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ELEMENTS OF STRATEGIC MANAGEMENT AND INNOVATION:

**"An Empirical Investigation Of The Elements Linking
Strategy-Making To Those Elements Needed to Stimulate
Innovation Within Scottish Firms ".**

By

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Business Administration (MBA)

A Thesis submitted as partial fulfilment

for the Ph.D. Degree to:

The Department of Management Studies

University of Glasgow

Scotland, United Kingdom

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DEDICATION

TO:

My Past- Ida, Edna, Willis & Thelma

My Present- Wife Elizabeth & Friends

The Future of- Kay, Douglas, Errol,

Mia, Lorre, Penny,

and Jamie

And Theirs- Timothy & Trevor

(ii)

DECLARATIONS

I hereby declare that the whole of this work is the result of my own research, unless otherwise noted, and all other sources are indicated in the text, footnotes and bibliography accordingly.

I also declare that no portion of this work referred to in this thesis has been submitted elsewhere in support of an application for another degree, award or qualification of this or any other university or any other institution of higher learning.

I further declare that this is not the first major piece of research conducted by me as the author; however all others were not used for this academic purpose as a partial requirement for the Doctor of Philosophy Degree.

Errol Duane Alexander

(iii)

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A very pleasant part of this thesis is to acknowledge the help of others. This task is not difficult in comparison with the other aspects of my research: but it is salutarily humbling to realise one's debt to others in the context of what to many may otherwise appear to be a sole effort.

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I am sure if it not had been for this collective effort, there might have been even many more blemishes and omissions on my part. However, no other individual should be held responsible for any error of analysis, faulty conclusions, or misstatements of facts which may be discovered. These are mine alone.

Glasgow, Scotland 1989

E. D. A.

A B S T R A C T

This investigation has three purposes which are described in the following: The first was to explore the concept of strategy-making as a major discipline within the field of strategic management. The enquiry describes how the analytical concepts, models and techniques of strategy-making were developed and assesses whether or not the essential elements of this discipline can be used to stimulate innovation.

In the literature review phase, this investigation reviewed some of the main arguments on strategy-making that have been put forward depending on three factors: whether or not they were advocates of a broad or a narrow goal-setting process; whether they believed that strategy is best formed deliberately or by a pattern of incremental decisions; and whether the approaches for strategy formulation were determined as being either rational-analytical, intuitive-emotional or behavioural-political. The enquiry concluded with a summary of the lessons gained from the ancient and military concepts of strategy and the development of a Table charting the evolutionary changes of business strategy into the field of strategic management during the past ninety years.

The second purpose of the study was to conduct an empirical investigation among 190 responding firms in Scotland as to how they stimulate innovation. The sample is divided into two groups: those users of a formal strategy to innovate and non-users. By this grouping, the investigation compares the elements of innovation used by both groups within the domestic firms of Scotland, and from international firms of North America, and

Other Overseas firms as well as those companies from the other parts of the United Kingdom .

The third purpose was to link the essential elements found in strategy-making with 83 elements used by managers in Scotland which stimulate innovation. To this purpose, a typology of seven technological strategies was developed and an explanation as to how they differ by their strategic focus.

Overall, the investigation was designed to fill a gap in the literature linking the elements of strategy-making to the elements of innovation. It provides a catalogue of empirical evidence of those factors used by managers within Scotland and analyses a band of small, medium and large firms, creating a representative and stratified sample rather than focussing on one firm or a few industries. In addition to a ranking of 36 firms found to be the most innovative, it provides a set of implications for further research, a glossary of terms, and a series of hypothesises.

THE GUIDE TO HOW THE STUDY IS ORGANISED

In addition to the Table of Contents outlining each chapter and its paragraphs, the material in the study is organised in the following six ways:

1. There are two distinct and separate sections: the enquiry into the field of strategic management is followed by primary research Data. They can be read separately or in total.

2. Each chapter has an introduction and ends with a summary. They highlight the main points and purpose of each chapter with implications arising as a subheading in the summary section.

3. A glossary of key terms is provided in the appendices defining certain words and phrases as they are used in the study.

4. Key tables are presented within the text and are numbered sequentially throughout the study.

5. All diagrams, figures, models, and illustrations are numbered according to the chapter in which it first appeared.

6. All exhibits, in the appendices, are numbered in the order that they are first mentioned.

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CHAPTER ONE

INTRODUCTION

1.0 OVERVIEW

This investigation proceeds in the following sequence:

Firstly, it provides an enquiry into the field of strategic management linking strategy-making to those elements needed to stimulate innovation. This was done in the form of a literature review.

Secondly, following a review of the literature, this study analyses a number of factors linking strategy to innovation based on a general survey of 396 firms in Scotland. The survey used a postal questionnaire constructed around a field of 32 multi-tiered questions. Its purpose was to probe 83 specific elements which were reputed to stimulate innovation within a firm.

Thirdly, this study tests the definitions of informal and formal strategies for the stimulation of innovation as developed by Baker (1975:147). For example, the term "informal" is to be used where there is no clear hierarchy (organisational structure) to stimulate innovation. This occurs when the authority and the responsibility to innovate are based more on short term goals rather than a strategy. A firm would have few, if any, written rules or procedures as to how it would develop an innovation. In short, the firm lacks a history as to how it would handle innovation.

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Whilst in contrast, the term "formal" is to be used when the firm has a distinct hierarchy of responsibility to innovate beginning with a strategic mission statement to having organisational development plans coordinated by special programmes. An employee's limits of authority to fund, develop, and test innovation are very clearly laid down. There is an exhaustive set of written "standard operating procedures" (SOP's) based on its previous experience covering most eventualities arising from a firm's or its employees' attempts to innovate.

Fourthly, the responses were totaled from a pivotal question being asked whether or not they used a formal strategy to stimulate innovation. From the 190 responding firms, 103 of them, who indicated they used a formal strategy for innovation, were classified as "users". The remaining 87, who did not use a formal strategy for innovation, were called "non-users" for the purpose of this study.

Based upon these responses, the sample was divided into two main groups.

Group 1 -Those who did not use a formal strategy = 87

Group 2 -Those who did use a formal strategy = 103

Fifthly, from this dichotomous grouping, firms were re-classified based on their responses to nine different elements. After which, the respondents' overall receptivity for being innovative were to be ranked statistically so that further comparisons could be made. These comparisons would reveal the pertinent differences between these groups of respondents and contrasted a number of general characteristics by separating them into different types of innovating firms.

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Then, a further grouping of respondents was done based on the technological-marketing strategy, strategic focus and the organisational structure being used by each firm. Using these three characteristics, a typology of seven relatively distinct organisational forms was developed. This typology was constructed using a series of technological strategies, the type of strategic focus being used by a firm and its structure (i.e. Pioneer, Follower, Imitator, Traditionalist, Dependent, Fatalist and Opportunist).

Sixth, based on a further analysis of this survey, a series of interviews were held with some of the respondents and a follow-up attitudinal survey with 12 questions was posted to 130 of the respondents to clarify the findings of the survey.

Finally, after a discussion of the general, specific, and group elements as developed from the analysis of the field work, this study ends with conclusions and implications for further research.

1.1 BACKGROUND OF THE STUDY

Attempts to link innovation, and technological strategies are neither new nor unusual: they had been made in theory and are supported by empirical evidence in several ways.

First, on a macro level, Posner's (1971) technological gap hypothesis and Vernon's (1966) product life cycle provided the conceptual foundation to use the field of strategy as an explanatory factor of how a firm could become more innovative. Empirical work (Hufbauer 1970; Hirsch, 1965; Freeman, 1963; and Wells, 1969) has lent support to these neo-technological theories.

Second, on a micro-level, innovativeness, business strategy, and technological superiority are widely regarded as prerequisites

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for corporate success. Examples are studies by Pinney, 1971; Quirm, 1988; and Tushman, 1989 to name a few. However, it is a lack of attention toward the management processes required to stimulate innovation which formed a gap in the literature (Miles and Snow, 1978:260).

Third, other evidence emphasising the importance of innovation - creating new products and services- as a determinant of a firm's growth and survival has been provided by Peters, 1988; Waterman, 1988; and Kanter, 1985. This body of literature supports the need for more research to address the gap between the managerial process of innovation and strategy.

The literature review starts with the topic of strategy. First of all, it must be stated that business strategy is a relatively new and complex business concept. Even in its brief period as a topic for study when compared to other disciplines, the theories of choice and formulation of the decision-making process for strategy have perhaps received the greatest attention to date by scholars in the field of management. Indeed, at the expense of other topics, Schroder et al. (1986) who reviewed the literature on innovation declared that most models of innovation appear to rely uncritically upon prescriptive process models. He argued that if the knowledge of this field is to be advanced then alternative methods must be pursued.

Further, setting aside the fact that the first academic article on using the elements of strategy to stimulate innovation was by Lawrence (1954), there has been little exploration of innovation and strategy as a joint topic.

Some thirty -five years later and the field still lacks definition and clarity about how strategy is to be used with other variables, such as structure, technology, process, and uncertainty. In fact, the most definitive explanation of

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strategy as a unifying element within a business was from Ansoff (1961), who stated,

"Strategy is a set of guidelines which consist of a firm's product-market position, the directions in which the firm seeks to grow and change, the competitive tools it will employ, the means by which it will employ its resources, the strengths which a firm will use to exploit, and conversely its weaknesses it will seek to avoid. All in all these make up strategy as the concept of the firm's business which provides an unifying theme for all of its activities".

Building upon this definition of Ansoff, Wilson (1966) proposed that a business strategy (on a corporate, competitive and functional level) should seek to include the principles of the product life cycle as the *raison d'etre* in its ability to innovate. He argues that it is not until a relationship between the strategy and a product life cycle is realised can innovation take place. It was in this secular way that the ability to innovate- to create new knowledge/ products for solving existing problems as a competitive edge- was discussed as a strategic theory.

While there have been many new theories since to explain why innovation should occupy a central stage in all diverse and eclectic types of strategies (Calvert, 1981), a scant amount of them have dealt empirically with how strategy, technology, and innovation were linked. One of the main reasons that many researchers tend to avoid this linkage is because the innovation process is considered by many theoreticians (Drucker, 1980; Kanter, 1983) to be one of the most complex of the organisational process. This is also the reason why this thesis will not offer any stylized representations of innovation or strategy in an attempt to disguise the complexity of this linkage.

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Even though many researchers have attempted to do so (Littler, 1988; Peters, 1989) and some have succeeded, it shall not be attempted here. For example, Clark and Staunton (1989) believe that innovation is a focalised process. They theorise that innovation in the 1990's will take on all the dimensions and benefits of the economies of scale as an operating concept.

On the other hand, Nadler (1980) suggests that there are only four components (the task, individuals, organisational arrangements, and the informal organisation) for innovation and when they are related to each other, harmoniously, then change and innovation will occur. Little attention is given to the role of strategy in making innovation happen.

1.2 AIMS

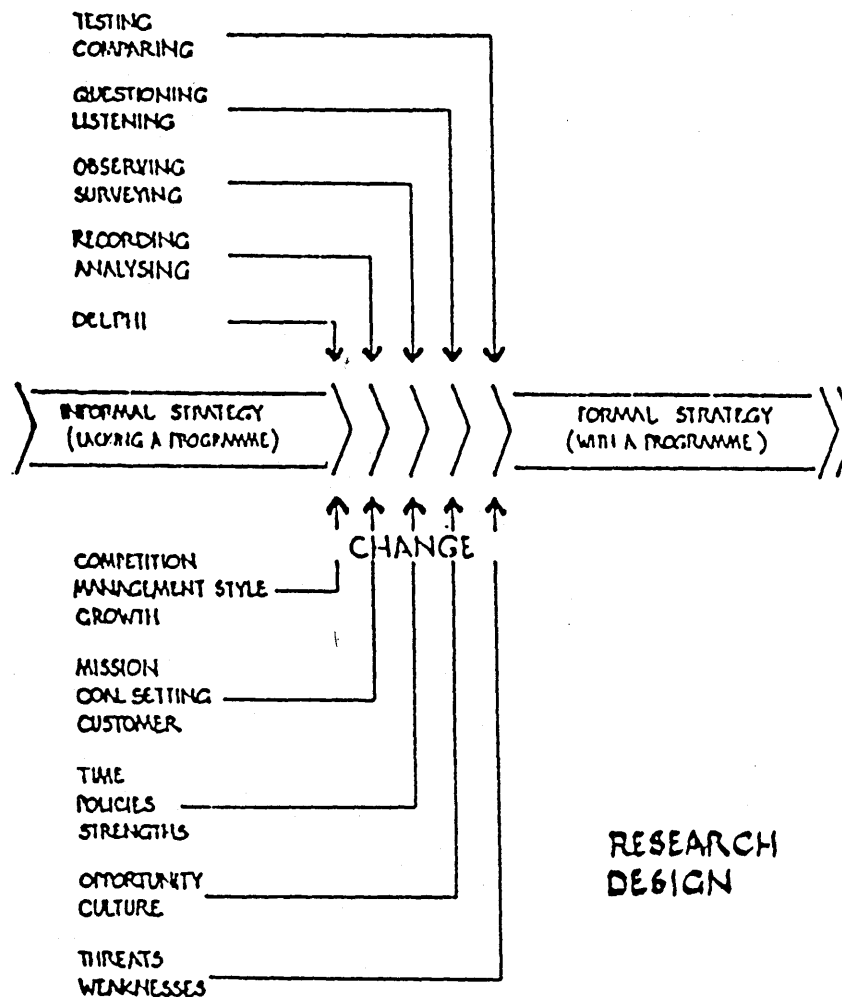
With the above background in mind, the general aim of this research is to investigate the relationship between the elements of strategy (being informally or formally linked) and the stimulation of innovation.

This investigation will attempt to measure and compare the non-users and users of a strategy to innovate. An effort will be made assess the relationship between management style, mission statement, policies, culture, and the strengths and weaknesses of each firm using a formal strategy. These firms will, in turn, be compared to firms classified as non-users.

The foremost method of assessing this data will be a questionnaire with five categories designed to capture the essential strategic elements needed in a formal strategy and those elements identified by well-known innovative firms as key factors needed for successful innovation.

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To these aims, the overall research design conceptually is shown below in Figure 1.1.



Specifically, this study sets out to investigate first what were the enabling factors for innovation that brought about change, and second, whether firms using a formal strategy could be distinguished from those firms using an informal strategy to stimulate innovation. To assess the feasibility of this study, five primary questions need to be answered to illustrate the positioning of this research:

- 1) Why should one be concerned with the elements affecting the use of strategic planning for innovation?

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- 2) What are the differences between a formal strategy for innovation and a strategy of informality which a firm may select?
- 3) Are there any common or individual characteristics which can be used to group a set of companies? And would they include the impact of the parent firm's nationality, type of strategies used, and its receptivity for innovation?
- 4) Why should this research be done in Scotland and what empirical comparisons can be made here?
- 5) Why were certain firms excluded (those with less than 51 employees and an operating age of less than seven years) from this study?

1.2.1 Why Should Strategic Planning For Innovation be Studied?

Considering these five questions in turn, firstly concerning the need to investigate the strategic elements for innovation, it should be noted that there was empirical evidence which demonstrated a clear association between firms using a strategy for innovation, and their overall performance.

In fact, the users of strategies for innovation achieved better performance records than their non-innovative competitors who avoided using a similar strategy (Kanter, 1984; Burgelman, 1984; Roberts and Berry, 1985). This is supported by historic research which indicated that innovative firms had measures of performance which yielded an average return on equity of at least 22.9 percent and never less than 15 percent for any ten year period since 1974 (Loomis, 1984).

Other measurements differ in sales growth and the return of equity ratios. For example, firms with innovative strategies have

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annual sales growth which averaged over 16.6 percent per year with a better than 38 percent return on total capital. Conversely, non-innovative firms experienced a lower sales growth (12.6%), up to less than 12 percent return on total capital and a return on equity of less than 14.5 percent in the same periods.

Besides being users of strategies, other differences were revealed (Sherman, 1984) as factors that made them important and worthy of further study. For example, innovating firms did three things much better than non-innovative firms:

First, they seemed to excel at predicting future product/market definitions because they were keen observers of the marketplace and had a superior understanding of their own strengths and weaknesses. They were able to use knowledge of the market place and customers needs as the measure to what products they should innovate, for whom and at what profit margin.

Second, they as a group seemed to have a better-designed business system (identified by their innovative operating concepts, flexible organisational structure, and entrepreneurial employee base that enable them to out perform competitors in producing and delivering their products/services).

And third, they seemed, intuitively, to manage their overall business systems better. Perhaps by the actual practice of innovation, they learnt to understand that innovation is a complex and demanding task that included not only the management of the interrelationship within the organisation, but an understanding of the external relationships between their suppliers, customers, and competitors.

In addition to the three factors stated above, the continuously successful innovators - IBM, Matsushita, Glaxo, 3M, General Electric, Nestle, Shell and Boeing, for instance- out

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perform their corporate rivals perennially when it came to introducing commercial innovations.

A case in point is 3M Corporation when utilising a formal strategy for innovation, generated over £800 million (1988) from 390 new products developed over the past four years. These new and improved products of 3M represented about 25 percent of its revenue.

Other research studies attempting to measure objectively the anticipated connection between formal strategic planning and corporate performance have found mixed results. For example, studies by Ansoff, Thune, and House, Herold, Burt, Eastlack and Macdonald, Wood and La Forge, Karger and Malik, Miller and Friesen, and Welch found that corporations that engaged in strategic planning outperformed those that did not.

On the other hand, studies by Rue and Fulmer, Leontiades, and Tezel, Fredicksen and Mitchell, as well as by Lindsay, Boulton, Franklin, and Freeman found no pay-off from strategic planning. Lamb (1983), however, tried to explain these contradictory findings by using industrial variations. He found a positive association between strategic planning and performance, whether it was in focused in specific areas such as budgeting, marketing or new products or in an overall corporate strategy. The key, he stated, "was separating the less-evolved planning processing from those using and knowing the true principles of strategic management".

Based on the above literature, a better understanding of the principles and history of strategic management was required and the types of strategies arising from its principles. But exactly what were these differences when it came to an informal strategy?

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1.2.2 What Are The Differences Between Strategies ?

In contrast to those successful firms with a formal strategy for innovation, secondly, there should be an effort to understand the differences between them and non-users of a formal strategy to innovate.

This is important because there was evidence which showed that a large number of companies do not use a formal programme to stimulate innovation, and yet are considered innovative (Peterson and Berger, 1971; Von Hippel, 1979; Drucker, 1985). Firms headed by entrepreneurs and scientists which randomly explore the realms of new product development fell into this area. They are considered to be innovative, generally, without a formal plan.

The literature, also, abounds with examples of informally-created innovations occurring within it. They can be classified into four different types of non-users (innovating without a plan), and that each of these dimensions has a core of ideas to explain how it occurred other than using a plan.

The first dimension is described here as the "serendipity factor" and offers examples of accidental discovery ranging from ivory soap as the soap that floated due to an employee leaving the mixing of the batter on too long, to the unplanned discovery of a cure for rubber.

The second dimension is described here as the "random events by individuals" and is based on the school of thought that innovation can never be planned. The belief is that innovation happens by circumstances, not by demand, a school of thought practicing that the informal strategy is best. Some core ideas excerpted from this concept of informality include:

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that inventors are the only true innovators and all others are followers, emulating their achievements;

innovation can not be created upon demand, regardless of methods used;

innovation disrupts and should be avoided at any cost; and

when innovation does occur, it is the sole creative act of the individual as a genius. They argue that this is the true force for innovation, and it can not be marshalled.

The third dimension is that " the size of an enterprise determines its ability to innovate" . It offers a host of theories. Most of its theorists seek to explain how the interplay between environment and market conduct overrides the value of a formal planning system for innovation.

Such proponents, also, believe that the rise of innovation depended more on the size of an enterprise, and the type of industry a company competes in rather than employing a formal strategy.

This was evidenced by two major findings in the literature: (1) Haspeslagh (1988), who reported that about 65 percent of the USA top 500 firms used a formal programme for innovation. This study updates a similar survey conducted in 1978 in which only about 36 percent reported such a programme. In the European context; (2) Andrews and Pettigrew (1986) reports that only about 21 percent of the 200 firms surveyed there had a formal plan for innovation.

Both of these studies broadly hinted that smaller enterprises (less than 25 employees) or certain industries (ship-building, agricultural, and job-shopping in the metal forming

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sector) accounted for most process innovations but without a formal strategy. These are often used as examples for the types of firms which lacked formal planning systems or even avoided the regular use of one. They preferred to use other stimulants for innovation, such as having a flat organisation, being close to the customer, or being a bold risk-taker. These practices were mostly clustered among these smaller firms (51 to 251 employees), regardless of the parent company's nationality of ownership or age.

These studies bring up the issue of the smaller versus the bigger firm in which is more innovative. The issue of the smaller firm was explored by local studies such as the one conducted by Peat, Marwick & McLintock (1989) in Scotland which indicated that less than 13 percent of the smaller firms had any type of expansion strategy for new markets or products.

Other research also found, even in relative terms, that small and medium-sized firms spend considerably less on new product development than larger firms and often fail to conduct any type of market research with customers on what innovations they need (Hooley and West, 1984).

Thus, a better understanding of the factors affecting the field of strategic management and formal programmes for innovation, particularly with a regard to smaller firms and medium sized companies, is required.

The fourth dimension of non-users is described here as "the lure of the market place" where core ideas are created by the interaction between competition, market structure, behaviour of the firm and the risk-uncertainty of the firm's environment. These are mostly external stimulators for innovation within a firm.

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This school of management practiced the belief that the combination of these forces become the driving force for innovation and can only be stimulated by the reward of greater profits. To support their theories, this school sought to explain how innovations are most likely to be discovered in the sunset period of an industry (excess resources) or in the sunrise period of an emerging industry (scarcity of resources); and only then, will market forces midwife an innovation into existence.

The literature shows how a substantial number of firms have chosen to ignore a formal strategy which could improve their abilities to be more innovative, and have instead selected other stimulants to create innovation. These include the practices of giving financial incentives for suggestions that innovate, intrapreneurship schemes (stock options, ownership, promotions, etc.) to create product champions; and the purchase of patents and acquisitions.

1.2.3 How Should The Companies be Grouped?

It would be helpful to group the companies by common characteristics where possible and thirdly this research sets out to discover the different elements which determined whether or not a firm belonged to users of a formal programme for innovation.

The descriptions for these nine major elements were taken from the research of previous studies (Andrews, 1971; SAPPHO, 1972; Freeman, 1974; Andrews and Pettigrew, 1986). This body of research denoted that the first element is a complete formal plan in which there are three types of overlapping strategies within it (one each for corporate, competitive and functional activities).

There would also be: (2) a budget to finance innovation; (3) a scanning and forecasting system; (4) a strategic focus geared to the key environmental elements (buyers/markets) where an

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innovation could best be marketed; (5) a method in how technological advances are evaluated and developed; (6) a structure opened to the investigating and assisting of innovation; and (7) the use of a formal programme (policy) for innovation which operates by having a number of procedures for stimulating and nurturing innovative employees, and a name (e. g. Pathfinder being the name of the programme used at 3M Corporation).

