTEM (PS)

N = 45	13 PS, 5 OS AND 3 PARTIAL VARIABLES

FUNCTION	R	R^2	RATIO	F	PR>F
1	0.8364	0.6996	0.0912	1.1917	0.2041
2	0.6445	0.4153	0.3035	0.7433	0.8722
3	0.5616	0.3154	0.5191	0.5840	0.9563

VARIABLES	W	L	CL	CL^2	%
PS					
1 : SR	0.1080	0.0953	0.0797	0.0063	0.91
2 : CR	0.2540	0.3161	0.2644	0.0699	10.10
3 : AA	0.0741	0.0368	0.0308	0.0009	0.13
4 : FC	-0.3688	-0.3361	-0.2811	0.0790	11.41
5 : PA	0.0147	0.0474	0.0396	0.0016	0.23
6 : IA	0.3742	0.4156	0.3476	0.1208	17.45
7 : SEA	0.4892	0.4074	0.3408	0.1161	16.77
8 : RA	-0.4329	-0.3905	-0.3266	0.1067	15.41
9 : IE	-0.1365	-0.0528	-0.0441	0.0019	0.29
10 : GEA	0.0504	-0.0390	-0.0326	0.0011	0.16
11 : PR	0.3491	0.3595	0.3007	0.0904	13.06
12 : PO	0.3379	0.3722	0.3113	0.0969	14.00
13 : TR	-0.0565	-0.0291	-0.0244	0.0006	0.09
OS					
1 : DOF	0.5965	0.6120	0.5119	0.2620	34.41
2 : LLD	0.4068	0.4688	0.3921	0.1537	20.19
3 : DOC	-0.3626	-0.4602	-0.3849	0.1482	19.47
4 : TMC	-0.5054	-0.4985	-0.4169	0.1738	22.83
5 : CAF	0.1387	0.1837	0.1537	0.0236	03.10

FUNCTION	VARIANCE		REDUNDANCY	
	PS	OS	PS	OS
1	0.2177	0.0761	0.1523	0.0533
2	0.2051	0.0709	0.0852	0.0295
3	0.1771	0.0783	0.0559	0.0247
5 (CUMULATIVE)	1.0000	0.3741	0.3453	0.1264

APPENDIX VII
PRIMARY AND SECONDARY OBJECTIVES

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3. OS & PS

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2. PEU, OS & ROCE
3. EV, PEU & ROCE
4. EVFD, PEU & ROCE

TABLE 10 : SUMMARY OF RESEARCH RESULTS

1. IMPACT OF CONTINUOUS CONTROL VARIABLES

	SIZE	CAPITAL INTENSITY	AGE
EV (R)	-0.16	-0.16	-0.18
EVFD (R)	0.02	0.28	-0.09
PEU (RHO)	-0.30 SIG	-0.21	-0.17
OS (RHO)	-0.33 SIG	-0.02	-0.14
PS (RHO)	0.11	0.02	0.15
ROCE (R)	-0.25	-0.30 SIG	-0.28 SIG

2. IMPACT OF CATEGORICAL CONTROL VARIABLES

PR > F	SECTOR	DIVERSITY	LTP	TOP100
EV	0.46	0.07	0.30	0.08
EVFD	0.13	0.46	0.80	0.91
PEU	0.58	0.40	0.05	0.08
OS	0.96	0.85	0.00	0.01
PS	0.47	0.40	0.12	0.43
ROCE	0.42	0.93	0.00	0.01