Two other key elements were: (8) whether the firms offered training programmes in corporate entrepreneurship; and (9) the use of a mission statement which sets a specific amount of business to be generated by either new products or new markets. Firms with five or more of these nine elements were accepted as "users" of a formal strategy for innovation; others were re-classified.

For contrast, as part of the research logic used in this study, firms employing an informal strategy were called "non-users" when less than five of these nine elements were present; irrespective of how the firm evaluated itself.

The problems of determining these nine characteristics and making a comparison of variables were addressed by using interval, nominal, and ordinal scaling methods. The questionnaire was designed so it could be re-coded for computer manipulation in order that the score of the various scales could be treated numerically.

This re-coding procedure was useful and enabled the computer to distinguish between four types of characteristics: a general element where it contributed to all the items on the scale; a group element which contributed to more than one group, but not to all items; and a specific element which contributed to only one item. Elements contributing to more than one item, and within more than one group were termed common. From all of these elements, correlations were made between all possible items scored.

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Further, the attempt to make comparisons between the respondents can be justified on three grounds. One was conceptual in that any comparative and empirical study refines our understanding of issues (Wind and Douglas, 1982). The second point was the test of managerial usefulness. This refers to the uncovering of any actionable similarities and differences which illustrated how a technique used by one respondent's firm in stimulating innovation amongst its workforce was assessed as being useful and transferrable for use by other managers.

The third point was how managers in Scotland differed on the topic of innovation. Their comments might not only be of interest to future researchers, but also of use by companies attempting to identify new business opportunities in Scotland.

1.2.4 Why Was Scotland Selected ?

Fourthly, the question whether Scotland contained enough diversity to be suitable as the survey site was a critical one.

In selecting Scotland over other developed economies, the concerns about the diversity of survey site were reviewed. However, secondary research indicated that Scotland is a fertile survey area with 189 North American manufacturing firms and 200 foreign ones operating within its borders (SDA, October, 1987). Plus, when Scottish-based firms were compared with firms based in France, Germany, Japan, and other successful economies, an unique feature of the Scottish economy stood out,

'not anywhere else is there such a mixture of firms by different nationalities, and size to the degree that a third of Scotland's manufacturing employment is directly controlled by overseas firms... and for contrast are there so many home firms which are entrepreneurial deficient-" doing the same old things"- yet Scotland is a host country to the subsidiaries to over 130 worldwide technological leaders, all existing within 60 miles of the same business community which makes Scotland an unique

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economy' (Commission on Scottish Economy; Alexander 1989:142)

The combination of these points rendered Scotland as a very suitable site for empirical research related to innovation.

1.2.5 Why Were Certain Firms Excluded ?

Finally, the question about what minimum age that an enterprise should be included in the sample frame was considered.

Research indicated the best rationale was not to post questionnaires to firms with less than seven years of operation in Scotland. This was based on the American -based study by Biggidike (1979) that it takes on average about seven years for a new venture of a North American Multinational subsidiary to reach break even and to yield a return on its investment. It was felt during this period, that most subsidiaries were too tightly controlled by the parent headquarters to experiment with on-site innovations and product development.

In an European context, a similar study (Wilson, 1984) indicated that eight years was an average for a new venture to reach break-even with some ventures taking up to twelve years.

The issue of size constraints was furnished from the research of Drucker (1980) that firms with less than fifty employees, generally do not engage in strategic planning or new product development. When firms with less than 50 employees engaged in such activities, and were successful, they either did not remain small for long or were acquired. This was especially true of start-up high tech and biochemical firms. However, on the whole, he projected that it was only when the firm started to increase to over 50 employees, or the firm had been in business over 14 years that strategic activities were pursued.

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Based on this research, it was decided that firms with less than 51 employees and operating less for than seven years in Scotland would be excluded from the survey.

1.3 CONTRIBUTIONS TO RESEARCH

Overall, the positioning of this research differs from previous contributions in three important respects:

1. This study analysed a band of small, medium and large firms, creating a representative and stratified sample rather than a study which focused on just one firm or concentrated solely on either larger or smaller firms.

2. This study contrasted users and non-users of strategies for innovation, and described those elements found in companies that used formal strategies from those companies that conducted any kind of informal strategies. Also comparisons were made to detect possible country-ownership nationality differences for the entire sample including Scottish firms.

3. This study provides new empirical evidence of the factors affecting the use of strategies and other techniques used by managers to stimulate innovation. Further, it contributes to the understanding of intercultural differences and enables a comparison of respondents from one management style to another to be made.

1.3.1 Supplementary Research Issues

In conducting this study, a series of peripheral and mnemonic questions related to innovation were developed. These questions are supplementary ones rather than supplanting the five primary questions as stated earlier.

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These supplementary questions were as follows:

Do patterns of stimulating innovation operate the same way in the world of the business firm, irrespective of whether the firm is considered large or small?

Does innovation exist within the broad discipline of management as a separate watertight theory or is it more a practice which exists apart from, but alongside, other business economic theories and managerial systems?

Is it best to present innovation as one of the means by which a company can exploit change or is it best approached as a strategy in establishing a different product, business or a different service ?

Central to these supplementary questions is the question whether or not those isolated and specific elements which enable a firm to be more innovative can be unearthed by a questionnaire?

And should this research address the issue of entrepreneurship: is it possible to project how, and to what degree, a company or a group of companies become entrepreneurial?

In turn, do certain types of companies as a group address an innovation differently from other companies?

In a sense, do they ask what innovation means to their competitive positions and when an innovation should be exploited?

Lastly, is there a pattern of managerial practices being used currently, but not known to academics, which enables an innovation to be done faster, more profitably and at a lower cost?

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1.4 THE NEED FOR AND THE SIGNIFICANCE OF THIS RESEARCH

As a study it would be fair to simply state that this is just an attempt to understand better the topic of strategy and innovation from a managerial process perspective rather than a theoretical one.

But in reality, this may be a task more likely to illustrate how complex and convoluted the topics of strategy and innovation really are within the field of management. Since innovation is a huge subject lending itself to many disciplines (being studied by economists, marketing specialists, engineers, designers, historians, and many more besides) each offering a contrasting view to the other, this study concentrates only upon the combination of two basic topics: strategy and innovation. This study will argue that the linkage of strategy and innovation must be used with other methods to combat the rising obsolescence of an employee's skills. Then, the building block to being an innovative firm begins.

To these aims, this study concerns itself more with strategy implementation rising from the narrower fields of strategic management empirically rather than as a theoretical study of decision-making and change. Pettigrew (1987:3-5) writes on some of the problems of the field as a whole, including the bias of existing literature on strategic management toward strategy formulation.

He discusses pointedly the limited amount of attention given to the surveying of managers' attitudes for their opinions about how innovation can best be stimulated.

Pettigrew, also, outlines how there is too much emphasis on prescriptive writing and the consequent under-concern with the description, analysis and understanding of the definitional

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problems of strategy from the manager's point of view. He quoted how most major research projects were geared to determine as to which area of strategy were most likely to be implemented with few on how the strategy should be implemented. Secondly, he argued that most studies did not contain any replicating measurement which could be used by other researchers.

Another study noteworthy to this point was that by Zajac and Bowman (1985), who analysed the articles appearing in The Strategic Management Journal, over a ten year period, which concluded that most studies eschewed quantitative studies of any type.

They noted that the few strategy implementation studies conducted by researchers on how it was done were more likely to use inductive theorizing, small samples, and intensive qualitative methodologies. The major findings in their article were that studies of strategy formulation far exceeded those of strategy implementation by some 90 percent. In fact, less than 10 percent of the implementation studies dealt with issues of strategic implementation over a time series using a longitudinal methodology.

Two other findings were considered by this researcher. One was the criticism voiced by Van de Ven that most studies of innovation to date have been retrospective case histories.

The other was by Pettigrew (1989:331) on how the gap in the field for empirical studies is growing and few, if any, deal with an on-going survey of managers in a study of strategy and innovation. This view is supported by Foxall (1984: 12-6), who stated,

"When it comes to the management of innovation, too many academic researchers are speaking in the terms of averages. There is a tendency of these writers to offer a distillation of knowledge, observation and

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experience gathered from one case when it comes to strategy. Often more likely they result in useless intellectualisation rather than applicable conclusions. The current need is not for more managerial prescriptions, but to understand much better the innovative process. There is an urgent need to perceive and conceptualise the innovative process in an empirical sense."

Likewise the topic of stimulating innovation in multinational corporations (MNCs) has received relatively little research attention.

Not one of the more than 4,000 studies on the topic of innovation (Gordon et al., 1975; Kelly and Kranzberg, 1978; Mohr, 1982; Ghoshal and Barlett, 1987) has focused specifically on the innovation process and strategy in the setting of a multi-nationals corporation. Similarly in the field of management for MNCs, past research has focused overwhelmingly on technological strategy when it has been defined implicitly as the way to enhance the efficiency of a current operation. While some efforts have been made to investigate the relationship between marketing, strategy and innovation (Foxall, 1984; Terpstra, 1977; Chisnall, 1989), there has been a dearth of information compared to the volume of studies completed.

Whilst most schools of theorists agree that the strategy for and the management of innovation are best portrayed as the Achilles heel of the organisational sciences, as a topic it warrants more and new research. Unfortunately there is still a debate raging within the field of management as to whether research on innovation can best be fostered by examining how deliberate formal strategies are formulated or by isolating the series of events leading up to and after an innovation.

The debate is not an argument whether the study of deliberate strategy versus the examination of infrequent and

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dramatic innovative events can reveal simplistic empirical receipes and studies, but one of approach. Therefore, it is better to treat this as an investigation, as an effort, to understand better these contrasts which form the foundation for an empirical study of innovation.

Thus, the researcher will argue that this study has relevance, even though the past two decades have seen an ever-increasing interest by managers in the stimulation of innovation. This is evident in the growing amount of literature in the field.

Witness, for example, the common call for stimulating innovation in management books by Ouchi (1981), Rodgers (1981), Pascale and Athos (1981), Peters and Waterman (1982), Kanter (1984), Drucker (1985), Peters (1987), Handy (1989) and Tushman, (1989). Partly responsible for this growing interest appears to be the realisation that, in the past, most of the normative literature has been written not in the assumption that companies can adopt a "rational and formal" approach to innovation: an assumption which is now being challenged empirically (Tushman and Moore, 1988; Pettigrew, 1987; Quim, 1988).

All of these studies indicate that a flexible strategy within a flat organisational structure which emphasizes that efforts of its employees to be entrepreneurial, may yield more innovation than firms which do not use any of these means. As Levitt (1989:) points out,

"there is a rising and growing consensus within the management field that strategy and the forces of innovation within an organisation are intertwined. After the fads and theories of strategic management such as in a search of excellence, boston box, portfolio management, strategic planning, and intrapreneurship, are placed aside; the remaining principles, which are constant and in the final analysis may be the true strategic elements of entrepreneurship and innovation. Once we understand

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these two elements better than the field of business strategy can be fully developed".

1.5 LIMITATIONS AND OMISSIONS

Three points need to be made about the content of this research.

First, some areas of research have had to be omitted: partly because of time and space constraints, but more importantly because they might best be dealt with satisfactorily elsewhere in other studies. These include the retail trade, and the role of the smaller innovative firm employing less than 50 employees and/or operating as an entity for less than seven years old.

Second, some other topics are dealt with herein in a wider context and may thus appear either to have been omitted altogether or to have been given insufficient emphasis. These include costing conditions (including the extent of economies of scale), the organisational theories of managing innovation, the costs and benefits of innovation, the role of research and development, and the financial impact of innovation. These have been dealt with in the context of market structure and the theory of the firm.

Third, whenever possible U. K. data have been used throughout the text.

1.6 ORGANISATION OF THE STUDY

This study is composed of nine further chapters and is presented in two main sections. The first section covers Chapter Two through Chapter Six.

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Chapter Two contains a development of the field of Strategic Management as a contextual background for this research. In order to gain a historical perspective of the development of business strategy, it was written chronologically.

Chapter Three reviews strategy as a topic within the field of strategic management and its past contribution, if any, to the stimulation of innovation. Its focus was deliberately restricted to highlight only some of the major thinkings and research in the field of innovation.

Chapter Four provides an outline of the generic strategic models being used in the field of management and reviews the applicability of each as a device to stimulate innovation.

Chapter Five analyses the topic of innovation, externally, from the relationship of the firm, its market conduct and market structure. It explores many aspects of the the arguments advanced in the field as to whether size, market structure and conduct inhibit or nurture the rise of innovation.

Chapter Six examines the topic of innovation by the internal elements of the firm which stimulate the acts of innovation. This chapter concludes Section One of this study.

The second major section of this study starts out with Chapter Seven.

Chapter Seven sets forth the methodology used in the study and the hypotheses used to test the data gathered from the postal questionnaires, and interviews.

Chapter Eight discusses the results and findings of the study. The purpose of this chapter is to underline the more important aspects of the study.

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Chapter Nine sets out the major points gleaned from the analysis of the survey data. Major conclusions and some key tables are presented for discussion with implications of the study as a basis for further research.

Finally, the Appendix Section contains supplementary data, a glossary of terms, statistical tables, readings, and a bibliography.

CHAPTER TWO

THE DEVELOPMENT OF STRATEGIC MANAGEMENT

2.0 AIMS OF THIS CHAPTER

This chapter is divided into two main sections.

The first section offers a historical perspective on how strategy evolved from its military use into a discipline within the field of strategic management. It sets forth the various schools of business strategists and the major thrust in each of their arguments.

The second section moves chronologically. Its aim is to explore under what business conditions the core of strategic terms and concepts were created, and why strategic management is the preferred term to be used in the 1980's.

This chapter provides a compendium chart (Table No. 1) depicting the evolution of strategic management. Its purpose is to provide a snapshot view of the major influences which caused the field to evolve from the pre-World War I era to the year 2000. There is a discussion on the environmental factors in Appendix A which spurred the rapid development of this field and a glossary for the various types of business strategies in Appendix B.

2.1 SECTION I -THE CONCEPTS OF STRATEGY

This section of this chapter reviews the overall traditional concepts of strategy, and outlines the difficulties in reducing the concepts of strategy to one single definition.

The difficulty in understanding strategy became evident over the past few years as increasing interest surfaced within the business community debating whether military planning could be used as an analogy for corporate planning.

To see signs of this interest as a military metaphor, one can turn to the business community which purchase books on the topic or to academics who pursue research on the effects of its strategic concepts. More significantly, many of the leading management schools and trainers have begun to offer strategic courses that promise to bring the lessons of the battlefield to the marketplace. This is relevant because military leaders and researchers have done more thinking about strategic principles than many business leaders and researchers.

The omission of many academics not to address or clarify the relationship of military strategy and business elements is a major flaw found in many studies of strategy. This is suggested and acknowledged by some business writers (Tilles, 1963; Jay, 1967; Anthony, 1965; Cawood, 1984; Quinn, 1988) that a preamble on the parallels between the military and business should be included in the study of corporate strategy whenever possible.

To this point, Jay suggests.. "the first transference to studying management terms is to read about military conflict". Anthony, in a similar vein, counsels... "the way military does strategic planning should be carefully explored (p.27) and... there is a tendency among business students and business leaders to leave out of their models, the dynamic impact of military

principles "(p.156). Cawood projects.." although some contemporary writers (K. Weick) attack the military metaphor, but as executives struggle with change, more and more parallels emerge which are relevant" (p.62).

Supporting this, (Miles and Snow, 1978:249) also argue that early theory and research have largely ignored the process of relationship and the elements of strategy linking it to other variables. If strategy had been studied in a wider sense, then the various "schools of strategists" writing in the field of strategic management could be classified. This they feel would bring some stability and less confusion to the field.

2.2 DEFINITIONS OF STRATEGY

Perhaps the most interesting aspects of on what is to follow are those lessons to be gained from the ancient concepts of strategy. Precisely because they will illustrate how strategy evolved from one concept into three conceptual levels: (i) leadership, (ii) logistics-the movement of supplies, and (iii) tactics.

Strategy is a discipline existing within the field of strategic management. It as a planning concept evolved from the military and the practice of warfare on three conceptual levels: objectives, operations, and tactics. In this context, it has been, traditionally, defined as the process of bring these elements onto the battlefield (Cushman, 1984).

As a concept, strategy was originally shaped in a military setting. It is derived from the Greek word, "stratego" which means to "lead an army or generalship" and the French word, "strategie", meaning a plan or design for achieving one's aims (Collier, 1985).

Military strategy from an European perspective means the purposeful combining of tactics and logistics by acts of leadership to conduct an operation of warfare (Jones 1988:54, 648). The term for "Leadership" indicates that it is an planning exercise of motivating, directing and executing affirmatively so others will follow voluntarily before the troops are in the field of battle.

" Tactics", on the other hand, implies an array of movement for directing the troops when they are in contact with the enemy. "Logistic" includes providing everything necessary from food to methods of communication, and even rewards to induce one's troops to win.

These terms from the military and their underlying concepts have come to be viewed as of having a direct value in the process of strategic business planning. Current definitions indicate that military strategy is in essence, "the determination and setting forth, a complete plan of war "(Cushman, 1987). In contrast corporate strategy is best defined as "a purposeful pattern of action, position and ploy and perspective" (Quinn, Mintzberg, 1988:13).

These two definitions flow from a traditional definition (Jones, 1988) in which strategy has three purposes: Grand, Combat, and Tactical. Grand strategy is for the purpose of gaining a political objective by military means using a broad or grand outline for the conduct of war. It is generally reflected by a type of declaration which is announced to all as to the intended purpose for warfare: foe or friend. By this declaration, resources can be mobilized accordingly to one common objective; be it peace, retaliation or aggression.

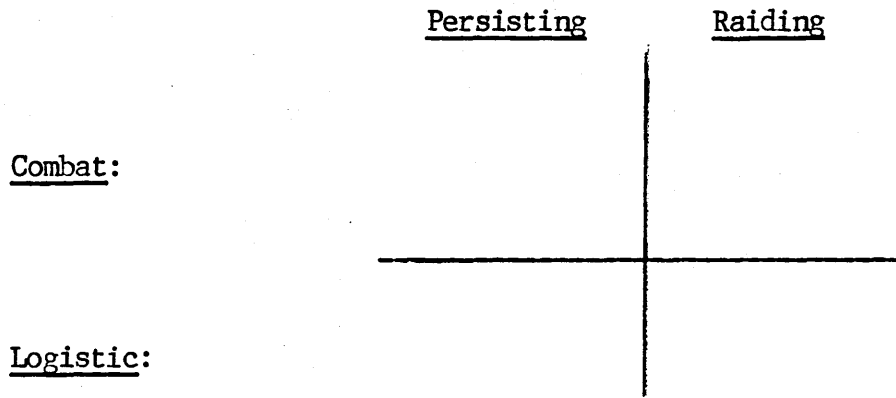
Combat strategies are the movements of resources (troops) for a purpose of concentration or retreat. These can be

overriding grand strategies and can be described in either a "defensively or offensively" context. They are best termed as defensive when one seeks to protect territories or offensive when the purpose is to invade another lands. Whilst tactics, the lowest branch of strategy, involves the best type of activities to be used when the conditions for combat change or are known. They, generally, provoke short term and rapid action compatible to actual battle conditions.

Strategies can be further distinguished as being either "persisting" or "raiding" ones. These are interchangeable with the terms of "direct or indirect " from the Asian school of warfare and "overt action or guerrilla" respectively from the European perspective of warfare (Clavell 1983; Jones 1988; Cushman 1987).

They are called "persisting" when one seeks to permanently occupy a territory. This strategy works best when one has superior forces or resources. Conversely, strategies are labelled "raiding" when the resources are limited and the goal is not to overthrow the enemy overtly. Its purpose, incrementally, is to penalize foreign troops occupying another territory and to reduce their resources.

The relationship of these four basic strategies are defined by the matrix in schematic 2.1 as shown on the next page.



Schematic 2.1 (Source: Jones 1988, p.82)

From these four strategies, scores of permutations and variations of different strategies can be developed.

2.3 LESSONS FROM THE ANCIENT RULES FOR STRATEGY

An review of ancient strategy (Jay,1967; Jones, 1988; Clavell, 1983; Roberts, 1989; Griffith, 1963; Cushman,1987) indicated there were some common rules to be followed when a strategy is executed and for leadership to know.

For example, leadership has the explicit task of inspiring friends and discouraging enemies to a cause for waging war. It is an essential ingredient of leadership to recognise that most followers are not sequacious by nature and need to be galvanised into action. The selection of a reason for entering a war and how it will be used in attracting followers requires much forethought and explanation. The cause should be clear enough or the reputation of the leader great enough so others would support the war voluntarily. The ability to inspire by words or action should be exploited as a mean to mobilize others to follow. How leaders selected an objective and their abilities to convince others to follow are enabling elements flowing from the ancient concepts of strategy.

Other lessons taken from ancient strategists reveal how strategy maybe formulated. For example, ancient leaders (e.g. Sun Tzu, Attila, Caesar, Alexander) believed that when troops were on home lands or retreating to home lands, they would fight more gallantly. Their strategies often encompass this belief.

Even their tactics for battle were based on similar types of beliefs. For example, they believed that the ratio of forces under their command when compared to the enemy dictated in many cases what the combat strategy would be: if the one's forces are superior by a ratio of ten to one, the enemy would be surrounded (encirclement); if five to one, attack him; if twice as numerous, divide and attack from two sides at once (flanking); if equal in number, delay and use a raiding strategy until bad weather or the lack of supplies defeated the enemy (seige and delay).

In a logistic sense, efforts were made by the most successful leaders to ensure that their troops would have the fastest horses, strongest weapons and the best disciplined forces to win most of the time. Military games, sporting events, contests of endurance and strengths, and dances simulating hand-to-hand combat assured this readiness, even in times of peace. The axioms for battle conditions to be avoided indicated what strategy to be used; for example, troops were not to advance uphill against the enemy nor oppose them when they were coming downhill.

Other examples cited: were not to fight facing the enemy with a river at your back or facing the sun. A fair amount of planning and resources were used to ensure that the passage of all emissaries either to and from the enemy's camps would be stopped as well as the bearers of supplies and information, these were important strategic elements in warfare.

2.3.1 Enabling Rules of Ancient Strategy

Ancient military history (Jones 1988: 704-707) indicates that the "enabling" rules of strategy as axiomatic strategic definitions could be summarized as follows:

- .Purpose for the war determined how troops will fight;
- .sizes of opposing forces dictated the tactics to be used and the type of weapons to be deployed;
- .the best-equipped army nearest homeland usually won;
- .conditions in which the battle is fought are critical;
- .information and supply lines must be controlled

It is possible to boil the problems and opportunities of strategy in ancient times down to one dichotomous decision: whether a general should aim his forces at the enemy's territory or at an advancing army. This decision forged the grand strategy for all other tactics and was adjudicated accordingly.

Equally important was whether a leader used a persisting or raiding strategy. Since it was believed that a persisting strategy was deemed superior to a raiding one, a guerrilla tactic would be used only as a last resort. The persisting strategy being viewed here as a more formal method of strategy and the raiding strategy being viewed as one of informality. But, the ultimate strategy was the idea of "winning with the least effort"; this as an enabling rule guided many of the past commanders in how they decided among the alternatives and when to combine more than one method or strategy to win.

The literature also indicates how the cross bow became inferior to gun powder and so on to the effect that it was the advance of weaponry by the acts of innovation which changed the use of these enabling rules. Jones (1984:103) illustrated how the stirrup did more for military superiority than any strategy. This

innovation made mediocre horsemen perform well because the hazards of falling off were reduced when swinging a sword and could increase the height above an opponent on foot by standing in them. Likewise when steel replaced iron, conferring the advantages of lighter and stronger weapons, the strategy changed.

To this point, Baker (1975:176) states "the best way to change the competitive situation of one's superiority over another, in both military and business struggles, is the use of innovation ". In simple terms, it was the advance of innovation which frequently led to a decisive outcome in ancient military struggles. This could be called the strategy of innovation.

2.4 STRATEGY INTO COMMERCE

Consistent to the language of war, commerce has adopted the concepts of strategy. The following citations from the literature will illustrate this adoption. First, the renowned nineteenth century philosopher of war K. von Clausewitz (1976) wrote "war does not belong in the realm of arts and science ...rather we could more accurately compare it to commerce".

It was also the view of von Clausewitz that war has only one purpose as "a necessary means to pursue national self-interest, its objective being to vanquish the enemy by achieving unconditional surrender". On the other hand, Liddell Hart, the greatest twentieth-century military theorist, saw 'the objective of war to be a better state of peace' and was severely critical of Clausewitz's theory of total annihilation.

Although this issue of "destroy or be destroyed" is not popularly endorsed by contemporary business, it sets a tone for the ultimate grand strategy of commerce. This type of competitiveness is still present. As noted by Day (1984) the military analogy is most insightful "when the objective of a

strategy is first interpreted by the primary question is it best to achieve a peace or to annihilate the competition ?" (p.15). This type of dichotomous choice reflects the basic patterns of most grand strategies: attack or defend; compromise or conquer; lead or follow..so on.

Expressed in business terms, the grand strategy is when a firm has decided that it is best to enter a new business area or to stay in a current business position which would give them specific advantages.

Ideally, this occurs when a firm uses a grand offensive strategy to be in a high growth market, or defensive one to keep competitors away. Then, in either situation, they would use competences to protect its markets or defeat its competitors whenever possible by a strategy. Andrews (1965) refers to them as "Distinctive Competences of Advantages" which strategic positions are built upon or changed. He stated, " these advantages can normally be traced to one of three roots: (i) superior resources; (ii) superior skills; (iii) or superior position". They will be discussed later with some detail in Chapter Three.

Even today, business people and specialists have found it convenient to use these military terms to describe their modern day competitive situations (Kotler and Singh 1981). They are aptly used by the business literature to express in military terms when companies were engaged in price "wars" and the "capture" of each other customers (territories).

Whilst one can see how strategy has been incorporated by commerce from the traditional and military concepts of strategy, the question becomes what additional assumptions can be gained by this review to a better understanding of the role of strategy in the business literature?

2.5 ASSUMPTIONS ABOUT THE ENABLING ELEMENTS OF STRATEGY

The next approach to understanding the assumptions about strategy from a wider perspective, is to review the various schools of writing on the enabling elements of strategy which the literature provides.

For that reason, what follows provides three separate and distinct sets of definitions for clarity.

The first is used to state general guide lines imbued in strategy by several definitions. For example, Porter (1980) argues that competitive strategy involves "the positioning to maximize the value of competences that distinguish it from its competitors" (p.47).

The second set of assumptions deals with the selection of alternatives. To this point, Tilles (1963) believes "it is significant when organizations are faced with choices how it selects the best choice" (p.111). Ansoff (1965) maintains that "strategy is a set of decision-making rules for guidance or organisational behaviour based on conditions of ignorance, risk and uncertainty" (pp.119-20).

The third set deals with finding the strategic fit. Day (1984) claims strategy to be "the direction the organisation will pursue in getting a strategic fit within a chosen environment"(p.1).

From these contrasting definitions, strategy could be thought of as being just a steering device, since it is often portrayed in literature this way, or is it a concept (in both a descriptive and prescriptive sense) for guiding an organisation, loosely?

Some theorists disagree with both definitions, (e.g. Ansoff 1984; Day 1984; Hamermesh 1986; Porter 1986), and suggest a strategy implies a commitment to action by a rationally-created plan with a formulation, implementation and evaluation stages.

This is the body of literature from the "rational-comprehensive school" which argues that the goal of a strategy is selected first and then adjusted by a constant stream of action and reactions to the stated goal. In the interim between the objective of the strategy and final action, this school believes that there is a continuous re-examination of one's objectives between other competitors, customers and suppliers. From this interplay, the purpose of strategy is to measure the progress being made in achieving the stated goal against these three forces. These may be called the enabling elements of the "rational school of strategists" and are examined accordingly:

2.5.1 Enabling Elements of Strategy- Rational School

In a business sense from the first set of definitions above, the following underlying assumptions may be deduced as being "enabling elements" from those definitions above:

- . market positioning is important;
- . strategy is the best selection of choices;
- . how resources are directed is critical;
- . objectives should be clear and environment known;
- . competitors and their strengths should be evaluated.

This school of management science theorists further set forth three basic assumptions: (1) that goals and objectives are clearly identified and agreed upon; (2) that the strategist has access to complete information; and (3) that the selected strategy is rationally chosen by all members of the organisation.

They believe that any final strategic decision made should be done in full awareness of all available feasible alternatives.

Their approach is rational, analytical and comprehensive. They vigorously contend that an analytical model developed including the needs of many parties will objectively set a better strategic goal. By this, they prophesied that only a strategic model will ensure adequate attention is given to the consequences of their decisions upon others.

The main flaw in their arguments which they begrudgingly agree to is that their modelling concept has some peccadilloes. First, they have to accept from time to time, circumstances preclude a decision-maker the luxury of awaiting for a strategic choice based on the output of a model or a chance to discuss it fully with others within their organisations. Conversely they argue such decision-making situations are rarely requiring rapid action and generally are not of the magnitude to affect a deliberately set objective made earlier. However, the lack of a dynamic mechanism to cope with a fast moving business environment is a major disadvantage of the rational approach of strategy-making.

2.5.2 Enabling Elements-Incrementalist School

The second set of definitions, which reinforces the "enabling elements " for the concepts of strategy, is for the strategy to be flexible and for its objectives to be changeable at will. They can be summarized as:

- .strategy should constantly be revised at will;
- .uncertainty can never be overcome;
- .strategy has an uneven stream of objectives.

This set of definitions reflects the evanescent elements of strategy and that it is "a series of conscious and objective actions developed in a plan for an intended purpose which may be changed by a pattern of behaviour during the act" (Spender, 1980; Pettigrew, 1987; Mintzberg 1985; Quinn 1988). They argue that plans and patterns can be quite independent of each other with the following distinctions: How objectives are realized (fulfilled) from their intended purposes are crucial. When plans are realized exactly as intended, they are "deliberate". When a pattern of action and plans are not realized exactly, they are "emergent" which are more descriptive of reality (Quinn: pp.14-6).

This "school of disjointed-incrementalism" directly challenged the views of the rational-analytical approach. These context-descriptive theorists argue that it is virtually impossible for a decision-making unit to have all of the facts to consider all of the alternatives .

They further argue that the most effective decisions are formed unintentionally on a day-by-day and a case-by-case basis. They feel a strategy "emerges" as a pattern in a disjointed stream of decisions.

The admitted weakness in their position is that the intuitive (recipe) and judgmental approach (rule of thumb) may discourage the decision-makers from using all of the managerial tools (computers, modelling, task forces, reports) available to them

2.5.3 Enabling Element -Situationalist School

Another and the third point of view is how the mission of the firm when objectively determined will direct the strategy. The "enabling" assumptions under this set of definitions indicate:

- .mission statement monitors the strategic goals
- .planning is not a substitute for action and change;
- .completeness is one of the objectives of planning;
- .information governs the human design of planning;

This set of definitions describes those who believe that strategy is an interactive process between analytical and intuitive issues. These theorists are best labelled as "situationalists". In theory versus practice, they do prescribe how the analytical component of a strategy should be larger than its intuitive component or, in an restated sense that it is a rationally-arrived at approach tempered by the realities of a situation.

They as contents-prescriptive specialists argue that decision-makers, who fail to integrate and digest both the analytical and intuitive issues will become "myopia-bounded", and eventually their organisations will become static and non-entrepreneurial.

The proponents of this strategic thinking (Miller and Friesen,1978; McGinnis,1984) argue that over time top management will began to receive rencountered information away from formal planning sessions. Their subordinates will speak to them in the mode of a strategic language which is biased. For example, the communicators (subordinate managers) will talk about risk in terms of quantitative facts to an analytical manager devoid of the manager's intuitions about a situation; or will set aside the recommendations of a technical planning system in order to appeal to a recipe-directed manager by talking in industrial cliches.

The key feature of this set of definitions is that strategy should be devised separately from how it is implemented. The

only overriding concern is that an attempt be made to make the strategy as complete a plan as possible.

Supporting this etymologically, Fowler (1988) states "strategy is generalship exhibited by a commander-in-chief planning before leading his forces into contact with the enemy, and tactics is the art of strategy after the forces are in contact with the enemy" (p. 593) It is only during the actual engagement that the original plan should be modified. When conditions change then, tactics change accordingly. So it is argued that the central feature of a plan is for it to be flexible. But every attempt should be made to ensure the plan is complete before engagement.

To this point of completeness, Von Neumann (1928, 1944, 1953) argues "strategy is a complete plan specifying every possible choice in conformity to the pattern of information available at that time"(p.79). This is the Game Theory Strategy which concerns itself with voluntary action based on information. Then an informed player will make a better choice when conditions change.

2.6 LESSONS FROM THE LITERATURE

As discussed above in the ancient military milieu, there is no single definition of strategy as a concept agreed upon in the business literature. So it is important to understand how commerce treats strategy as a concept.

By using three different sets of definitions, it is clear that strategy could be defined in a holistic sense: by the behaviour of its employee in an operational pattern; the completeness of its plans; and the implied permission for an employee, in affirmatively sense, to act on new information

provided that the objective of the strategy is clear and exact. This is the process of "how to do it".

It is, also, perspicuous that the relationship between the different sets of definitions and its mission statement provide a perspective as to how a company will view its world. And based on this view, how its decision making units will act according to whether they are being threatened or seek to threaten others. The issue of resources at hand determines whether the firm will choose to use "attack, defence or delay" tactics as methods of strategy. These are some of the lessons from the past.

By seeking to understand the various definitions in their proper contexts, the concept of strategy is enriched. In the final analysis a strategy is a set of goals, no matter how loosely defined. The underpinnings for these assumptions are that it is the first role of leadership to ensure all players understand the overall strategic mission (goal) and are acting in concert to the same database of information and the willingness to let employees act differently when conditions or information change.

From the literatures in each of the schools of thought, there is an implied attempt to develop a strategic theory. Individually or in combination, the development of such a theory still escapes this discipline as will be discussed below:

2.7 IN SEARCH OF A STRATEGIC THEORY

In the earlier quests for a strategic theory, most observers excavated terms and definitions from the field of economics. They began by using formulations such as achieving a gain in profits by either increasing market share or realizing cost savings using economies of scale.

These in principle comprised two main strands of thought and research. One was "neo-classical". It was in 1921 that Knight et al first wrote of an implied relationship between economics and strategic competition. He took the theory of perfect competition to the austere extreme and asserted that a firm's strategic position was of little consequence. The terms of risk, and uncertainty were explained from the perspectives of consolidation and specialization. The basic theory stressed a strategy of efficiencies using a highly abstract analysis.

The other theory used the principles of a "realistic" approach. This theory embraced some of the thinking of economists (Berle, 1932; Robinson, 1933; and Burns, 1936) as they expostulated how real-world roles determined ways in which a firm's performance could be improved strategically at the expense of competitors, suppliers and customers. A strategy should be used for a firm to become a monopoly or protect its market position by making the entrance barriers too high for new competitors.

2.7.1 Attempts To Formulate A Strategic Theory

As discussed above, it is from this ferment of rethinking and rhetoric during the 1930's that the topic of strategy began to appear in need of a theory. It took some three decades as a field before any new theories on strategic concepts began to appear in the 1960's.

Ansoff (1968) was the first to argue that by examining the micro-economic theory of a firm in a competitive environment, a relationship between input and output factors can be manipulated strategically in a way to maximize the profits of a firm.

This could be used as a strategic theory, but he had to agree that this theory does not explain how a firm may have

other strategic objectives other than profits. He attempted to disprove those views which contended that strategic behaviour has so many variables that an expected output from these variables cannot be predicted.

Ansoff argues that it is not the identification of the strategic factors or the classification of variables which is the problem. He was able to prove that the important variables (information, behaviour, objectives) could be isolated. And that they could be classified in either a descriptive or prescriptive way, but a specific relationship between these variables is what is needed.

The literature is able to supply an context-descriptive theory of the missing relationship of a firm having objectives other than profits. The missing element for variables between the theoretical formulation of this relationship was modelled by Cyert and March (1963). On a purely descriptive dimension, they argued that a relation can be modelled between strategic action, information and behaviour. But in the real world, in a prescriptive sense, data on a strategic theory can not be quantified because of the long lead time between a strategic action and its outcome. Thus, there is not a complete strategic theory in which a strategy for innovation can be tested.

SECTION II-STRATEGIC MANAGEMENT

This section introduces strategic management, and how it evolved from military practice into a field of management.

2.8 DEFINING THE FIELD OF STRATEGIC MANAGEMENT

Whilst the roots of strategy may go back over 2,000 years as a cognitive skill, strategic management and business policy are current and fast-developing fields of study. These disciplines

looked at firms as a whole and attempt to explain why some firms develop and thrive whilst others stagnate and go bankrupt. As a field of study, it focuses on analysing the environmental problems and opportunities faced by people in top management.

It is still best to view strategic management as a field of managerial practice rather than a series of theories. Even though, it is currently defined " as the process of agreements reached by top management about how the company should determine long-term goals and how should position itself to take advantage of future market opportunity and to outdo its competitors " (Chandler, 1962; Andrews, 1981). This view that it is a practice rather than a theory is based on several different reasons:

First, as discussed earlier, throughout its history, this field is comprised of disciplines rather than theories. Whilst it is accepted as beginning with American management practice in the 1950's, Whyte (1930), a British writer, outlined its principles much earlier, when he stated: " Any great industrial enterprise needs a vision of some distant goal, and a planning expedition for the struggle against human inertia and material difficulties". Since then, there had been little attention in the business literature to the formulation of a theory.

Second, The development of strategy as a field of study has been sporadic due to the failure of many academics to recognise the significance of its concepts until after World War II, and the inabilities of its practitioners (strategists) to effect an organisational change sought by many top managers in the late 1970's.

The demission of corporate planners began when strategy professionals, at that time, failed to project unforeseen environmental changes (oil prices increases, the rise of international competitors). These caused a turning away by many

multinationals firm from a strategic method of planning to a business portfolio method of planning. This attitude by top management and theorists on "corporate strategists" lasted until the middle 1980's.

Top management did not make the change directly. Instead they diplomatically distanced themselves from the planners. These strategists sensed the distancing on the part of top management and adapted by producing more complete analyses, hoping to satisfy their superiors. The top management, in turn, saw the more complete studies as excess paper. Only in the late 1980's has there been a renaissance in the development of strategic management. However even using its elements of planning from the 1900's to its international business practice of today, this field of study still lacks an overall strategic theory.

Third, the failure of current writers and theorists to recognize and write about the concepts of strategic planning as they developed in commerce. For example, as a practice, several American executives (i.e. Henry Ford, Alfred Sloane, and Pierre Du Pont) were using the principles of strategy in the 1920's and throughout the 1940's without it being labelled as such. There was a group of authors (Barnard, 1938; Newman, 1948) writing about planning principles. However, they wrote more of the process of setting objectives rather than addressing strategy as a concept.

Early writers, such as Professor Newman of the Columbia Business School for example, defined strategy "as a follow-up plan to evaluate the anticipated reactions of customers, fellow executives and suppliers" He never addressed the process of planning as approaching a concept of management or attempted in literature to separate it from the other duties of an administrator. In short, this was more about explaining the

concepts of Fayol (1961) as the elements of administration rather than strategy as a managerial process.

2.8.1 The Development of Strategic Management Principles

It was not until much later that the genesis of strategy as a managerial process was first academically implied by a business writer. This was done by Drucker (1954) in the framing of his question to managers by asking " Do you know what is your main business and what business you should be in? And when you answering this question, all else should follow".

Yet, it was some ten more years before the first wave of American writers (Alfred Chandler, 1962; Kenneth Andrews, 1965) focused explicitly on the concept of strategy, followed by writers in the European context (Igor Ansoff, 1965; Robert Heller, 1967; Kenneth Taylor, 1971).

However as a concept, it was Chandler (1962) in his seminal research of structure and strategy that first broached the concept of strategy by stating, "strategy is the determination of long-term goals and the allocation of resources necessary to carry them out".

But it was Andrews, who first combined the procedural thinking of Drucker, the current practice of some managers, and Chandler's concept of strategy into current usage by stating, "corporate strategy is the pattern of decisions in a company that determines its goals, reveals its objectives, and produces a policy for achieving those goals... it is an organisational process inseparable from the culture, structure, and behaviour of a company "(pp.1- 4).

Ansoff, on the other hand, defined strategy as the "common thread" combining a company activities, growth vector,

competitive advantage, synergy of joint efforts and its products/markets interface (p.163). A definition encompassing most of the principles of strategic management.

2.8.2 The Terms and The Role of Strategic Management

From these contrasting views, strategic management as a field of study has been labelled at various times "policy-making", "strategic planning" and "business strategy". Even today, the definition of strategy hinges on whether it is a broad goal-setting focus (Andrews) or a narrow one (Ansoff); whether there are many separate components (Ansoff) or is just a process of thinking strategically (Andrews).

From the sample of writings above, the general area of strategy shows that the practice of strategy has been changing, and the search for terms and definitions goes on. As the subject area has become broader, the problem of choosing job titles/areas of expertise has become more difficult, and the agreement on common terms seems to be more remote.

After some seventy-five years of being practised, the term "strategic management" has evolved to be the preferred nomenclature by the majority of its practitioners and subject matter specialists. For example, business policy as a term traditionally associated with the course in business schools is no longer accepted by researchers (Glueck and Jauch, 1984:4). This was confirmed when the American Assembly of Collegiate Schools of Business (1976) strongly suggested that accredited schools teach strategic management rather than business policy. Gradually from that point on, the term -strategic management- has been deemed to be more precise to the role representative of the task which "business strategy makers" will play throughout the 1990's (see Appendix A for a discussion of professionals' attempts to adopt the term). It was the beginning of a trend.

2.9 MAJOR INFLUENCES

Like everyone else, managers in companies react to trends. These trends represent a particular application of strategic influences which were coming into vogue by the most forward-thinking managers rather than as the most dominant managerial practice. To give a historical perspective on the rise of each of these major influences on strategic management within a period of time that they first appeared, Table No. 1 was constructed. Any projections of the key strategic thrust and methods to be used by managers shown on this Table 1 from 1990 through the year 2000 are speculative. This is not the case in the time periods from the 1900's through 1980.

Very little of the literature provides any indication as to how strategy was developed. Drucker attempted it in his book on management (1973) to piece together a picture how management in general was developed. But it is the research of Chandler (1977) that indicates that a combination of trends that overall developed the field of management and business strategy. Using this as a research map, five factors seem to be the major trend-setters. They are reflected in Table No. 1 on the next page.

The five dominant influences arising in each period were as follow: (1) Product-Market Composite; (2) Emerging Organisational Structure; (3) Key Governance Process; (4) Most Popular Management Model; and (5) The Number of Business Schools. These were, further, developed from a number of writers (Chandler, 1977; Adams, 1986; Quinn and Mintzberg, 1988; Drucker, 1973). The interplay between each of them as influences either enhanced or developed strategy-making from a primitive "trial and error" process to one of concepts and principles. In short, they are contextual factors for the rise of strategic management.

Table 1. THE EVOLUTION OF STRATEGY AS A TOPIC OVER THE PAST NINETY YEARS

(1) KEY STRATEGY PRODUCT-MARKET COMPOSITE	(2) EMERGING ORGANISATION STRUCTURE	(3) KEY GOVERNANCE PROCESS	(4) POPULAR MANAGEMENT MODELS	(5) NO. OF BUSINESS SCHOOLS
Pre-1900: MILITARY & RELIGIOUS BUREAUCRACY				
Agricultural & extractive	Hierarchical & Gestatorial	Acquisitional War & Political	Missionary	N/A
1900: ENTREPRENEURIAL MODE				
Single product, local/regional markets	Entrepreneurial & Family-owned	Profits exploitation	Process-oriented Scientific	3
1920: MACHINE BUREAUCRACY				
Limited standard- ized product line National markets	Functional	Control by master plan and budgets	Apprenticeship and on-the-job management training	50
1940: DIVISIONALIZED - PLANNING MODE				
Diversified product line, National/ international markets	Divisional	Control by performance (profit centres)	Supervisory training, functional (accounting, etc)	85
1960: PROFESSIONAL BUREAUCRACY				
Standard & innovative products, Stable & changing markets	Matrix International National	Control by person, plan and/or market performance	Functional and limited general management education	200
1980: ADHOCRACY & ADAPTIVE MODE				
Highly complex goods & services Worldwide markets and industries	Network International (centralised)	Control by markets (e.g., contract & fee for service)	General Management and high-level functional education	800
2000: POLYVALENT ENTREPRENEURIAL MODE				
Highly innovative goods & services, International Markets (Global)	Nexus (decentralised Global)	Control by values/niches of international markets	General Management and functional linked to corp. entrepreneurship	1000

Table adapted from terms and concepts of J. Quinn/Mintzberg(1988); R. Miles (1985); and R.Adams(1985)

The table, on the previous page, uses the following contextual factors as taken from the literature. For example, Chandler described the product-market composite as "the centre core of activities from which a firm received most of its revenue"; Quim/ Mintzberg indicated that the organisational structure is "the type of relationship in how technology, span of control, and operations were structured "; Mintzberg wrote that the governance process "reflected the chief control and direction by the way that a strategy would be judged".

The other two contributing factors were from Adams, who indicated that the management models were "the most up-to-date methods in how managers, generally, operated or reflected the training in how they should operate"; and from Drucker, who wrote how the number of business schools "by their growth implied the level of sophistication and standardization of strategy being taught to future strategy-makers".