3. BASIC RESEARCH RELATIONSHIPS

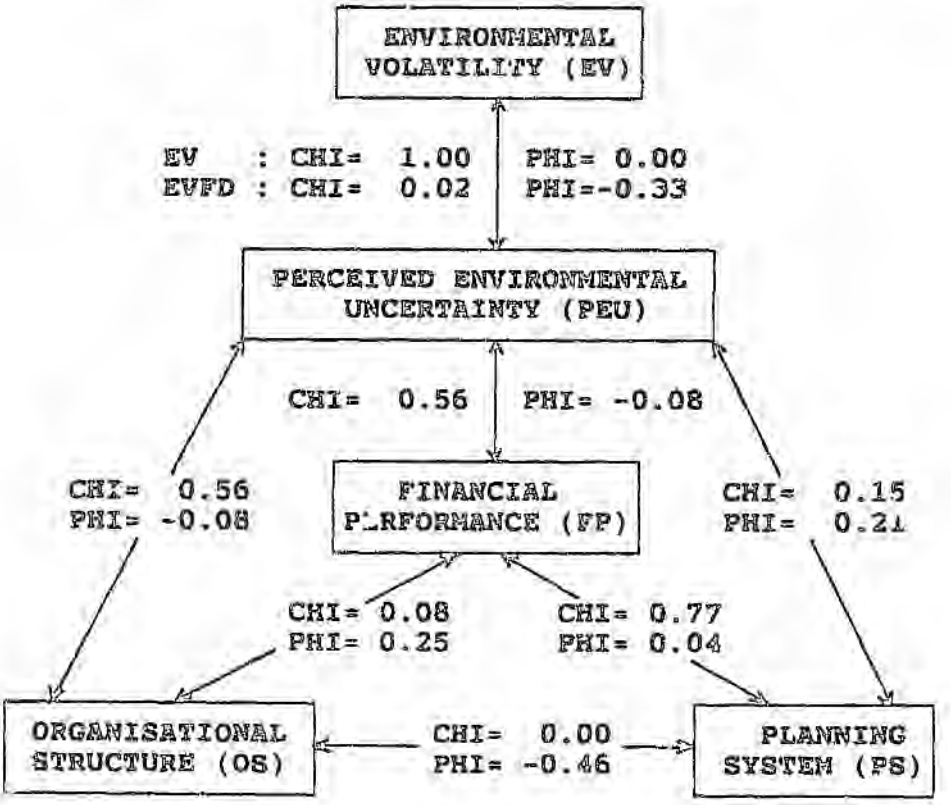


TABLE 10 (CONT.): SUMMARY OF RESEARCH RESULTS

4. CONTINGENCY RELATIONSHIPS - HIGH/LOW

CROSS-TABULATION ANALYSIS	CHI/FET*	PHI	CHI/FET*	PHI
	LOW PEU		HIGH PEU	
PS & ROCE	0.72	-0.07	0.42*	0.19
OS & ROCE	0.43	0.16	0.22	0.33
	LOW EV/EVFD		HIGH EV/EVFD	
PEU & ROCE (EV)	0.68	-0.08	0.68	-0.08
PEU & ROCE (EVFD)	1.00	-0.03	0.38	-0.23
CANONICAL ANALYSIS	PR > F	REDUN-DANCY	PR > F	REDUN-DANCY
	LOW PEU		HIGH PEU	
PS & FP	0.57	0.52	-	0.48
OS & FP	0.69	0.20	-	0.78
	LOW EV/EVFD		HIGH EV/EVFD	
PEU & FP (EV)	0.74	0.18	-	0.47
PEU & FP (EVFD)	0.42	0.68	0.91	0.41

5. CONTINGENCY RELATIONSHIPS - INTERACTION EFFECTS

ANALYSIS OF VARIANCE PR > F	WITHOUT COVARIATES	WITH COVARIATES
PEU * PS = ROCE	0.1251	0.8256
PEU * OS = ROCE	0.9760	0.7505
EV * PEU = ROCE	0.1830	0.1224
EVFD * PEU = ROCE	0.6189	0.5849

TABLE 11 : PRIMARY OBJECTIVE
COMPARISON OF RESULTS

Relationships N	Detail 48	Abridged 33	Combined 81
(A) PEU & OS CHI/FET*	0.56	0.21	0.30
PHI	-0.08	-0.22	-0.11
(B) PEU & PS CHI/FET*	0.15	0.60	0.74
PHI	0.21	-0.09	-0.04
(C) OS & PS CHI/FET*	0.00	0.39	0.58
PHI	-0.46	0.15	-0.06

TABLE 12 : SECONDARY OBJECTIVE COMPARISON OF RESULTS

1. PEU, PS & ROCE

Relationships N	Detail 48	Abridged 33	Combined 81
PS & ROCE			
1. PEU = Low			
CHI/FET*	0.72	0.62*	0.33
PHI	-0.07	-0.20	-0.15
2. PEU = High			
CHI/FET*	0.42*	0.31*	0.89
PHI	0.19	-0.32	0.02
Interaction Effects			
1. Without Covariates			
PR > F	0.1251	0.4532	0.7544
2. With Covariates			
PR > F	0.8256	0.2674	0.7506

2. PEU, OS & ROCE

Relationships N	Detail 48	Abridged 33	Combined 81
OS & ROCE			
1. PEU = Low			
CHI/FET*	0.43	1.00*	0.79
PHI	0.16	0.04	0.04
2. PEU = High			
CHI/FET*	0.22	1.00*	0.34
PHI	0.33	0.13	0.15
Interaction Effects			
1. Without Covariates			
PR > F	0.9760	0.5169	0.9514
2. With Covariates			
PR > F	0.7505	0.3055	0.5297

3. EV, PEU & ROCE

Relationships N	Detail 48	Abridged 33	Combined 81
PEU & ROCE			
1. EV = Low			
CHI/FET*	0.68	0.35*	0.41
PHI	-0.08	-0.29	-0.13
2. EV = High			
CHI/FET*	0.68	0.32*	0.34
PHI	-0.08	-0.38	-0.15
Interaction Effects			
1. Without Covariates			
PR > F	0.1830	0.5466	0.4150
2. With Covariates			
PR > F	0.1224	0.4318	0.2907

4. EVFD, PEU & ROCE

Relationships N	Detail 48	Abridged 33	Combined 81
PEU & ROCE			
1. EVFD = Low			
CHI/FET*	1.00	0.64*	0.16
PHI	-0.03	-0.18	-0.21
2. EVFD = High			
CHI/FET*	0.38	0.13*	0.44
PHI	-0.23	-0.50	-0.12
Interaction Effects			
1. Without Covariates			
PR > F	0.6189	0.2281	0.8367
2. With Covariates			
PR > F	0.5849	0.0866	0.2608

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