Overall, the table shows how each influence has an unique context; how the managers' perceptions and interpretations of the contextual factors in each period influenced their method of strategy and the results being sought. The description for each period is as follows:

2.9.1 The Periods Preceding 1900: Military & Religious Bureaucracy Period. These periods were best characterised as when strategy was used as the military parlance for warfare and political control. It could be stated that it was taught in some form or other since the birth of civilization, but it was first documented as being done by Sun Tzu two and a half thousand years ago. Its importance as a topic of study goes back to 1513 when Nicolo Machiavelli in his counsel to the Prince, Lorenzo De Medici stated "he , who rules others shall have no other aim or thought for study than war and its rules "(chapter XIV).

Strategy, in this period, was primarily a military device for the seizure of land and wealth. For these reasons, the key products and markets used were labelled agricultural (i.e. tea, land, cotton) and extractive (i.e. gold, iron and silver). They were periods of religious crusades (into Palestine in 1099) and European warfare. Their purposes as a strategic process were to conquer, in the acquisitional sense, the land and goods of others for either God, king or country. The strategy-making was done by those who gained their power by a hierarchical structure using a downward span of control.

The power to manage being delegated by either a royal birth, legacy, church or military organisation, and symbolized by those carried in a gestatorial (ceremonial) chair. The literature indicates that its management style would be labelled as "missionary", for it operated based on a common ideology, had little specialization of skills, and was decentralized (Quinn/Mintzberg, 1988).

Up through the medieval ages into the 1900's, revolutions in industry, and agriculture converted the need for strategy from a military use to a commercial one.

It was in this period that the growth of markets were made possible by larger ships and improved highways which permitted the efficiency of an expanded division of labour. Productivity was aided by such development as steam power, electricity and improved metal working. Scientific and mechanized agriculture increased output and the efficiency of labour in food production. However, markets were local, and shops were small in scale and workforce. This was the general pattern of commerce until World War I.

After the 1900's, the Table is calibrated into six 20 years periods. These periods are not to be exact and may overlap by 5

to 10 years. The key governance process within each period reflected the most dominant type of strategy being produced at that time. What follows is a succinct summary of each.

2.9.2 The Period of 1900-1920: Entrepreneurial Mode. This period up to World War I, began the rise of large-scale organisations which were mostly managed by entrepreneurial individuals or their families. The product was generally a single product and the markets were regional.

The key governance process was profits at any cause and managed by the principles of Fredrick Taylor "where employees were viewed as economic units". The first business school, Amos Tuck Business School of Dartmouth College, was established in 1901 where business policy (strategy) as a topic was first taught. It was followed shortly by the Wharton School of Commerce and the Harvard Business School. In this mode, strategy-making was dominated by the active search for new opportunities using big bold steps.

2.9.3 Period of 1920-1940: Machine Bureaucracy Mode. This period ushered in the standardization of work and management. It was because products became more sophisticated and were multi-lines with some international markets and the expansion of national markets.

Also, the basic organisation became functional and was controlled by master plans as prepared by analysts. The analyst assumes major planning responsibility alongside the manager. Factory workers were being recruited from the agricultural sector into an industrial economy which used apprenticeship schemes as the prevailing management models for increased productivity.

Strategy-making was directed more to how the firm could gain a better strategic fit with its business environment which was now becoming more hostile and competitive.

2.9.4 The Period of 1940-60: Divisional- Planning Mode. The diversification of product and customers became evident in this period. Organisation became more complex with three or more layers of management.

The management focus was more analytical using profit and cost centres for control and growth. Special training for front line supervisors and the staffing of technical personnel in areas such as marketing, accounting and engineering was the management model. Strategy-making was, mostly, geared to the defence of regional markets and expansion into national markets.

2.9.5 The Period of 1960-80: Professional Bureaucracy. In this period was the rise of administration and the specialization of skills. They were created because existing products had to be standardised for increasing demands and new products had to be developed for an increasingly more complex and technically-advanced global market.

In this period, strategy-making became one of the skills being required for better internal coordination of multi-divisional structures. To meet this demand, professional managers were now being hired from business schools in growing numbers and placed over multi-structured organisations using market, product and regional control systems. The thrust was a combination of growth and expansion strategies. They were used for either acquisitions, vertical and/or horizontal integrations of customers and suppliers from national markets into international ones.

2.9.6 The Period of 1980-2000: Adhocracy and Adaptive Mode.

The business environment in this period is projected to continue on a rapid and complex ascent by the pressures of new and international competitors.

It is further projected that expertise will require the hiring of specially-trained staff with international experience in the areas of management, finance, production, and planning to cope with the rising uncertainty of international markets. Flexibility and adaptability will be the dominant factors used in the setting of goals and reacting to problems.

Decisions will increasingly be made by both the departmental heads of functions and production. Freedom will start to be given to divisions located in off-shore operations to make production and service decisions, but the headquarters will continue to have control over most marketing and financing departments. The network is becoming moderately flexible, and decisions will be centralised with power being given to experts.

These experts, whose knowledge and skills have been highly developed in training programmes and business schools, will be controlled by an extensive international communication system. Strategy-making will become more fragmented, more flexible, and enable local divisions to react decisively to the newest or strongest threat arising from the environment.

2.9.7 The Year 2000: Polyvalent- Entrepreneurial Mode.

Management in this period must deal with the short term problem of rapid change, whilst developing more innovative products. Competition will become tougher, ever changing as the customers become more sophisticated in specifying value over cost. Due to the levelling effect of technology, smaller firms will be able to compete head on with larger ones. Downsizing and restructuring

into smaller units by many of the larger international firms will take place.

Contemporary writers (Peters, 1987:31; Waterman, 1989:102) estimate that up to 75 percent of most larger firms' middle managers will be reduced and the lead time for developing new products to market will be slashed by some 90 percent. Risk-taking, entrepreneurship, independent action and flexibility will be the chief modes of management. Employees will be expected to be polyvalent- able to deal simultaneously with current and future problems at the same time.

In his vision of the future, Handy (1989) projects that a significant amount of the workforce within some firms will become self-employed and hired through personal contracts. Others in the workforce will be hired and trained for their entrepreneurial and technical skills.

Based on Handy, the governance process will be to seek new opportunities and competitive advantages by more and better innovation. Worldwide operations will be completely autogenous from one workstation to another; using a flexible and linked (nexus) organisational structure with one project manager reporting to another.

In this period, all aspects of a project will be distributed all over the world building on values indigenous to certain areas of the globe. For example, a product may be designed in North America, manufactured in Thailand, tested for quality in Japan, assembled in Germany and sold in Britain. It will be later serviced by a subsidiary of the parent company. This is the type of linked project manufacturing-service company being forecasted in the year 2000 by the studies at Boston University (Miller et al,1983).

This international dimension of production, communication and operations will be linked by computers, and joint cooperative agreements forced upon them by knowledgeable customers (e. g. airbus, motor car). The emerging management model will be for employees to be granted freedom to innovate and experiment on company time. The overall organisational structure will be extremely flexible and training will be offered to combat obsolescence and to stimulate innovation amongst the workforce.

It is projected that strategy-making will be punctuated and multi-layered to provide a series of co-ordinal technological, behavioural, and human resource strategies to combat occupational obsolescence. Discussion of the strategic elements to be used by this mode will be illustrated in Chapter Five.

2.10 DISCUSSION ON HOW BUSINESS STRATEGY WAS DEVELOPED

The literature (Chandler, 1977) describes how major impetus in the development of strategic management owed its origins largely to rapid and hostile changes being faced by businesses.

These hostile changes go as far back as the 1920's and intensified through the 1940's. It was in this twenty year period of fluxion that strategy became recognized as being important and useful to the conduct of business. Business concepts before this period were directed more to functional and task specializations.

The period of time as exhibited in Table No.1, (1920-40: MACHINE BUREAUCRACY) was the watershed for strategy development and awareness. This was the period when the business environment became increasingly more competitive.

Out of a body of literature including the research of Forrester (1961); Chandler (1977); Smith (1963); and Ansoff

(1965) there seem to be nine different factors with a direct bearing on the need for gaining a better strategic perspective within the field of management. They range from factors in the environment to the development of strategy as a discipline within the field of management, and are discussed in the Appendix Section of this study.

These factors as ranked in importance were:

1. Business Environment became more hostile.
2. The spread of foreign markets and operations.
3. Unforeseen decline of markets and products.
4. Rise in technical and pecuniary economies theories.
5. Investment cycles became longer and risk greater.
6. Organisational structure became more complex.
7. Management education providers increased.
8. Wealth-creation opportunities in management,
9. Standardization of strategy as a managerial tool.

A combination of these factors, therein, forced business leaders to use more rational approaches in their efforts to understand, control and exploit these changes.

The major development of this discipline was the recognition by corporate planners in the 1980's that the nomenclature of being "a planner rather than a manager" was misleading and by its continuous use isolated the planners from the mainstream of management. It is in the ADHOCRACY MODE that the proponents of strategic planning began to question the overall effectiveness of its practice, and to concentrate academically and professionally on the search for an overall theory.

2.11 Summary

The literature on military strategy offers a series of enabling rules as to how strategy should be executed. However, it was the acts of innovation (stirrup, and improved weaponry) which changed the strategic superiority of one force over another. This supports the argument that a strategy of innovation is the ultimate strategy for changing the rules of competition.

This chapter also shows that the field of strategic management is not contained in any applied science, but its core ideas are now being incorporated into industrial organisation research and is one of the central fields in modern business theory and practice. The field of strategy is best described by Hofer (1984) who explained how the field must now concern itself with two main cores of study.

The first core of strategic management should deal with all aspects of strategy formulation and execution; and the second being the macro-organisational design and behaviour pattern of managers in a business situation. These two core ideas give a guide to how a strategic paradigm within the boundaries of this field should be designed.

In the managers' quest for answers, the chapter outlined how attempts were made academically to formulate a strategic theory. In short, the stakeholders in business increased from the will of the few to the concerns of many. The understanding gained here as to how the field of strategy was developed will become increasingly more important as the need for all types of firms to innovate becomes the new thrust in the field of strategic management.

This chapter provides a strong contextual background to the development of this thesis. This review of the literature

indicated how the convergence of the factors discussed in Appendix A, and business conditions in the early 1900's intensified the efforts of modern business managers to develop a study of strategy. It also discusses as to how by 1930, strategy evolved into a tool for managers to acquire, expand or merge their firms more competitively than in the 1920's.

Up through this period, the general thinking about strategic issues varied little from the first article on the topic written in the Harvard Business Review (1922), descriptive on what has been done or prescriptive on what should be done. Either way, the planning styles were, by and large, retrospective in nature.

Further, the researchers, in the past, precluded the consideration of widely differing options, resulting in an intellectual planning straitjacket of concepts. Their analytical approach was based on decimal points and consolidation of disciplines, but not on the strategic direction needed for the future. A strategic approach requiring the need for innovation and flexibility was often missing in their planning schemes. They failed to understand that a corporate strategic profile should be considered only as the initial steps in a competitive strategy. It is secondary to the drafting and negotiating of a mission statement which must be articulated to and understood by all employees. The mission statement will then form the unifying thread for strategic implementation as stated by Ansoff.

By contrast, current researchers (e.g. Hofer, Glueck and Jauch, Tilles, Quinn) indicates that strategic management includes formulation, and implementation, plus evaluation and control. They focus on how the mission of the corporation derived from the interaction of internal and external environmental factors, modified by the needs and values of top management is the key strategic ingredient. They argue how a

precise statement of mission is needed to guide the firm in the setting of objectives and the formulation of strategy and policies. Then, strategy is implemented through specific programmes, budgets and procedures. They understand that corporate strategy and business policy only explore the ways a firm can develop a "portfolio strategy" for its many activities.

They, now, believe that a firm needs three levels of strategy- corporate, business, and functional- to form a hierarchy of strategy interacting for a firm to be successful. It is by the monitoring of these separate strategies that management can evaluate its performance toward future, not just the formulation.

It was during these periods (from 1920 through the 60's as exhibited in Table 1 that the field of strategy developed from a single concept of planning into a multi-purposed one dealing with uncertainty by using an overall organisational approach to solving strategic problems. However, it was not until the rise of professionalism era in the 1960's that the field of strategic management was stimulated. A force created by the needs of management and an increasing complex business environment. As businesses in the USA and other developed countries flourished, the number of business schools proliferated, growing from three in the nineteenth century to 50 by 1920, and to 85 by 1940. The emergence of a need for this new skill became the major reason why many entered business schools. It was when managers sought a greater variety of systems that there was a rise in the field of strategic management.

2.11.1 Implications Arising

From the literature review, it is clearer now why the present and future climates of change require more dynamic models than those used previously. It, also, indicated how that strategic models

in the future will require more stimulation from innovation and more entrepreneurial acts by all employees to a specific mission.

Discussions will be presented in the following chapters and in the Appendix section on how the "nescient principle" (a belief that most top managers will be operating in ignorance) governs when managers totally start to believe in either the analytical school or the intuitive schools of strategy. And how the sovereignty principle is the "supreme element" (as to what type of business and experience the firm has previously been successful in) will dictate how strategic choices are selected (Andrews 1965: quoting Stephenson (1976) states that "the knowledge and experience of the firm are the truly key links which determine a firm's core competences").

These principles which form the basis for this research raise questions such as:

- i) Is there one principle or a series of patterns as to how a strategy for innovation will be developed?
- ii) What are the enabling elements a manager should incorporate into a successful strategy for innovation?
- iii) Is a strategy for innovation (change) different from one of growth or one of profit?

To these questions, the elements which are needed to have the most enabling type of strategy will be argued elsewhere in this thesis. It will be argued that there are up to nine "enabling" elements for a successful strategy, especially in the development of an innovation.

Research indicates that the key five elements are: (1) The mission statement is the sovereignty element in which all

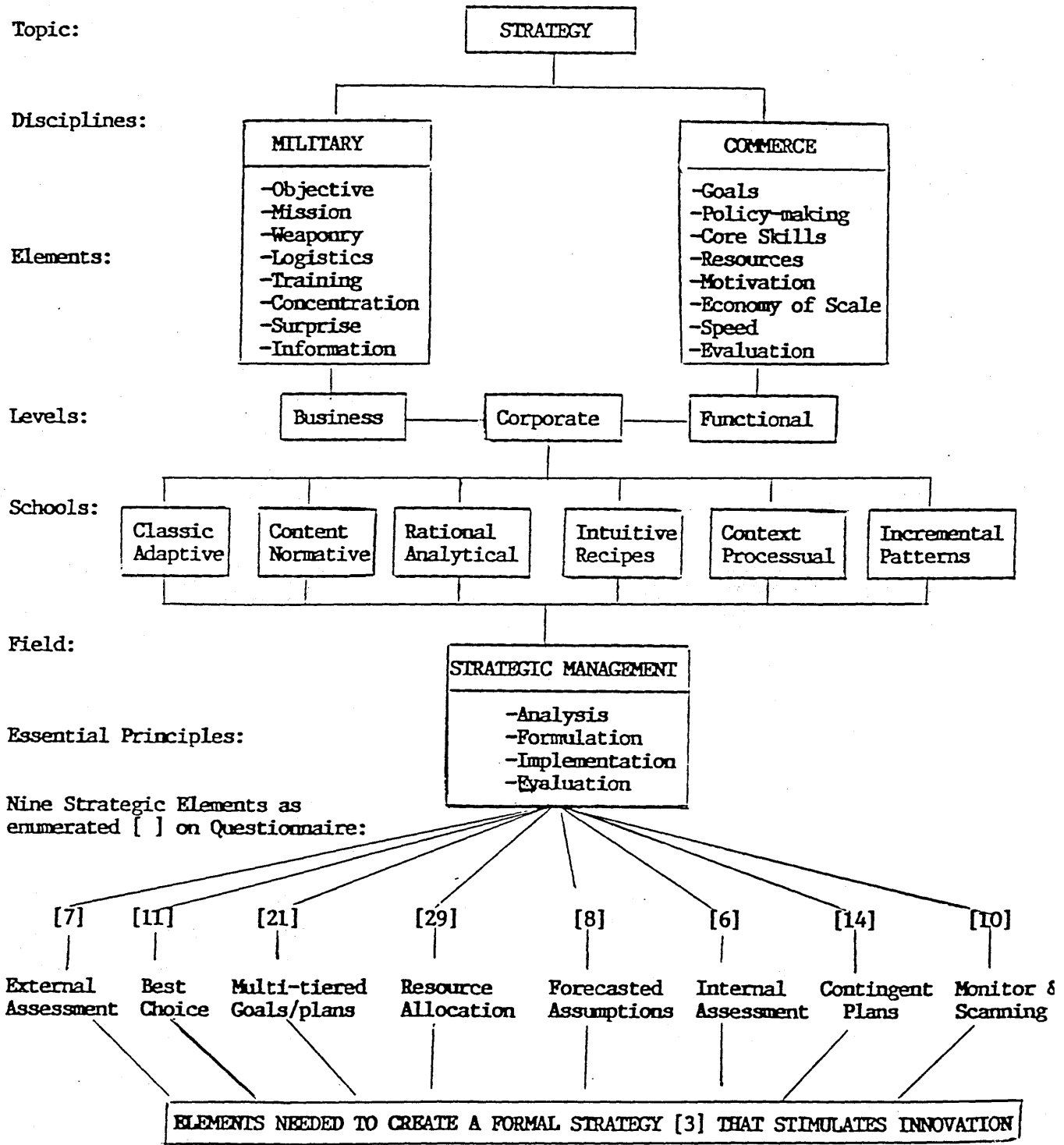
alternatives are evaluated; (2) Most plans are incomplete unless employees at every level are trained to communicate without bias about what is happening in their environment; (3) The company should have a plan to combat occupational obsolescence so innovation can occur when an employee has time away to learn; (4) The company should have funds allocate for the specific investigation and development of innovation; and (5) The strategy should be able to reward all types of employees that contribute with new ways and be willing to bend to internal forces as well as external ones.

Central to all of these sets of definitions is the need to mobilize others to a plan which includes as much information as possible. The presence of certain factors (goals, base of information, mission statement, action) constitute a strategy whether it is a process, concept or plan. A strategy, at its best, can provide a degree of certainty that one is acting "proactively" in an uncertain environment, but it is not a guarantee of success.

Hopefully, the next stage of development within the field of strategic management will concern itself as to how change, innovation, and entrepreneurship will take leading roles which will assist in the development of a strategic theory. This is one of the central themes in this thesis.

In support of this theme, the nine strategic elements, as outlined above, were developed into specific questions which were dispersed throughout the questionnaire. The linkage of these questions will determine whether or not each respondent is truly using a formal strategy. The construction and reference for these strategic elements are shown in Exhibit No. 1 and in the Supplementary Chart- Exhibit 1A on the next page.

CHART EXHIBIT 1A
LINKING STRATEGIC ELEMENTS TO QUESTIONNAIRE IN EXHIBIT No. 1



CHAPTER THREE

INNOVATION AND STRATEGY

3.0 AIMS

This chapter provides some traditional definitions, and concepts on innovation as they relate to strategy.

It starts by outlining two basic types of innovation and the sequences of their development from basic research to placing a product on the market. Then, it explores the various schools of writing and how they defined the causes of innovation. The understanding of these concepts and arguments shapes one of the conceptual foundations for this study.

3.1 INTRODUCTION

Although this study is primarily concerned with a broad definition of innovation (the effective application of a new idea), the literature supports many other definitions. For instance, specifically:

(a) There is a technical definition (Littler, 1988) that technological innovation occurs "when technology replaces a skill or enhances a skill" to the degree that it coined a new name or spawned a new industry (e.g. from hand lettering to typing to word processing);

(b) There is a scientific definition as stipulated by Clark (1961) that "innovation is the end process of any invention which has been commercially tested";

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(c) There is a marketing definition as suggested by Gerlach and Wainwright (1968) and covers six types of product innovation, namely:

1. A process or product new to a firm, but not new to the world
2. A different size, or weight
3. A new package, form or delivery
4. A different material or physical form
5. An improved version of an existing product/service
6. A truly new product rising from an invention

(d) Finally there is a strategic definition of innovation as defined by Henderson (1989:141) that "innovation is the evolution of change for a competitive advantage whether it is a new product, idea, or process. The planning for this change requires a deliberate search and that is the mission of a strategy for innovation".

Clearly the range of these definitions opens the way to many others. However, this study discusses just two of the definitions for innovation: the technical process and the strategic view. From these two definitions, several questions will be answered as to how innovation is linked to other strategic issues in the literature.

The first recurring question is whether innovation is defined differently when it used for developing new products than when it is used if one is just seeking improvements in existing ones. Other key questions are: is there a difference in the literature depending on whether the innovation is service or production-oriented? Or is there a different way in which product innovation varies from process innovation in terms as to how they are stimulated? These questions are debated in several different ways.

Braun (1981) argues that existing theories do not fully explain our requirements for understanding how innovation is created. Moreover, he prophesied "if one could understand the circumstances,

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at least, innovation could be nurtured, directed or assisted in its development".

First, the literature tends to wander how certain activities lead to innovation, but does crystalize on several points. One is the Constellation of Circumstances Theory advanced by Braun that the first step toward innovation is the identification of a weak link in an existing manufacturing or servicing system. This link may be revealed from a variety of individual circumstances: skill shortage, lack of material, wastage of energy, returned goods, loss of key customers, inadequate output, safety regulations, unreliable equipment, high costs, and poor working conditions. This list is not exhaustive.

The second point is that generally an actor turns to existing technology (machinery, process, knowledge) to solve the problem. This actor may be an innovation champion acting independently or a wide range of personnel. These actors borrowing from other theories of innovation are: gate-keepers, researchers, managers, intrapreneurs, product champions, etc. The key element is the belief of an actor(s) that a problem can be solved or must be solved.

To this point, Braun argues that only when these actors failed to solve the problem with existing methods or technology that innovation begins. For it is in this next phase (when an actor tries to modify current technology to solve the problem or begin a programme to solve the problem) that the second phase of innovation begins.

From these two stages, implementation and commercial acceptance may proceed incrementally or in large leaps. The essential element is that actors will follow certain steps when circumstances lead to the discovery of a weak link; when there are actors wanting a change; and that there must be some type of testing before offering it commercially. It seems from these points that innovation requires a

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plan of discovery based on monitoring circumstances and structuring a programme as to how innovation will work. Some argue that organisational development of such a plan provides a strategic focus for innovation within a firm (Quinn, 1989:637; Burgelman 1984:34).

In a similar vein, there seems to be an increasing belief that the practice of innovation should be incorporated into the field of strategic management as one of the mainstays for dealing with keener competition, declining markets, drops in market shares, and environmental turbulence (Drucker, 1985).

Others (Hounshell and Smith, 1988) believe the most successful innovation systems aren't systems at all. Drawing lines between strategy, management, theoretical and applied research are arbitrary acts, for it is the environment which stimulates innovation.

They argue for environments hospitable to people with innovative thoughts. For economic policies which encourage people to explore new paths and take meaningful risks at reasonable costs. For companies where innovation is nurtured and curiosity is a highly valued skill. But a justified criticism is that the proponents of this environmental approach do not show how skills and values should be managed differently within such environments.

The other parts of the debate are whether the elements of being innovative are best stimulated formally or informally. A third recurring theme is the nettlesome dichotomy between the larger firm and the smaller one. Is the ideal organisational setting for the stimulation of innovation, a division of a large firm, an unstructured team of experts, or one man within a smaller firm?

Does innovation occur easier in a formal research and development programme using professional researchers or best brought to fruition by a tinkering self-motivated employee?

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Some corporate strategists (Roberts, 1965; Andrews, 1971) believe pure science and applied technology should remain separate and unequal. They argue that companies should be more interested in the creation of market share rather than the creation of knowledge unless the two somehow are linked. For example, some firms quite wisely do virtually no research and development (R & D) and others rely on a formal R&D programme to accomplish the same.

Between these extremes there are many variations and theories as to how innovation is simulated. Because of this array of opinions, an overview on the process of innovation follows.

3.2 DEFINITIONS OF THE INNOVATIVE PROCESS

Depending as to which literature of technological change and management is reviewed, the process of innovation can be one of two distinct yet closely related connotation.

In the technical sector, innovation is seen as a a sequence of evolutionary steps. As proposed by Bright (1969), the six stages of innovation are:

1. Basic Research- investigating the scientific dimensions of a physical phenomenon without any defined use in the mind of the researchers.
2. Applied Research- identifying a specific use or application of the knowledge gained in basic research.
3. Developmental- testing and modelling a potential application into a set of specifications which can show the capabilities of a new product or process.

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4. Experimental- converting a process model or prototype into cost factors so the economic concerns for its overall feasibility as an innovation is established.

5. Commercial- designing and assembling the manufacturing or process equipment, then modifying it until a full manufacturing operation is able to produce the innovation and to reach acceptable efficiencies needed in a commercial venture.

6. Marketing- overcoming any technical problems of distribution and customer use by a new marketing method or an older one.

In practice, the separation of these six stages of technological innovation is fuzzy. The sequence is not immutable, (e.g. steps 3 and 4 may precede step 2). Problems encountered at any one stage may require backtracking to a previous stage. For instance, a difficulty uncovered in a pilot project may signal the need for further development or more applied research.

Similarly, management practice requires forward bridging of these sequences from time to time. Thus, basic research shades into applied research, and applied research shades into development. Especially important is a frequent checking of market potential and market requirements during all of the stages except basic research.

Further, the type of output projected for each phase is revealing. Table no. 2, to follow, presents an outline of these six stages of technological innovation with respect to output, predictability of results, and types of personnel involved.

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Table No. 2: Normal Stages of a Technological Innovation

Stages	Output	Ability to Predict Results	Kinds of Personnel Involved
1. Basic research	Knowledge	None	Scientists/researchers
2. Applied research	Application	Little	Inventors and engineers
3. Development	Operationally tested	Some	Proposer to managers
4. Pilot Project	Economic factors	Moderate	Organisation-sponsored
5. Integration	Systematic Approach	Moderate	Managers, Specialists
6. Marketing	Buyer acceptance	High	Marketing personnel

Sources: adapted from Littler, 1988; Pinchot, 1986; Newman and Logan, 1976

This table outlines how technological innovation, starting with basic research, is dominated generally by trained personnel through its development process (Newman and Logan, 1976:159). It also illustrates the key features of technological innovation and how personnel is controlled and the predictability of results at each stage. It implies that a strategy is in place because few companies allow their personnel to organise their own work without approval or a defined objective.

The feature of how and why these personnel are controlled is something that the literature does not address adequately. The variations as to how these personnel could be controlled are numerous of just a few. But they must be controlled to some type of plan.

The question arising about structure and innovation is whether or not employees of a firm are managed in a style and structure and using a type of a technological strategy that may be loosely defined or tightly controlled? For instance, certain companies permit their researchers to devote, say, 20% of their time to anything that intrigue them. Other companies impose tight budgets and firm deadlines for each stage of development. These types of guide lines -

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policy- focus the effort and are directly derived from some type of a company strategy.

For an contrasting view in the business literature, innovation is sometimes regarded as an act-the commercial exploitation of an invention - for a strategic advantage. Followers of this more restricted view are observing the distinction between invention and innovation first advanced by Schumpeter (1942). One of the debates within this body of literature is whether innovation and invention are separate activities or the latter development of the same. The literature clearly states that invention is an essential perquisite of innovation, but it does not argue that innovation, itself, is a sufficient condition of invention.

In fact, much of the literature overlooks how the ingenious marriage of exploiting an invention's features and developing a marketable innovation often gives a company an unique strength. It also overlooks the view that it is not the improving of the features of an invention, but the marketing of its benefits that is one of the concepts to successful strategic innovation. It does not emphasize enough how the scanning of the environment, and the management structure and style determine the pace and urgency to which an innovation is developed. The technical literature explains at great length about the process of innovation and invention, but not the variety of personnel and the strategic concepts to which they operate. The adoption of these concepts is best done in six steps as shown in Table No. 3:

Table No. 3: Normal Stages of a Strategic Innovation

Stage	Output	Ability To Predict Results	Types of Personnel Involved
1. Conceptualizing	An Idea	Little	Tinkerers, Intrapreneurs
2. Industry Analysis	Feasibility	Little	Planners, Top Management
3. Scanning Procedure	Competitive Edge	Moderate	New Business Specialists
4. Development	Feasibility	Moderate	Engineers, Specialists
5. Customer Research	New Market	High	Marketing researchers
6. Education of Buyers	Competitive Edge	High	Sales Specialists

Source: Pinchot, 1986; Quinn, 1988; and Drucker, 1990.

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Table No. 3 shows how the sequential steps in a strategic sense differs from the technological innovation in several different ways. First, unlike the technological innovation, it is not primarily used to solve a problem, but to compete using innovation for lower costs or product differentiation strategies (Porter, 1986). Second, it generally starts from a conceptualizing stage rather than from basic research and goes from applied research to educating the customers (Burgelman, 1984). The competitive advantage is the speed in which a firm goes from one stage to another. Third, a systematic scanning of the industry is recommended before the development of an innovation is attempted. While these may seem to reflect a similar flow to the steps in a normal technological development cycle, then what is its strategic advantage?

In short, how fast, after applied research, the idea is transferred into market acceptance determines its strategic value. The speed of the innovation in passing through a sequence of development is increased by some and deliberately slowed down by others, each depending on its previous strategic history of either being innovative as a pioneer or a market follower.

These concepts of strategies for innovation were based upon the tacit acceptance of the Schumpeterian distinction that the technology transfer or the organisational slack between application and full commercial development constituted the strategic element.

The next question is how does a firm decide to innovate. This can be approached by two separate and parallel tracks. First, there is the formal method based on an industry analysis, which is a prerequisite for drawing up a company strategy. Or secondly, there are informal methods propelled by external forces of competition, customers or suppliers, these are generally found in a maturing industry. For in a mature industry lower costs are necessary to meet price competition. Then the attempt to innovate resulting in lower costs, cheaper material, etc. may be crucial. One approach used by

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many firms is to deal only with improvements where the savings are significant (e.g. not less than 12 percent as used by Pratt & Whitney Aircraft). On the other hand, newly designed products may be the primary success factors in another industry, so there the focus would be on products.

Other decisions rising from the overall strategic decision to innovate still leave open the question of which type of product to concentrate on. Does a firm stick to existing products or does it seek to capture new markets with new products? Does a firm develop products that are (a) new, (b) patentable and (c) consumable (repeat business) or just concentrate on core product improvements? Does it acquire another firm as a forward integration method of diversification in an attempt to innovate or seek to enter another market where its core skills are transferrable (e.g. Du Pont development of nylon by its paint division).

Business literature, further, argues that the purpose of innovation is to gain a competitive edge. To be truly competitive, one may ask whether the elements of surprise and the speed in developing the innovation must then be viewed as the essential features. While dramatic innovations such as Carlson's Xerography or Land's Polaroid are mentioned as examples of innovation in business, in reality, these are poor illustrations of innovation in practice. To dwell on major discoveries are the fallacies of some and tend to discount the incremental cycle of innovation.

Generally, the success of strategic innovation does not depend solely on major breakthrough innovations, but more on a succession of small improvements, built one upon another, that in total add up to a major change. Does this indicates strongly that innovation is more an evolutionary process rather than a revolutionary process? But can innovation be evolutionary and still possesses a competitive advantage when other companies are aware of it being developed. This

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view opens up another dimension in how successful innovation can be described, is it best defined as evolutionary or revolutionary?

The issue as to whether innovation is best described as being evolutionary or revolutionary is also argued in the literature. Quim (1985) states that by his research "few, if any, major innovations result from highly structured planning systems". The operative word is major, for he argued while major innovations in mature organisation can pose problems, "flexible structures can produce a stream of moderate innovations incrementally almost at will".

For contrast, the literature gives examples of Hewlett-Packard, 3M, Intel and Dewey & Almy, suppliers of highly technical specialities, who innovate around and through formal planning systems. They, either by policies such as Intel, allow up to 20 percent of each employee's time to bring innovations to the marketplace. Other companies form parallel programs to test new technologies before system wide commitments. These programmes incorporate the incremental character of innovation and provide a more common description of the process than the random breakthrough assumptions of some writers.

The other fallacy, argued in the literature, is the relationship between the patents and innovation. Klein (1977:639) argues that only the holders of patents possess strategic advantages within an industry. Bright (1969:244) disagrees and believe it is the firm's relationship with either sources of supply or buyers that created a strategic advantage. He argues that while the basic invention being protected by a patent is a great competitive advantage, the majority of innovations are done without such protection.

He explains that it is the firm's speed to innovate past the conceptual stage of an invention that determine its strategic

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advantage. Most firms advance an innovation a step at a time, and their success is measured by who is stepping fastest. Other firms build on the advances of another, enter the market late by a plan and still are successful. He found that companies using a combination of strategies with a delayed method of marketing, but an accelerated method of product development were common practices within certain industries (e. g. chemical, electronics, and manufacturing).

What follows are the theoretical distinctions offered for innovation and how the literature debates whether the process of innovation is a strategic element or not; when and how a firm gains a competitive advantage.

3.3 THEORETICAL DISTINCTIONS

The theoretical distinction between what is innovation and invention has been discussed by a wide range of management writers (Schumpeter, 1939, Fishlock, 1987; Mansfield, 1969; Blundell, 1968; Jewkes, 1969; Bright, 1970; Little, 1988; Von Hoppel, 1979; Drucker, 1985; Kanter, 1986). Each contributed to sharpen the definition between the concepts according to whether they treated innovation as a commercial process or a technical one.

These writers and theorists can be grouped into several different schools. They range from those who view innovation as either an expression of economics, a human endeavour, scientific pursuit, to the school of the universalists, whom embrace any type of measurable change as the same. Briefly each will be discussed as follows:

From the economist school and one of the earliest writers reviewed was Schumpeter. He regarded the process of innovation as quite distinct from that of invention. He maintained that invention could exist either independently of, or yet be combined with innovation.

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In his view, he asserted that "invention is something which never existed in the world or experienced by humans before, while .. "innovations can be traced to some earlier conquest in the realm of practical or theoretical knowledge that has occurred earlier (in the remote past or immediate)". He further argued that invention may not have any economic relevance, but an innovation should have an economic effect. His argument has an oddly up-to-date ring, not so much in the terms of how the two concepts differ, but how they should be measured from a commercial perspective.

On the other hand, from a humanist perspective, Mansfield applied the term, "innovation" to be the sole province of applied invention. He stated that economists have traditionally argued, and wrongly, that an invention has little or no economic significance until it is applied and accepted commercially. He felt that an innovation began when an invention is exploited fully by mankind whether or not it has a commercial value.

Also supporting this humanistic point of view is Rogers, who philosophised that innovation is "any idea perceived as new to the individual". To this school, it really matters little so far as the human behaviour is concerned, whether or not the idea is objectively new to the world or how much amount of time has elapsed since its discovery. It is the newness of the idea to the individuals using it for the first time and if they determine it to be useful regardless how long it has been around". To other theorists, this type of definition seemed too broad and impractical to be useful.

For a more pragmatic view, one turns to Drucker (p.16,30), who declared that "innovation is the specific tool of entrepreneurs as means by which they exploit change... It is capable of being presented as a discipline, capable of being learned and practised. It is the creation of value".

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Similarly, Kanter in her research (p.395) quoted several definitions from Thompson, Roberts, and others, who believed, 'that innovation is the process of developing any new and novel problem-solving idea to impact on something already in existence'.

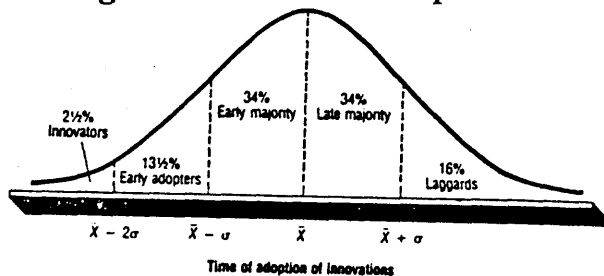
Thus, from this statement and using other definitions, the range of innovation could be expressed as a new way of budgeting, writing music, or making a product - the willingness of people to gamble on the future in order to gain an advantage. Whilst Kanter expresses a universal point of view that any type of improvement valued by humans to improve their existence is innovation, it does not explain the scope of innovation from a scientific viewpoint.

3.4 SCOPE OF INNOVATION

The scientific scope and range of innovation as a concept conveys several meanings. This is particular true because the term is used in many different ways across disciplines and industries.

For example, in some disciplines, it means the creation of something new is stressed (e.g. in psychology and economics). Other disciplines use it to emphasize the adoption of something new to the adopter (e.g. in marketing and organisational science). Or, as used in diagram 3.1, it describes the diffusion process of acceptance, i.e. how the adoption of a new product, process or idea is spread throughout a social milieu over time by different sections of a community of users (Rogers,1983,1962).

Diagram 3.1: Time and Adoption of Innovations



Source: Redrawn from Everett M. Rogers, *Diffusion of Innovations* (New York: Free Press, 1962), p. 162.

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This diagram illustrates how people can be classified in their readiness to try new products. The adoption process can be represented as a normal distribution when plotted over time, and each of the five adopter groups has a differing value. Whether this adopter classification of time by Rogers can be used by an innovating firm is the question. It will be argued that the conversion of these terms of Rogers could be correlated to be the same as the strategies of a company: innovators (Pioneers and Opportunists) willing to try new ideas at some risk; early adopters (Imitators) willing to adopt new ideas early, but carefully; whilst early majority (Followers) will adopt innovation only after the leaders in their industries do; late majority (Dependents and Fatalists), on the other hand, will adopt only when customers and standards of the industry force them to do so; laggards (Traditionalists and Fatalists) will adopt an innovation only when it has taken on the measure of tradition itself.

As to how this chart can be used, Rogers (1976:139) further noted "... many innovations go through many extensive revisions, essentially announcing this as "reinventing", in the process of their adoption to be conceived as better than those in existence ". He suggests that an innovating firm would use this adoption cycle in a couple ways. One is to research potential users of an innovation and to phase sales communication material over time accordingly. Second, the willingness of companies to innovate depends on the mixture of its workforce recruited from the community at large. Certain communities tend to have more people, who are innovators, adopters, etc. and who are drawn there by education, life style, and employment opportunities dictated by their skills. Thus, a firm should locate in this type of community and then use its marketing forces to inform all potential users of the benefits of an innovation. This process of newness using employees and location will stimulate innovation, internally and externally. Drucker refers to this total concept as "the creative imitation process" and states it begins with an employee with a new idea and ends only when it is purchased with the expectation by a buyer, who welcome innovation.

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Even when applying the basic concept of newness to the scope of innovation, the field denies common terms. Also, it is lucidly clear that the use of the word innovation by so many sources and disciplines makes it so wide-ranging a topic that to render an edited view is to narrow the power and complexity of the subject.

Two seminal definitions bearing out this conclusion. First from the Central Advisory Council Report (1968) for Science and technology where it is stated, "innovation can imply simple investment in new manufacturing equipment or any technical measures to improve the methods of production; whether it might mean the whole sequence of scientific research, market research, invention, development, design, tooling, first production and marketing of a new product".

And later from the Project SAPPHO, a British-based study of 43 different industrial innovations in 1972 at the University of Sussex, which qualified innovation as "a complex sequence of events, involving scientific research from its invention to its technological development resulting in management, production and selling of it as a new product".

As a summary of the above definitions, innovation depends on inventions, but inventions must be harnessed to commercial activities before they can contribute to society or an organisation. If any conclusion can be drawn from the review of these writers it is that a managerial, or scientific perspective differs as to what is an innovation. Different people offer different meanings, but can it be reduced down to one definition is the question.

Different schools of thought indicate that innovations may involve fundamentally new inventions, as well as they could refer to any commercial improvements in existing methods of manufacturing/ service/ research. The key point is ...do they result in new versions that can be measured economically superior to existing

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products/processes? In short, innovation is any novelty that has an economic purpose.

3.5 INNOVATION AS A TOPIC FOR RESEARCH

For the purposes of this research, innovation as a concept and as a logic for future research is defined herein: the conceptualizing, development and introduction of new methods, tools, techniques, of new approaches, philosophy, way of thinking; and new themes in an existing field of application (Kanter,1983).

By these definitions, then, innovation could be interpreted as anything that provide a competitive advantage. Examples of its concepts are: a new accounting system, televideo as a new form of communication. Examples of new approaches may comprise using a new management theory or the use of a matrix organisational structure. New themes may contain topics such as intrapreneurship, corporate culture, participation management or just the improved well-being of one's workforce. New fields of its use, for examples, could include the application of technology and a new type of organisation theory; all can be included under this definition.

Setting aside the plethora of definitions in the literature, in a strategic sense, a narrower definition is needed. The preferred definition that best fits the need of strategic planning (MGimnis, 1984:47; Shepard,1967:470-7) perhaps is the following:

"innovation occurs when a firm through its employees learns to do something it did not do before, and then proceeds to do it in a sustained way... or... learns not to do something it formerly did, and proceeds not to do it in a sustained way".

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This means that the innovative firm or its employees are willing to learn new ways and the firm is willing to bend when it is useful for a purpose. By this definition, it is the opposite of being "obsolescent". This being a term when a process, idea, skill, or product is no longer useful and has been clearly and authoritatively defined, both, in the social science and engineering fields (Ferdinand, 1965; Mali, 1970; Malmros, 1988). In other words, to innovate is to combat obsolescence for a strategic advantage.

In a sense, this implies that strategic innovation is a contrast to old and established methods, approaches, themes, and fields of application. It is a dichotomy which can be made between the old and new, the existing and the new, and supports a common definition and even labels, regardless of industry. However, research does indicate in all cases, that it requires a risk-taking entrepreneurial attitude toward change (Leavitt, 1973; Pettigrew, 1988; Drucker, 1985).

3.6 CATEGORIES OF INNOVATION

Further research indicates that the categories of innovation reflect to some degree the difficulty which arises in defining the term of innovation without placing it in a context first. Whenever this is done, it increases its value as a concept.

The value in placing innovation as a practice or a process into categories can ameliorate the concept from a vague murky topic of interest into a multi-faceted discipline. In doing so, it approaches a theory for innovation in two different ways.

First, it ascertains that innovation can broadly be bifurcated into two distinct and definite groups: one which either enhances current skills and products or one which displaces them depending on the constellation of circumstances which created them. Innovation represents the most useful data, technique, process or product available at that time. It is the opposite of being "obsolescent"-no longer useful.

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Secondly, it is more important and easier to classify them along a continuum of impact which reflects the advances they have made whether they are minor, major or radical improvements over that already existing.

This is illustrated best when placed at the extreme end of the continuum are the radical earth-shattering innovations (mentioned earlier) which are generally rare events: the polaroid camera or the dry-copying process of Xerox are two unique examples of this ilk. And to cluster at the other end of the continuum, the minor innovations comprised mostly of small improvements made incrementally. These generally do not gain the headlines and attention, but their contribution can be just as real and the gain may be substantial.

From this attempt to place innovations into categories, the impact of two other key elements should be discussed. The first is how the behaviour of individuals dictate the pattern of innovation and second, how they use information.

3.7 INNOVATION BY THE INDIVIDUAL

The behaviour of the individual to innovate is the untapped reserve which probably accounts for most of the accomplishments of mankind in the field of innovation. There is a rich field of the literature (Collins and Moore, 1970; Madidique, 1980) existing on the heroic independent efforts of individuals to find innovative solutions or to chart new courses for existing ways.

During the past two decades, new literature has emerged on entrepreneurship (Quim, 1980; Schon, 1963) and product champions (Pinchot, 1986) within firms who carry the burden of innovation against organisational structure and resistance. The significance of such an individual has been recognised for at least the last two centuries. It was J. B. Say, the French economist, who first mentioned the

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entrepreneurial behaviour of the innovator as" the pivot on which everything turns" (Schumpeter, 1954:554).

The first academic to write extensively about these individuals, who championed innovation, was A. D. Schon. Schon (1963:84) found that the "new idea either finds a champion or dies". His analysis led him to four basic conclusions:

1. At the outset, the new idea encounters sharp resistance.
2. Overcoming this resistance requires vigorous self-promotion.
3. Proponents of the idea would work primarily through the informal systems of an organisation rather than the formal structure to win acceptance and sponsorship of its concept.
4. Typically one person emerged as the champion of the idea.

In the decades following Schon's work, new names for the old roles of championing ideas within a corporation that he wrote about began to appear in the literature such as " internal entrepreneurs, business innovators, change agents, sponsors, and intrapreneurs " (Tushman, 1988:567).

Studies by others (Collins and Moore, 1964; Duschesneau and Olsen, 1977) found similar correlations between independently-acting managers, entrepreneurs and product champions. One of the common characteristics of these individuals was the way they were able to convert existing information into ideas for innovation. It seems that this body of literature clearly indicates that one of the keys to stimulating innovation within a firm starts when the structure of the firm allows these types of individuals time to experiment, and question existing methods using the sponsorship by some type of corporate programme.

3.8 THE USE OF INFORMATION TO NURTURE INNOVATION

Studies indicate that information can be a doubled edged weapon for innovation; if used well, it can support new, imaginative developments and be used to convince potential sponsors to approve its adoption and

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at the same time be used to quell criticism or to nullify opposition. The literature (Myers and Marquis, 1969; Burgelman, 1984) outlines how there are three main areas in which information could be used by innovators to support an innovation adoption and to suppress resistance to it:

1. **Exploratory Areas-** Innovation by its definition involves leading edge activities, whether an organisation is producing pure research or introducing new practices. The key component for these activities is the skilful use of information to identify problems or opportunities. One of the roles for information in this area is to ensure that the perceived benefits of innovation are repeated at each junction of the innovation development. In this way, it sharpens the objective and scope of the innovation. The other is the development of options. They, both, are central to the innovative effort in its incubatory stages of exploration. Techniques which promote and aid these processes can make a significant contribution and the use of well-documented reports is one of them. This is a skill which can be taught.

2. **Presentation of Ideas-** Innovators often have difficulty in presenting their entrepreneurial vision in a convincing fashion. Most are not aware that a new idea should be conveyed in both an analytical and commercial way. The ability to present a new idea with both of these views intact greatly improves the acceptance of an innovation.

3. **Planning Techniques-** The implementation of innovations is often fraught with difficulties. While standard managerial techniques are important, planning for entirely new ideas needs even greater communication skills to lay out opportunities and problems clearly so sponsors of an innovation can understand why things went wrong or right to ensure continued financial and corporate support.

To these three points, Glueck (1985:59) agrees that whilst innovation needs a champion, who is single-minded, creative, talented and knowledgeable to spark an idea into an innovation, he states, "I

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suggest that there are two other attributes the product champion needs: these attributes distinguish this type of individual from all others: (1) the possession of an ability to store a tremendous amount of raw information; and (2) the skill to communicate, combine, order or connect information in a novel and better way so all can understand what is being newly created".

3.9 SUMMARY

From this section of the literature review, it is clear that a distinction can be made between invention and innovation. An invention can be defined as the discovery of something new- such as a new production technique or a new product- not existing in the world before. An innovation, on the other hand, can be defined either as the final sequence after the introduction of an invention before its use commercially or as a measured planned improvement of an existing process, product or service.

Among theorists, regardless of their disciplines, it is accepted that innovation is nurtured best and quickest when circumstances dictate a need for it. Further, these theorists believe that new products or processes will not be introduced unless it appeared profitable to do so and the world can exploit it fully.

Also arising from the literature, the development of five hypotheses can be put forward: (1) innovation is a random process occurring because of unsatisfactory circumstances and the curiosity of human nature create a search for a better way. In the final analysis, it is a process of trial and error in which thousands of attempts may be made before a successful way is found; (2) innovation also occurs by individuals as responses to the type of organisational structure in which they work. The flexibility of the organisation structure, the use of information, a firm's policy of allowing experimentation, the reaction of its supervisory rank, and the type of business which the firm is in can either retard or stimulate the process of innovation. The linkage of

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these factors determines if innovation has any strategic importance attached to it.

Thus, innovation may be an external by-product of a firm's environment, but it is more likely to be the product of a firm, its structure, and its employees' efforts to innovate; (3) innovation is the product of science and is the second scientific stage after invention. This proposes that science has a logic and momentum of its own which propels the advancement of an innovation. This school of thought believes that each technological age has a time which will produce a fair amount of innovations depending on whether an industry is going through a time of great scarcity or surplus; (4) innovation occurs because of a well-timed, well-financed, and committed strategy to innovate; and (5) innovation is propelled, most often, by the drive for more profits.

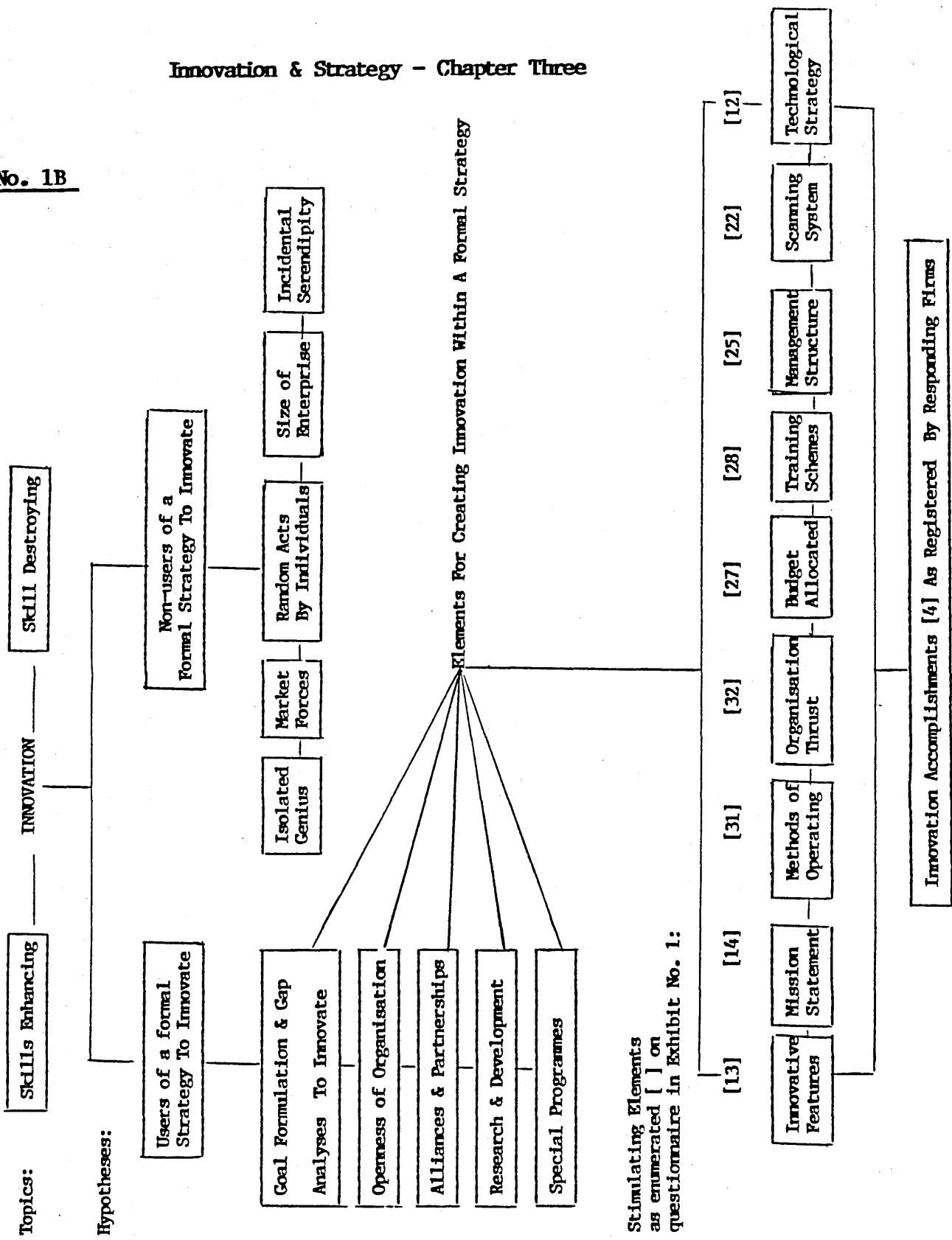
3.9.1 Implications Arising

This thesis argues that all innovations inherently, to some degree, have a strategic element attached to them and for an innovation to occur systematically (being conceptualized and developed within an organisation), it needs some type of a model for decision-making. Examples for some of these models will be present in Chapter Four and as to how these elements of innovation form a strategic linkage will be discussed in Chapter Five.

To discover which of these elements were used by non-users or users in an effort to stimulate innovation and which of them are linked into a formal strategy for innovation, a series of questions were framed in the questionnaire as shown in Exhibit No. 1. As to how these elements were linked by the questionnaire, Supplementary Chart- Exhibit 1B (on the next page) was constructed to display this linkage.

EXHIBIT No. 1B

LINKING THOSE ELEMENTS WHICH STIMULATE INNOVATION TO EXHIBIT No. 1



CHAPTER FOUR

ELEMENTS FOR BUILDING A STRATEGY-MAKING MODEL

4.0 AIMS

This chapter provides an examination of a wide range of the most popular planning and strategic models used in business and in how they are generally selected, formulated, and implemented.

The chapter begins with a blending of views about the quality of the general elements required in a strategic decision-making model. Then it discusses how specific elements in most of the models, in varying degrees of sophistication, are traceable to five major motors of strategic thinking: (1) Intuition; (2) the Experience Curve Theory; (3) Strategic Business Units; (4) the Product life Cycle; and (5) Portfolio Planning.

The suitability of some key models will be discussed in respect of how each may develop the strategic element for innovation as outlined in Chapter Three. The chapter concludes by stating what are the most practicable purposes for each of the models discussed. And whether each model will yield a view of the firm's world which is measurable, understandable and predictable to its users for the stimulation of innovation.

4.1 INTRODUCTION

One of the goals of contemporary strategic management is to develop a philosophy and an approach as to how it will analyse and solve a problem strategically.

Philosophically it assumes that any of the causes that creates a strategic problem can be explained and solved, provided a systematic approach is used. Andrews (1971) states "when a problem is studied systematically with a defined set of variables, whether it is being used formally or informally by managers then it is proper to call it a model". The strategic choice arising from such a model can be no more sophisticated or rational than the method of analysis embodied in the model itself.

The distinction given to a strategic model is that it should be able to determine environmental problems as well as be able to analyse them by a pattern of information. It should draw upon observable elements for a comparison of where a company is in relation to its environment, and provide a better understanding of what the future holds to its user.

The inputs should be parsimonious and draw upon definable and essential data which should enable a company to compete, survive, and prosper. The outputs of the model should contain enough useful information which will assist in the most feasible choice possible.

4.3 DEFINITIONS OF A MODEL AND ITS ELEMENTS

Aczel (1989: 422) defined a model as a framework of evaluation (or paradigm) which is a representation of something real.

It should show important relationships among variables therein, and be able to predict or explain what could or has happened - an artificial description of the real world in miniature- controllable, measurable and manageable in a scaled down size.

In reality most models fall short in fully duplicating their real world counterpart, but they can give one a simplified version of a problem. Even with this admitted statement of incompleteness, one can deal with the essential elements and concentrate on the heart of a problem.

Encapsulated within each model are qualitative and quantitative elements which are included in its construction. Each of these elements should contribute enough useful information so that the most rational decision can be made at that time when consolidated. Each element of the model as a variable should meet the tests of usefulness, accessibility, suitability, and feasibility which will assist in the rationale for the selection of one alternative over another.

Drucker ((1973) has identified other key elements needed in a model for business planning. Succinctly, he outlined how the features of dealing with the future, and digesting the most current information available were the threshold elements needed for managers to organize for action properly. He stated that a strategic model 'is a continuous process of making present entrepreneurial decisions systematically and with the best possible knowledge of their futurity, organising systematically the effort needed to carry out these decisions against expectations through an organised feedback'.

A further definition was offered by Ansoff (1965) that a strategic decision-making model should encompass the elements of system, implementation, and measurement: making decisions

systematically; preparing programmes for their implementation; and measuring actual performance against programmes. Management planning requires, therefore, a method to sustain all of these efforts within precise standards by which one can evaluate their performance. The underpinnings demand that a continuous monitoring device be deployed to ensure that all resources are being optimized toward a goal. Without such a monitoring, chaos takes over and soon reduces any kind of organisation to a miserable shamble.

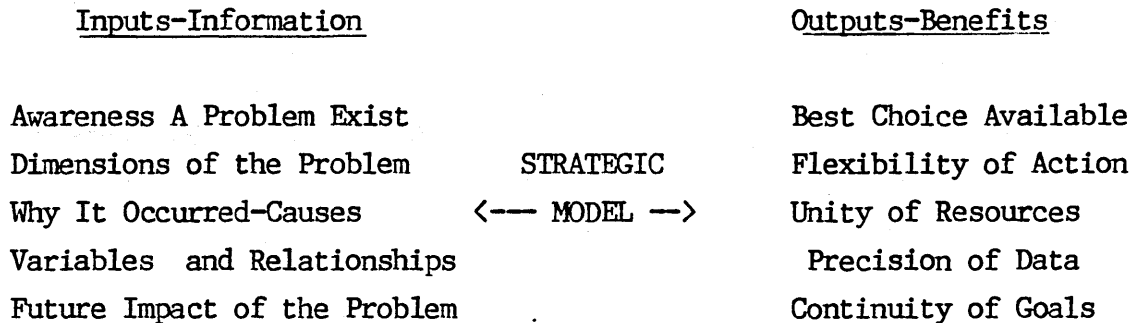
Fayol (1961), a leading management specialist, listed four general elements for an effective plan: unity, continuity, flexibility and precision. He argues that these characteristics are interdependent.

Unity implies that only one organisational plan should be operating at any one time; if more than one plan is put into action, confusion will result and organisational resources will be used inefficiently. Continuity refers to the linking of successive strategies over time so that long-term objectives are finally attained. Flexibility is needed so the plan will be dynamic to avoid the static property of being locked into an untenable decision. Precision demands disciplined methods of measuring and forecasting. Without reliable data and these characteristics, strategy cannot be formulated with reasonable chances of success or be monitored for its tactical effectiveness.

Andrews (1971) also addressed what key elements are needed in a strategic model. They can be best described as "limiting factors" and resources allocation" elements. He sharply defined how the factors of judgement and strategic choices are bounded by these elements. The quality of a strategy rests upon the type of information that decision-makers (DMU's) have at their commands, and in his opinion, "It is one of the chief reasons for planning

in order that the limit of one's resources are made known to a DMU; only then a strategy can be determined".

Diagram 4.1: Theoretical Decision-making Model



4.4 ELEMENTS OF STRATEGIC CHOICES IN A DECISION-MAKING MODEL

All strategic choices began with a bifurcated option of either a "do nothing" or a "this is the time to do something" decision point. It is from the latter decision of taking action that the level of a strategic analysis began and may over time gradually develop into more sophisticated methodology. Springing forth from this decision to take action there is a need for a measurement based on a reference point. Change without reference to an objective accumulation of data is meaningless. Turning to the insightful comments of Nisbet (1969) "the perception that there is a need for change without the dimension of time or an instrument of rationality to measure alternatives, may in the final analysis be fruitless".

To evaluate the alternatives available, one must choose a criterion to distinguish between what constitutes a "good" choice and a desirable end result from what would be considered a "bad" or unsatisfactory choice. To do so, a manager must

feel he/she does know or at least is confident that the model will furnish all the choices available to his/her company. This is a primary test of choice and usefulness.

Deciding which is the most appropriate form and type of model to use is the first part of the equation for the primary test of choice. The answer depends on the purpose of the analysis, the nature of the problem, and the level of detail required. The final answer is guided by two overriding considerations, What kind of information is needed to make a decision that is reasonably accurate, and how fast will the model produce such an answer?

These results when gained from a model or by an attempt to receive them can yield valuable insights such as: (1) forcing the users of the models to recognise a problem area and to decide what types of decisions are required; (2) identifying the variables which are most likely to affect the performance of the overall system; (3) gaining some knowledge of the magnitude of certain actions; and (4) recognising any of the trade-offs and relationships based on costs and profits.

The process for most strategic decisions, in addition to those results mentioned above, usually involve several other major elements. First is the recognition that a problem, an obstacle to achieving a goal, even exists. Second, attempts must be made to identify all alternatives, to evaluate them, to select one best alternative, and be able to implement the decision accordingly. In the process of evaluating and selecting the best choice available, a series of "in-between" steps must be considered peripheral to the decision: namely, identifying the criteria, isolating relevant variables and experimenting on what can be measured or observed.

Central to most decision-making and strategic thinking is the belief that all possible strategic models will (by a systematic comparison of strengths, trade-offs and weaknesses) make an informed choice which is best at that time and under that circumstance. This is the second test of a model's usefulness, the one of "strategic fit" or suitability. It is first decided when a firm dichotomously select a strategy which either builds upon its strengths, or seeks to overcome weaknesses and in both cases to take advantage of an opportunity. It must do so whilst minimising or circumventing the environmental threats facing it at the same time.

Some (Andrews,1971; Ansoff, 1964; Pettigrew 1989) argue that the ultimate purpose of a strategic model is its ability to reduce the uncertainty in a firm's environment by measuring the effects of change. They believe the model is most effective when it is able to measure change before, after, or during its use.

This belief is indirectly based on the assumptions of the Alpha, Beta, Gamma Discovery Theory (Terborg et al, 1982:293) . This theory, in brief, recognises that change of any kind can be measured in one of three ways: Alpha- is a perceptual measure that reflects a stable dimension of reality because people are now aware a change is taking place; Beta- is a change in the perception of a problem because it is viewed differently based upon new inputs (facts); and Gamma- is that a change becomes measurable because there has been an intervention which can show a "pre" and "post" empirical observation. This theory covers some of the elements of the Constellation of Circumstances Theory (Braun, 1981) for innovation discussed earlier in Chapter Three, herein.

4.5 GENERAL LIMITATIONS OF STRATEGIC MODELS

The synergical triad of most strategic models are based on the argument (Porter, 1985; Levitt,1960; Alexander, 1988; Derek, 1980; Peters, 1980; Chisnell, 1989, Foxall,1984) that the firm, its employees and its customers are in a dynamic coexistence.

All sides in this trinity have advantages to be gained from the exchanges between them. The implication from this is a view that a firm's resources and time should be spent in searching each other out, understanding the nature of any issue of mutual concerns and dealing openly and constantly with a flow of information between them. It is felt that this exchange becomes the flywheel for strategic issues and is used as the motor for keeping a model in motion.

The motor or theoretical model propelling strategic choices depends on the type of prevailing sovereignty being practised by a firm. These may range from 'the Customer is king; profits at any sacrifice; or the firm should seek to be the first producer of new products'. They are referred to as the firm's sovereignty principle (Srivastava and Shocker, 1987). Thus the action for any strategic change is based on a large degree around this sovereignty principle. This is another dimension to the perception that something should be changed but only if it support a sovereignty view.

Unfortunately, this conversion of variables into a diagnostic tool does not solve the problem of an emotional sovereignty as an overriding and supreme strategic element (Chamber 1986:1238)). Later in this thesis there will be discussion how all outputs from an analytical perspective will be tested against the sovereignty principle which may be inherent to the culture of a firm.

Most research (e.g. Urban and Hauser, 1980) agrees vigorously that in blending a consumer principle of sovereignty with a competitive reality, a firm is able to discover and balance out the opportunities that are desirable to pursue. However, at the same time, by accepting this overriding perspective such as the "customer is king" and by organizing around such themes, other more logical approaches may be excluded as an analytical tools for defining both the products and people who comprise a product market. By viewing strategic options such as new products abstractly in the terms of benefit/cost bundles, it is then possible to consider choices more objectively. The measurements by perceptions of either employees, suppliers and customers are inchoately conceived, but are building blocks of innovation. However, the points as registered have several of the following implications and limitations:

First, for example when the firm is very young, it is not aided by history, time, or tradition in making a strategic choice and can deploy its resources with the fewest of constraints. But at the same time it should have the most difficulty in implementing its strategy because its newness imposes larger risks and trade-offs from the environment. In contrast, an older firm must bear both the advantages and limitations imposed by its history and track record.

Secondly, a new product in a new firm, serves as a prototype in which all other entrants will be compared. And when there are not any existing standards, then a new product will set them. Its success or failure will loom much larger as a framework of evaluation than would be the case in an older firm which has launched new products previously. On the other hand, a product new to the firm, but not to the market must conform to market norms, and carry both the advantages and liabilities associated with the past and present products in an older firms' portfolio.

The point being made that an incomplete analysis of a product that caused a failure will linger long after the product has been scrapped or sales have ceased.

The other major issue of measurement is more often than not made in relative terms by comparing success with competitors' past performances. When there are not absolute standards, the firm tends to accept less than it could achieve with the same resources if it was only aware.

This principle of sovereignty will vary a measurement based on an empirical observation over time and will distort the awareness by a DMU as to what needs to be done even when some type of analysis has been carried out. This perception can be measured from the outputs generated from a simple one-step process or radiating from a computerised multidimensional analysis. From these outputs, a strategic choice is made. This is particularly true when a firm decides to innovate as a strategy.

4.6 LEVELS OF ANALYSIS AS MODELS

The types of analyses from which a strategic choice is made are:

- (i) Gap Analysis
- (ii) Situation Analysis
- (iii) Scenarios
- (iv) Heuristics

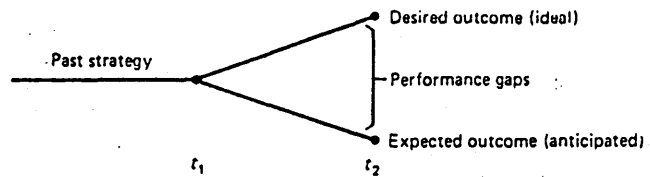
and to understand how they work, a review of them is as follows:

4.6.1 Gap Analysis

The gap analysis is the most primitive strategic choice arising from a "Doing Nothing" type of thinking by a manager to one

that "Sometime Action Must be Taken". This generally occurs when a manager is desiring an outcome in the future better than one presently confronting him/her as a decision-making unit(DMU).

Diagram 4.2: Gap Analysis



Glueck and Jauch (1984: 22) outline how several conditions must exist in the nature of a gap before decisions are made to make a change or even to entertain a proposal for making such a decision. There are three minimum levels of perceptions and emotions that a DMU should possess: (1) the gap must be seen as large enough that a DMU will feel emotionally-bound to do something about it; (2) the trade-off or desired outcome (ideal) must motivate the DMU enough to overcome any perceived risk in making the said change; and (3) the DMU must feel philosophically in tune with the thought that the gap can be reduced and the expected outcome (anticipated) can be accomplished with the resources available to him. If these three conditions are not present, it is highly unlikely that any change will be made or even contemplated by the DMU.

The first process of innovation requires an acknowledgement by the DMU that a gap is occurring technologically or circumstances are forcing the desire for a better performance. This acknowledgement forms the gap analysis leading to the formulation of a strategy in which innovation is welcomed or attempts are made to stimulate it.

A gap analysis is a process more emotionally-based than rationally- based. A gap may be perceived because a firm is

suffering declining sales or a significant shrinkage in profits, before the DMU may begin to think some type of action should be taken. In the term of Simon "it is more about satisfying rather than maximising the opportunities to do better".

The gap-filling process may be labelled several different ways: (1) a "blue sky" outlook with no specific objective in sight but just a desire to be bigger, more profitable, etc.; (2) a "rose-coloured spectacles" perspective that sees the future better than it really is; or (3) a "green grass" mentality which drives the DMU to feel without facts that another market, product or core business would be better than ones they are in. In short, the gap analysis is based on a perception for change rather than being based on facts. It is driven, more often, by a psychological need (from ambition, greed, fear, to revenge) of the strategist to improve upon his firm's present position than reality.

However, a gap analysis for innovation requires a more sophisticated diagnostic tool. First, it requires a systematic attempt to measure internally other members of the firm's perceptions of its position (i. e. attitudinal surveys, delphi, qualitative audits of employee perceptions), then tries to measure externally the attitudes of its customers and others on their perceptions of the firm's products, image, and brands.

Therefore, innovation must be viewed in two ways. First the internally-directed gap analysis will test the resistibility of making a change and the employees' abilities to support a change. Whilst, externally -formed gaps will appraise the competitiveness of others affected by said change. In both cases, they can often reveal whether the firm has the resources (equipment, cash, skills, etc.) to make a change or that some resources are not being deployed properly which could make a change possible. Still the three intuitive conditions must be

in force: a perception that a gap exists, motivation to take action, and the belief that it is reducible.

To counterbalance the strategists tendency in the earliest stage of decision-making to overestimate (Blue sky) to misinterpret (rose-coloured spectacles) and to ignore its own strengths (green grass), a gap analysis should be attempted as rationally as possible.

Externally, a gap in the market and a need for a strategic product change can be realized by using a multi-dimensional attitudinal tool (Green, 1975) which measures perceptions, loyalties and emotional preferences of customers toward a brand or product. This utilizes a scaling mechanism calibrating the customer's most salient viewpoints about a firm's image, brands, performance, or pricing strategies as a communications device. Many of the components of the customer framework, i.e. the competitive array, product portions, segment of market, and the like, can be represented in a chart or diagram. The effects of such pictorial representation can communicate rationally what type of strategic choice is required.

Either type of a gap analysis, whether it is internal or external, should stimulate the managerial vision of the DMU to reduce or expand its objectives based upon the data received. They are the first distinctive elements starting the innovative process of making change. From these elements, a DMU creates his/her strategic vision after gathering other stakeholders ' views in a systematic way and measuring them against a scale.

As noted by Rothwell (1981), innovation within a firm must ultimately be decided by either the ultimate user (the customer) or the ultimate creator (the innovative employee). Awareness of the problem/ opportunity starts with assessing a customer perception as to the degree that one customer or a

consensus of same indicates that a gap exists in the market place. To these concerns, a scale is needed to match opportunity to imovate with the needs of the customers as balanced by the competences of the employees to make change. The scale should be well-developed to met all of these objectives.

4.6.2 Situation Analysis

The situation analysis is an objective audit of the resources of a firm, identifying strengths and weaknesses of existing skills: technological, marketing, production, financial, and administrative.

This analysis is grounded in the assessment of two specific elements: the principle of the limiting factor; and the leverage factor. They are needed to assess the level of resources and skills available to a firm. These factors may be strengths, obstacles or constraints which exist in an organisation and must be classified accordingly. All will have properties of limitation and leverage.

The principle of limiting factor can be dissected in several different ways. The first assessment is where the firm is at present; secondly, that all resources have a limit regardless of a firm size; and thirdly, the actual conditions at the time and place will dictate what new controls are necessary. These views form the basis for the first "limiting" factor comprising a situation analysis.

To the first view of determining where a firm is at present, Sir John Harvey-Jones (1988) states in a pragmatic way '... there is no point in deciding where your business is going until you have actually decided with great clarity where you are now... to arrive at this crossroad, one needs a situation analysis. This

like practically everything in business is easier said than done'.

To the second view, Ansoff (1968) has observed that a large majority of corporate decisions have to be made within the framework of limited total resources, no matter what size the organisation may be. There are alternative uses for scarce resources, and the objective 'is to produce a resource-allocation pattern which offers the best potential for a firm's objectives related to its situation'.

The third view of assessing conditions required by the principle of limiting factor is exemplified by Chester Barnard (1938), who writes '... The limiting factor is the one whose control, in the right form, at the right place and time, will establish a new system or set of conditions which meets the purpose of that situation'.

Finance (cash position), of course, is often the most common situational analysis made by a firm, but there are many other ways such an audit could be performed.

This principle of leverage, not to be confused with its usage in the financial sense, is an essential part of a situation analysis. It reflects the concept of comparative advantage advanced by David Ricardo and others in the early-nineteenth century classic economic theory of international trade. It means to identify the major strength or distinctive advantage a possessor (nation, firm, or person) has over others and to leverage it.

In more modern business terms (Porter, 1986; Blios, 1980; Peters and Waterman, 1982; Andrews, 1971) all counsel that firms should identify the main advantages or skills they have over their competitors. There should be an deliberate attempt to

isolate those distinctive abilities which are attractive to customers. Porter refers to them as "the key links in a value chain"; Peters called them "the central strengths which all strategies are built upon"; Andrews classified them "to be the distinctive elements, the critical success factors (CFS), in why a customer picks one service, product, etc. over another".

Identifying these competences is only part of the process. Blos pointed out that whilst the concept of leverage is well known and understood, it has the additional problems of application and its erosion by time. He stressed "how any competence will change over time in line with environmental change and should be assessed regularly by some type of analysis". This reinforces the condition of obsolescence, the counterpart of not being innovative.

There are many ways in which "leverage" can be developed; it may, for instance, be related to specific patents, or superb after-sales service, or to efficient distribution arrangements, or brand-name or financial resources.

Leontiades (1983) cited how the international strategy and consulting firm of McKinsey and Company studied the management practice and strategy-formulation processes of 37 different companies. Among other findings, he quotes how it was concluded that the distinguishing characteristics shared by these companies was that they did one thing well; be it marketing, producing, training, etc. These companies had developed a significant strength in one feature of their business which gave them the comparative advantage over their competitors.

It is extremely important for a situation analysis to be done as one of the first steps to understanding the environmental acceptance of new products, sales methods, strategy, etc based off the principles of limitness and leverage. This analysis

forms the strategic thinking which will spark innovation around a firm's existing products and markets either by exploiting its strengths or eliminating its weaknesses.

4.6.3 Scenarios

Next in the hierarchy of strategy-making is the use of scenarios. They are the structured, but simple forms of strategic choice created by the use of contingency plans based on the possibility of certain events happening in the future.

This method, essentially non-quantitative, is popularly called "scenarios strategies" because it uses the phrases, "What if.. or what would we do if...." . It remains solely qualitative even when the Delphi Technique is computer-assisted or when mathematical models are used to show alternative scenarios of the future. In effect, the DMU is forced to consider the possible future strategies, reactions, and behaviours of competitors, governments, suppliers and customers.

The making of contingency plans to counteract or to incorporate the outcomes when certain environmental forces act in a specific way. This type of planning builds in the flexibility element as stressed by Fayol and mentioned earlier. Johnson and Scholes (1984) outlined several types of scenario-building strategies used by Shell UK Ltd. to examine trends in growth of the UK GNP. They divided them into unresolved conflicts, revival, and progress scenarios for action based on some possible future outcomes.

These types of analyses are totally unsuitable for determining a formal strategy for innovation. They draw heavily on the predictability of the future and long-term growth trends. However, innovation by its very nature denies measurement which is based on a static unchanging and predictable environment.

4.6.4 Heuristics

Heuristics is a way (strategy) of using a rule of thumb or defined recipe to solve a problem. Spender (1980) defined them as industry-based recipes, or perceived wisdom, used as a basis to measure, control or predict a business strategically. They may not be the best possible solution to a problem; instead, they provide quick and satisfactory solutions. They are generally used by the more experienced managers within an industry, who have accumulated some fairly simple and similar ways of analysing a business.

For example, the May Company and similar USA big retail stores in the 1950's used a rule of thumb that their home consumer appliances retailing departments should contribute about 25 percent of a store's total monthly sales. Even when the sales traceable to home appliances doubled in less than four years, this company stubbornly refused to accept this as an indication that a new consumer trend was under way and spent thousands of pounds trying to rectify the lower sales with sales from other parts of the store. They thought the other areas were declining rather than the fact the appliances were increasing disproportionate to the previous historic data of consumer purchases.

Generally in this type of prescribed strategic accounting system, its users become locked into believing that most problems and opportunities can be easily defined based on their previous experiences. The major flaws are that innovative ideas and emerging opportunities are discarded when they prove contrary to their conventional thinking and rules of thumb.

4.6.5 Financial

There are a number of financial analytical techniques that can contribute to an assessment of strategic options. Most are solely concerned with the criterion of profitability, risk, and cash flow.

The simplest of these is a break even analysis. It tests the effect of volume, variable costs and fixed expenses to the feasibility of a strategy. Others are sensitivity measuring techniques which determine financial risk and project a calculated amount of uncertainty against a degree of confidence.

More complex financial analyses employ the use of funds flow forecasting, pay-back analysis, and profitability projections as strategy forming techniques. In most cases, they are primarily used to determine the feasibility of a strategy projecting when funds can be reasonably anticipated.

It is important to note that most innovations fail to measure up to the tests of acceptability, profitability and feasibility when these analyses are used. The graveyard of missed opportunities contains many innovations owing their early deaths to these financial strategic techniques.

4.7 PLANNING CONCEPTS AND GENERIC STRATEGIES

As shown in the preceding levels of analysis section, the first step in planning is some type of analysis and the development of external assumptions or scenarios, which describe the outside world of the firm.

This outside world is best judged as the environment in which the firm will be doing business during its planning period. From this view, multiple scenarios are constructed in prose that

can be clearly and fully understood by operating managers as well as top managers.

For the next steps of planning, an effort should be directed to identify the critical factors for success (CFS) as discussed by Andrews et al in the situation analysis for leveraging a firm's strengths. It is in this phase that an opportunity analysis is constructed to reveal the resources available for deployment and future strategic options. The key factors investigated are financial, physical, human, intangible assets (reputation, brand name, etc) and assumptions of what is needed from customers and suppliers.

From these analyses, planning as a concept centres around the elements of contingency and measureability into the twin camps of objectives and constraints. Contingency being the eventuality that what is planned has to be changed due to unforeseen events occurring and measureability is needed so these pending changes can be measured easily at reasonable expense.

O'Connor (1981:23) argues that most good planning should be projected with a measurable contingency built-in .. "if certain changes are determined as possible to happen before their occurrence then a plan objective does not have to change. This requires some type of system to measure when and how often a change is made to trigger a contingency plan of action".

The other planning elements expressed as constraints and objectives stress the importance of having potentially conflicting business aims within a plan. Gluck et al (1978) stipulated that "constraints are to be satisfied, not necessarily exceeded. While objectives are to be maximised, subject to satisfying the constraints." He explains that having these twin aims can cause management to think about what they really want

from a business (for a specified period) and what they are prepared to give up in terms of minimum constraints levels to get it.

The overall comprehensive process of strategic planning has been skilfully summarized by Ohmae (1982:242-243). He suggests that there are five conditions in a winning strategy:(1) the business domain is clearly defined; (2) The forces within the environment are extrapolated into the future on the basis of cause and effect; (3) Many planning options are reviewed, but only a few are chosen; (4) The firm paces its plan according to its resources; and (5) Management adheres to a plan's basic assumptions as long as these assumptions hold, but will change when other conditions (feedback and monitoring) dictate it is best to do so.

4.8 STRATEGIC CONCEPTS AND GENERIC MODELS

One of the first developments in the strategic field was the separation of strategies into distinct and different analytical categories (Ansoff, 1971; Hofer, 1984). The principal differences between a generic strategic model and a competitive one is that the generic model deals with problems between the firm and its environment, whilst the competitive model deals with the differences between competitors in the same industry or selling in the same trade area.

Just as there are hierarchies in planning and analysis, so are there three hierarchical levels in strategic management: (1) corporate level; (2) business level; and (3) functional level.

At the corporate level of strategy, there are four principal tasks: (1) determining the firm's attractiveness for present and future investment; (2) determining whether such investment in total (synergy) will permit the firm to achieve its

overall objectives; (3) identifying the various gap-closing options available to the firm; and (4) identifying and evaluating other business areas in which the firm can invest. Corporate planning is generally more valuable in analysing existing business sectors which can not offer an attractive return than in seeking areas for innovation.

At the second tier, there is the business level of strategy, its focus is on how a firm will compete in a particular industry or product/market segment. It is in this level that the distinctive competences (CSF'S) as described by Andrews (1965, 1971) are determined.

At the lower and third level of strategy, there is the functional planning of short term goals. Its principal focus is to test the liquidity and ability of the firm to marshal resources and how they should be managed. The combination of these levels set the generic and grand strategies of planning which have been determined by research (Kotler, Glueck, Henderson, Andrews, Ansoff, Porter et al) to be: (1) Building; (2) Holding; (3) Harvesting; and (4) Divesting.

(i) Building Strategies are based on planning efforts to increase market share through new products and/or new markets. Other terms to describe the same are expansion, offensive, acquisitions, and growth. In the Boston Consulting Group (BCG) Matrix, it is called the "star-making" strategy.

(ii) Holding strategies are designed to maintain existing markets or customers: preserving the status quo. They are sometime describe as tenable, defensive, internal retrenchment, protecting and concentric. In the BCG matrix, it is called a "milking the cash cow "strategy.

(iii) Harvesting strategies are deliberate policies of allowing market share to fall hoping to secure higher short-term earnings and increased cash flows. Some popular terms are disinvestment, loss-leaders and cash-enhanced strategies. In BCG terms, they are "dumping the problem child or curbing the dog" strategies.

(iv) Divesting strategies are aimed at selling or liquidating a non-core business because other business opportunities offer prospects of greater growth and profitability. These are various forms of external retrenchment, and asset-stripping strategies. In BCG matrix terms, this strategy might be applied to dogs and question mark/ problem children.

By practice and philosophy, in addition to the harvest to divestment strategies mentioned, researchers (Freeman, 1974; Harrigan and Porter, 1983) propose that most companies' strategies can further be classified into various different types of operating strategic policies: (i) Leaders; (ii) Followers; (iii) Pioneers; (iv) Dependents; (v) Imitators; (vi) Traditionalists; and others (see glossary of key concepts- Appendix B).

These could be called the "grand strategies" of companies and would be governed by the sovereign element of a firm using specific policies and programmes. The leadership type of strategy, for example, is the theory of management that it will reap above average profits if it controls or leads an industry technologically or by size (e.g. IBM, ICI, 3M).

Other examples of these grand strategies are: being the first with the newest product/service (pioneers); to innovate only to a specific customer need or niche (dependants); to enter a market in its growth stage (followers); to improve on another firm's innovation (imitators); to innovate for the purpose to make a quick profit and exit (opportunists).

Since the glossary of other grand strategies are described in Appendix B, an assessment of the most popular strategic models as to how they can be used in planning for innovation follows:

4.8.1 Experience Curve Model

The experience curve was a derivative of the learning curve theory that arose from the observations of the commander of Wright-Patterson Air Force Base in Dayton, Ohio, in 1925. It was observed that production worker hours for airplane manufacturing appeared to decline as the volume of production increased. It was coined "the experience curve" in 1960 by Bruce Henderson of the Boston Consulting Group (BCG), whom converted it into a strategic model which can indicate a strategic position using the market share and competitive dynamics of a firm.

Simply stated, the experience curve theory is the hypothesis that the relative costs of two competitors are a function of their relative accumulated production volumes.

It prophesied that a market-share leader would enjoy an inherent cost advantage over smaller competitors. This cost advantage could be exploited by setting industry price levels to provide itself, but not its higher-cost competitors with a satisfactory return on the investment. This was an amazing observation and not at all self-evident. The remarkable discovery was that it was applicable to a large number of industries. Product cost dropped each time the number of units manufactured doubled, and then levelled out to a fixed, but constant percentage of the original cost.

The experience curve model has attracted its share of critics and supporters in recent years. Kiechel (1981) writes cautiously about its use as a management tool...' it requires

constant managerial attention and to get costs to decline down the curve can be very difficult, if not impossible in certain industries'.... Alan Zakon, who now heads BCG and quoted in the article by Kiechel, also indicated another one of its limitations, ' it relies too heavily on industries where there must be big-growth potential to work properly and sometimes it requires an economies of scale which can not be sustained, especially in the areas of distribution and manufacturing of consumer related items'

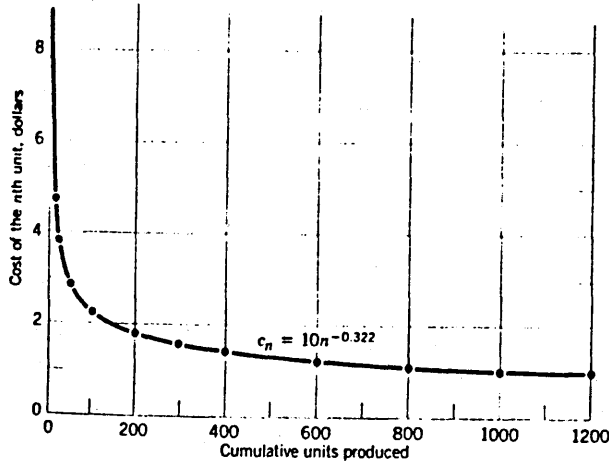
Furthermore, case studies and research by Hall (1980) demonstrated convincingly how some low-cost producers (Inland steel, Whirlpool Corporation, and others) have achieved their lowest cost positions without the benefit of high relative market share.

Yet, the supporters of this concept were able to cite an equal number of examples where the experience curve was able to communicate as a flexible strategic tool to great profits (DeNeui, 1980).

In fact, the key to the experience curve's uniqueness is that product costs drop as a result of a combination of things: (1) material cost; (2) change in product design technology; (3) manufacturing process improvements; (4) "learning" among production workers; (5) specialisation among suppliers, workers and equipment; and (6) better inventory control.

In theory, none of these factors alone can account for the experience-curve rate of decline and the impact of each factor vary from industry to industry. This planning concept teaches that the share of the market (exceeding 20 percent or to double one's sales volume) is an early measure of future profitability.

Diagram 4.3 Experience Curve Model



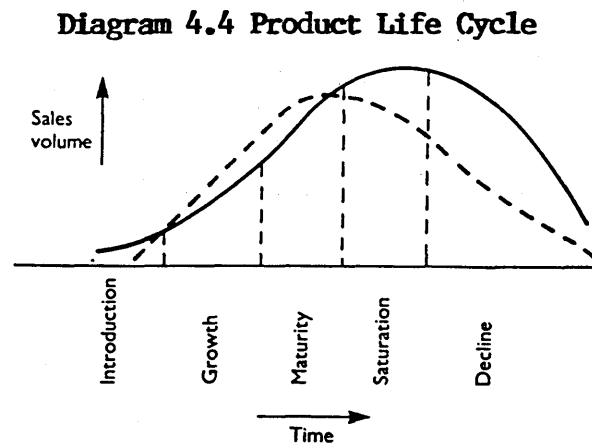
The experience curve model (Diagram 4.3) could be extremely important in the development of innovation and new products where there is no existing history on what the future costs will be and what share of the market is needed to be profitable.

When used as a guide rather than as strategy-making model, it can motivate and communicate strategy very effectively. Since the model is based on reaching at least 20 percent share of a market and projecting future profits, it could be used to test when and how much a new innovation should cost to reach that level. Imagine for a firm about to produce a new product to know what the cost of a product will be before it is designed. Or imagine knowing how competition will price their next-generation products. While the tool is approximate, it is rational. It can be adjusted and manipulated and if used as a strategic planning tool for innovation, it could be invaluable.

4.8.2 Product Life Cycle Model

Basically, the Product Life Cycle (PLC) theory states that products, company, or industry tend to follow a pattern of growth similar to a biological entity: a birth to growth, maturity and then eventual decline and death. This well-known strategic model

of a finite life span as a bell-shaped curve has been depicted by researchers to have from four to six phases.



The validity of the PLC and in particular whether it is bell-shaped or not have been challenged by many researchers; and at the same time been promoted as a powerful management tool. Day (1984) poses the critical question is whether a change in the product cycle justifies a separate life cycle analysis. He cites examples to demonstrate that PLCs summarise the effects of many concurrent forces in a product market; acting together which may help or hinder the rate of a product's growth. In some cases, these influences may not dictate a new cycle.

The debate still rages as to what constitutes a life cycle. Rink and Swan (1979) suggest new products could be classified into several new degrees of newness. They argue that a product may be better classified based on customer perception and its introduction as either being entirely new, partially new, major, and minor change of newness rather than developed by stages in a life cycle pattern.

The major flaw of the PLC and not addressed by several of its proponents is its failure to recognise how a length of a product/process may vary. Critics point out the cycles of a product life depends on guesswork by management as to when a

product is entering or exiting a growth and decline stage. They make their arguments in several different ways. First, they argue that an injection of cash in the form of advertising and improvements and other resources or the withdrawal of either can artificially affect the commercial life of a product/service.

Secondly, the length of a product's life will tend to vary significantly to the generic type of product/service/entity and the type of competitor it is competing with and the market structure. Further the life can be shortened pre-maturely by substitutions or new technological developments in an existing market; or lengthened by the discovery of new uses or demand within a new market.

Innovation-based work tends to be very different from other organisational activities. To be successful, they need specific goal or goals, a defined beginning and end, and a limited budget. Whether the project is headed by a product champion or a team of specialists, a high level of communication and coordination is needed to control role overload, cost-profit goals, frenetic activity and a focussing of mission. A multiple-factors product life cycle provides all of these (Slevin and Pinto, 1987:27).

So when a firm uses a PLC's multiple-factor model of critical success factors and determines which factors become more critical at different points in a product life cycle, then the following occurs:

(1) The conceptualizing and planning of an innovation can receive the review and commitment of the firm early.

(2) It creates a strategic plan of communication through each stage of the innovation development to all areas of the firm.

(3) Cost and schedule overruns are reduced because definite cut-off or revitalize adjustment periods are determined early.

Research (Rhodes and Wield, 1985) indicates that for the planning and stimulation of innovation, the product life cycle provides a useful framework for looking at strategic implications of a firm's products or services over time. Within each cycle of the innovation, critical success factors can be developed to ensure the effort of the firm is focused on the "how" instead of the "what" factors of an innovation. These "how" factors of training, stimulating, and managing used in a PLC become embedded in specific action steps of an overall strategy.

4.8.3 Matrix Portfolio and Planning Models

These models illustrate where different product/ markets being operated by the same company or in the same industry are compared for attractiveness of investment or disinvestment and growth. They are the most primitive analyses of those based on product/ portfolio models. It is designed to classify product/market on one axis and its competitive position on the other. However there are two major flaws with this type of strategic model.

First, some researchers (Linneman and Thomas, 1982) wisely observed that defining the product/markets group correctly depends on how they are technologically related, competitively-impacted, and geographically-linked, but the degree they attract managerial attention and corporate resources from one to another remain a difficulty with this type of model.

Secondly, the models are generally not applied correctly by most of their users. The concept of a planning theory for a diversified business portfolio or a strategic business unit (SBU) was developed in the mid-1960's by the General Electric Company (USA) as a guide for budgeting. Even when it was refined

in the 1970's, its purpose was to measure performance and to develop an entrepreneurial thrust (Springer,1973), not to plan strategy.

But it has a strategic value. Its value is limited, but its concept of an SBU being synonymous with product/marketing unit or organisation does create strategic thinking. This is the principle of synergism (the creation of values by having one business unit supporting and complementing another).

The other features of the model (Springer, 1973; Anthony,1965; Andrews, 1964 ; Ansoff, 1961) do ensure that the allocation of resources across an organisation are the best possible; and the development simultaneously of two core business strategies (the product-market investment which encompasses the market scope/ investment intensity) and the identification of those competences or assets which give a firm a sustainable competitive strategy over its competitors. These are useful features for a generic portfolio planning theory.

Diagram 4.5 Ansoff's Generic Product-Market Model

		Products	
		Existing	New
Markets	Existing	1	3
	New	2	4

Product/market matrix (Source: Ansoff '71)

The dimensions used in this product/market matrix as first developed by Ansoff (1961,1968) can use market share, profit sectors, competitive position, brand name, products and industries. The variations are endless. The generic guide lines, if not theory, determine how each business by product or market should be classified as (a) Strategic business units (SBU) which

can stand alone from other business;(b) one manager should have accountability and control of each SBU's resources; (c) be unique enough to have a separate market focus and large enough to have a measurable scale as to growth or profits; and (d) should embrace the autonomy principle in which a SBU will set its objectives in concert with others, but singularly responsible for controlling its personnel and operating costs.

The problem with using this model can be reduced down to three major points. First, this portfolio planning theory, inherently, fails to deal with the administrative problem of "corporate turf-fighting and the power that profits generating units have over others" when seeking to convert its principles into managerial practice.

Second, there is a tendency for many of its users to generate a great amount of internal debate about its analytical techniques of what and how to measure sales, markets, and the impact of direct competitors. Too often, the core strategic issues which should be addressed are ignored when this debate begins.

Third, it is often used only when there is a crisis. The practice of this strategic method was evaluated (Haspeslagh, 1982) by a survey of the USA top 1000 firms in 1979. He reported that 75 percent of the respondents found separating a SBU from one operating unit into another was the major hurdle in developing a strategy. Most of the firms turned to portfolio management when they suffered a performance crisis or when 'triggered by a need to allocate resources in a capital-constrained environment'.

The most serious limitation of the portfolio planning method is its inability to create the need for new products and innovation. Issues about earned short term profits and market

share, too often, dominated the planning process to the degree that most of the reporting firms (45 percent) indicated that specific programmes for new product development had to be developed outside the SBU and matrix method of planning. Haspeslagh does state that its merit would be its abilities to provide a framework for balancing the needs of one unit with another and greatly increased a company's strategic control against competitors.

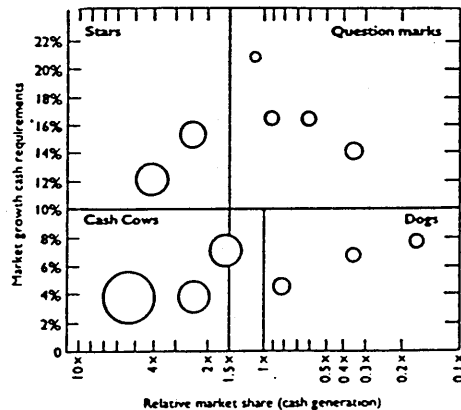
At least four product portfolio models, internationally, attract varying levels of support. These will now be described and compared.

4.8.3.1 Boston Consulting Group (BCG) Growth Share Matrix

This model is based on the generation of cash flow as a measure of success and how future cash injections should be allocated to a particular product group or SBU.

Its portfolio dynamics are based on the premise of the experience curve and that high growth products (SBUs) require cash, while low growth products should provide cash. The matrix is divided into four quadrants using two definitive parameters, vertically and horizontally.

Diagram 4.6 BCG's Portfolio Model



BCG portfolio model (Source: Hedley²⁹).

The concept of this model (Diagram 4.6) is that there are four basic categories of SBUs within each quadrant of the matrix euphemistically called: Star, Problem child, Cash Cow, and Dog. Utilising the experience curve principle, all four of the generic strategies (harvesting, holding, etc) mentioned previously can be related to the following quadrants of the BCG matrix.

(i) In the top left quadrant, there are the "stars" which are high market share, high market growth SBUs. These are market leaders and growing fast, but needing substantial amounts of cash to maintain their growth (Ennis,1980). They hold the company's future growth and profits, once they are settled down into "cash cows" and require aggressive strategies in their introduction and early growth stages. Corporate stellification (star-making) occurs by knowing just when to stop investing and start to harvest the profits of this SBU and is the key strategic decision related to this strategy.

(ii) In the bottom left quadrant, there are the "cash cows" which are high market share, low market growth SBUs. They are former "stars" which are maturing. At this point, rather than using large amount of cash, they are generating large revenue in excess of their expenses which can be invested elsewhere. The strategy, here, is tenable and one of protection against new market entrants.

(iii) In the top right quadrant one finds the "questionmarks/problem children" which have low market share, but high market growth SBUs. They need large amount of cash just to survive and may turn into "stars" or "dogs" depending if the market share increases or declines after investments are made.

Management has to decide whether to spend a lot to make and build the products into leaders or to withdraw them from the market or to license-sell off the product for a small profit. The

key strategic factor, here, is timing the investment to gain the largest returns possible at the lowest risk by not investing too soon or too late.

(iv) In the bottom right quadrant, is where the SBUs, called the "dogs", are located showing a low market share and a low market growth. These SBUs, with a poor competitive position, are barely surviving in a rapidly declining market. They exhibit low profits, but require large amounts of cash in excess of what they are earning. The future prospect of any type of a return from this SBU is relatively low. Unless they represent brand names, or produce a complementary product (supplier) for the core business, they become subject to strategies of disinvestment.

Dividing the matrix up axially, there are two axis: the vertical axis is the market growth indicator and the relative market share of SBU to its largest competitor is the horizontal axis. These form the basis for making strategy. They reflect the logarithmic principle of the experience curve which argues that the decline of costs and the rise of profits are related proportionately to volume of sales increases when exceeding a 20 percent market share or the doubling of a firm's sales.

The ideal strategies are to transfer cash from the cash cows to problem children, whilst the product or business flow (learning and managerial experience) transforms a problem child to star and a star to cash cow. Dogs are stripped of assets or disinvested for a profit.

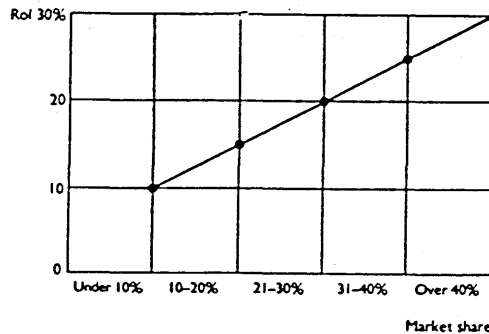
Henderson (1960) and Wind (1982) argue that it is by the learning effect of employees and their experiences of developing, producing and marketing its products that a firm gains an advantage over smaller competitors and new entrants.

In other words, where knowledge and technological skills are readily available in an industry, a company can outpace its competitors by rapidly acquiring and utilising these resources. This strategic principle, a central theme in this study, is how to combat employee obsolescence and build on the abilities of each employee to collectively gain knowledge entwined within the experience curve.

4.8.3.2 Profit Impact of Marketing Strategy (PIMS)

This model shows the strategic relationship between the market position and profits of a SBU as determined by Harvard Business School and the Marketing Science Institute in 1973.

Diagram 4.7 Profit- Market Share Model



Relationship between market share and pre-tax ROI (Source: Buzzell et al.²⁸)

This matrix shows the results of studying 620 businesses over a three year period which determined that there was a positive correlation between market share and return on investment (ROI). On average, it was found that ' a difference of 10 percent in a market share is accompanied by an increase of about 5 percent in pretax ROI'(Harvard Business School:1981).

Using the PIMS model, explanations were given that it was the advancement of three possible factors why this occurred; (1) economies of scale for larger volumes achieved by an overall sales increase, the buying, manufacturing and marketing on a

larger scale will assist in lower costs and higher profits based on the experience curve; (2) market power and purchasing power of the large volume producers enabled them to negotiate with suppliers or buyers for a more profitable arrangement vertically and horizontally; (3) the management engaged in more training of its key employees and attracted a higher quality of employee, initially.

These three explanations are not mutually exclusive: since PIMS requires by its practice for management to engage in understanding the impact and overall strategic relationships of its SBUs. The effect of larger size upon a firm's profitability was supported by Drucker (1974), who stated, 'size has a major impact on strategy and strategy, in turn, has a major impact on size'. The larger size enable a firm to better control its environment and the players operating within it because of its resources. The firms identified as leaders, followers, imitators, etc (Eastman Kodak, IBM, Xerox, Bendix) clearly show their grand strategies enabled them to exploit the market better.

Later research by Porter (1980) on the competitive forces and the negotiating power between suppliers and the large firm supported the principles that a firm must choose to be either a leader, follower or niche filling firm, not to seek to be more than one at a time. Selecting one generic strategy and sticking to it is a key way to be competitive according to Porter.

The PIMS concept of market share is theoretically tidy and impressive, but its critics pointed out that the market can be defined in too many different ways for such a neat equation. Day (1977) has noted it is not easy to measure a firm's market share because the data to do so is incomplete. Also the quality of the products of the firms surveyed ranged from high quality and high price to low cost commodities in some cases. The effect of this

discordance may explain that the profitability of a firm depended on pricing and type of competitors as much as the market share.

This model is often misapplied when size at any price becomes its chief strategic feature. Even Porter parted company with the research of PIMS in stating that "any firm which concentrated on just size or volume increases at any price is likely to lead to corporate suicide. Strategy must be balanced by other factors than share, or profit".

When using a PIMS model as an innovation stimulating device there are problems. This type of model works against a firm's decision to invest in newer products or innovation for capturing future markets. The emphasis is on share and profits rather than research and development expenditures. A firm may be characterized as conducting "navel-gazing" if they become too occupied with either the size enhancement or quick profit improvement strategies and decide not to consider other viable strategies.

4.8.3.3 McKinsey/GE Expanded Assessment Model

This model has a nine-cell portfolio matrix with a horizontal axis representing industry (market dimension) and the vertical representing business dimension (product strength) of a SBU (see Diagram 4.8)

It was developed by the McKinsey consulting firm for the General Electric Company in 1959 as one of the first model to assess business investments. The model assess the industrial attractiveness of a business opportunity and is based on a rating of market growth, size, profit margin, competitive intensity, seasonality and economies of scale.

Each feature is weighted numerically against each other to

determine whether a particular industry is "high, medium or low" in the terms of attractiveness for future investment. An analysis using a grid of more than ten variables (.01) should be avoided as being too many and one with less than five (.20) may give be too few. So constructing an elegant but meaningful scale between 5 and 9 variables is the key to this model being effective.

Diagram 4.8: GE Business Screen Model

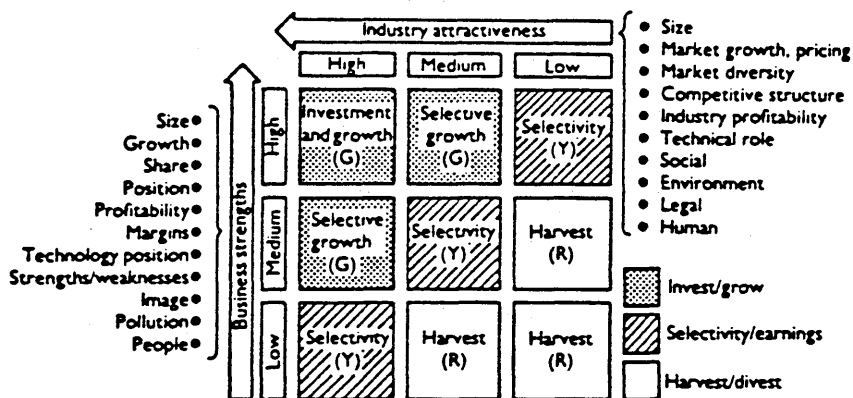


Figure 6.8 McKinsey/GE Business Screen.

Source: Reprinted, by permission of the publisher, from *Corporate Planning Techniques and Applications*, edited by R. J. Allio and M. W. Pennington, p. 214, ©1979 AMACOM, a division of American Management Association, New York. All rights reserved.

The business strength (vertical axis of the model) summarises the ability of a firm to compete in a specific industry provided certain competences are present. They would include factors which are weighted such as: relative market share, price, competitiveness, product quality, knowledge of customer, sale effectiveness, and geography.

The generic guide lines for these type of matrix are to combine a quantitative rating system with a qualitative process (judgement) to gain a partly subjective view of and hopefully an objectively-derived strategic point. This should be done, at the least, annually in a planning format which will be evaluated before investing. Ennis discusses how these are used in conjunction with other models. For example, the BCG matrix is

used to classify whether the SBU is a Star, Problem Child, Dog, etc. and later the attractiveness matrix (e.g. GE) is used to go into greater detail. Then a final decision is made.

Modifications of these models can integrate the principles of the product life cycle, the BCG strategy modes, and the experience curve theory for a specific function, such as in the analysis of customers, competitive position, and investment criteria. Currently, the expanded versions of the PLC models are used in this manner by the A.D. Little business profile matrix or the Shell international directional matrix (Johnson and Scholes, 1984). The basic concepts of these as found in the BCG's model are not radically different.

The key of these models is that every one of the grids provides a systematic way of evaluating and communicating the competitive strategic options resulting from a business cycle stage. Rather than describe their businesses as "animals in a zoo", they use terms such as "Invest Grow" for the Star; "Maintenance " for the Cash Cow, "Limit Investment" for the Dog, and "Selectively Invest" for the Question Mark. Others such as the Booz-Allen Hamilton Approach (Gardner, Rachlin and Sweeny, 1986) based their portfolio attractiveness models on the qualifications of the company versus market position; or the technology position of a firm as indicated by the technological leverage of its products (uniqueness, complexity).

All of these models are intended to supplement, not supplant, managerial judgement. Wind (1980) and others have counselled against their use without other data to verify their conclusions. He warns, " despite their abilities to show a business/ market attractiveness as a ready answer ... most of them as prescriptions ignore many other relevant dimensions and therefore they must be considered misleading, unless additional reports and analysis are done to confirm the same".

Other critics such as James Farley of Booz-Allen Hamilton stated in the firm's annual report in 1965 that "their model based on technological leverage was developed because the BCG and McKinsey Models using an experience curve do not hold in high technology businesses". His argument was that, whenever technology changes, high-tech businesses started down a different experience curve and then shifted at a faster rate when technologies emerged. He reasoned there must be some type of mechanism to incorporate this likely change in technology.

The major criticism and the principal difficulty with the GE business screen is that it does not depict as effectively as it might the positions of new businesses that are just starting to grow in new industries. Thus, it has limited usefulness in establishing strategies for innovation.

4.8.3.4 Product/Mission Matrix Model

This model is a later version of the one developed by Ansoff (1973). It is based on a new or present product growth vector going horizontally and mission (type of marketing options available from greater market penetration to diversification) vector going vertically is often used to show the non financial types of relationships which exist among a firm's business.

Diagram 4.9 Product/ Mission Matrix

Product Mission	Present	New
Present	Market penetration	Product development
New	Market development	Diversification

H. Igor Ansoff, *Corporate Strategy*, McGraw Hill, New York, 1965 (p. 109).

This model (see above) depicts the permutation of options from the greater market penetration of an existing product to new products in new markets as well as diversification.

Ansoff proposes that his model could be used at four different levels of strategy; market penetration; new product development; market development; and diversification. These are explained as follows:

The market penetration involves the expansion of the firm's existing market; (2) new product development involves the expansion of an existing market through the creation of a new product, even though the firm mission remains the same; (3) market development concerns the search for additional missions which can be met by existing products; and (4) diversification requires the firm to invest in other businesses which involve a new mission for the firm.

This and other expanded hybrid models using the four main strategic categories when combined with other classifications could be useful in determining which industry (growth rate, customers potential) a firm should expand into. They may be used as key directional indicators for innovation and new product development, externally. Or internally they could be used to determine what type of a new product is needed for entrance based on a firm's existing competences.

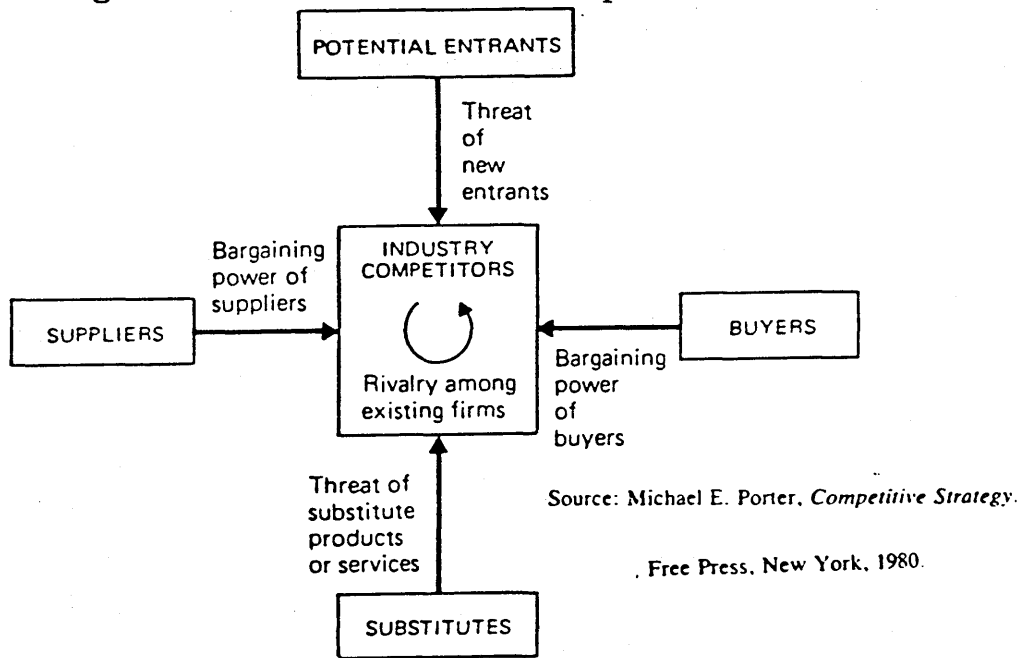
Braksdale and Harris (1982) in their studies came to the same conclusions and aptly commented, " while an expanded matrix does have problems in accurately defining all products and every market or eliminating all of the ambiguity encountered in trying to define rates of growth, they do provide a more comprehensive framework for strategic decision-making and future R & D efforts"

4.8.4 Industry Structure Model

This model provides an approach devised to determine how a firm is doing against competitors within a specific industry. This generic model deals with the irrelationships between a firm's competitive strategy and industry structure (see Diagram 4.10).

This modelling as developed by Michael E. Porter, a professor at the Harvard Business School, dispenses with the unidimensional concept of competition, Instead it stresses how competition is the rivalry of firms doing business in the same industry. Porter contends the state of competition depends on five basic competitive forces: (1) the rivalry between firms; (2) the bargaining powers of buyers; (3) the threat of new entrants; (4) the bargaining power of suppliers; and (5) and the threat of substitute products or service.

Diagram 4.10 Industry Structure Competitiveness Model



This model shows the types of generic strategic choices available to a firm in order to gain a greater share of profits. It illustrates how to "cope with these five forces by selecting one of three generic strategies: (1) being an overall cost

leader; (2) differentiation by creating something new or different that is perceived industry wide as being unique; or (3) focus their skills to concentrating on a particular buyer group, segment of a product line or within a geographic market.

The implication of this model to this study indicates that greater profit by differentiation leads to the practice of innovation. This model assists management in selecting a strategy not simply in response to rival companies, but to the other four forces driving industry competition as well: substitution, customers, suppliers, and potential entrants. The selection of the strategy to be a cost leader is probably best restricted to the larger firms whilst the focus strategy is better suited to the smaller firm.

4.8.5 Value-Based Models

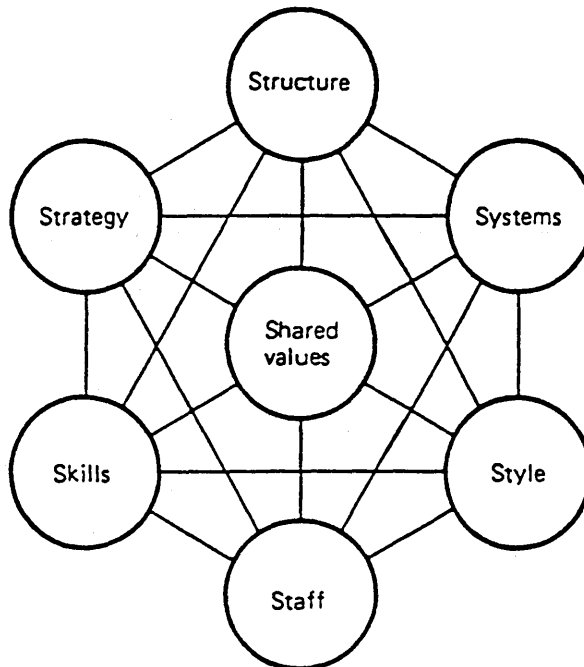
These types of models emerged in the early 1980's as ways to look at a company portfolio of SBU based on a value-created strategy. They were developed (Waterman, 1982; Peters, 1982; Porter, 1980) to exploit the value-chain of specialised activities of a company.

The model's emphasis (shown below in Diagram 4.11) is on the visionary- abilities of top management to set objectives based on a clear assessment of a firm's strengths and weaknesses, and the strategic questions such as what markets to compete in, how it will compete using its uniqueness (excellence) and the use of major action programmes.

Peters (1982) writes, "The companies who practice excellence, do it daily by sticking to their knitting and motivating their people to a high degree of standards". Its guide lines are based on the principle that most people, by their

nature, resist change. Thus, management must introduce training and systems to overcome this resistance.

Diagram 4.11: McKinsey's Model



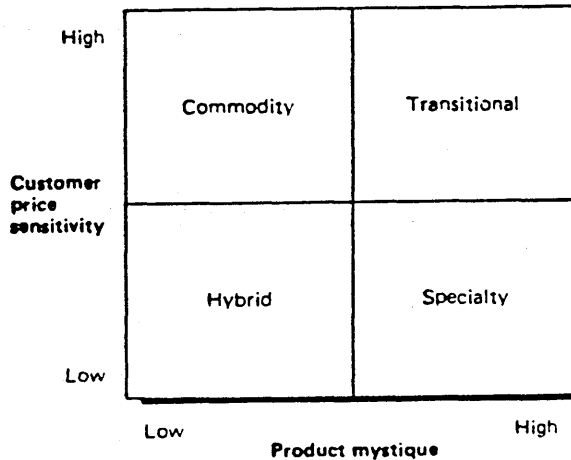
Source: McKinsey & Company, Inc., 1982

McKinsey's 7-S model argues that organisational effectiveness stems from the multiple factors of structure, strategy, systems, style, skills, staff, and shared values. Waterman (1988) writes "these seven factors bring about organisational change through the interrelationships and orchestration of value-driven objectives i. e. excellence, customer service, innovation".

For a more externally directed value-chain model, Porter (1980) created one using upstream (internal operating controls) and downstream (marketing, sales) activities type of matrix all linked to support a customer-directed strategy. It is a complex web of values and beliefs requiring the support and belief of each employee from the conception of a product to how service is rendered after its purchase. It is monitored by a constant

feedback from one end of a company to another, much akin to a corporate quality circle with the customer in the centre.

Diagram 4.12: Value-Chain Model



Source: Strategic Planning Associates, 1982.

This is a 1980's-style of portfolio planning approach, developed by Strategic Planning Associates of the USA. It suggests in a 2 X 2 portfolio matrix with vertical axis dimensioning the "customer price sensitivity" to a value and the horizontal axis measuring a "product mystique". A firm positions its business as to how their customers value their products. If it is a commodity then the strategy is to offer more for less. If it is a specialty, then a firm continues to add value (quality, uniqueness, etc.) to sets it product apart from others.

The chief flaw with the value-based model is that innovation must be valued by potential customers, even when its ultimate value has not been defined by its innovator. Thus a firm must under price its innovation in order to lure some customers to try it. Early critics (Fayol, 1961; Anthony, 1965;) and current critics (Drucker,1987; Quim, 1988) write with caution of the practices of under pricing and the difficulty of doing a value-based strategy. There are two basic things wrong with this type of strategy. First, in respect to innovation, a firm's current customers tend not to value it or even to ignore it. Secondly, products are generally promoted based on getting a quick return

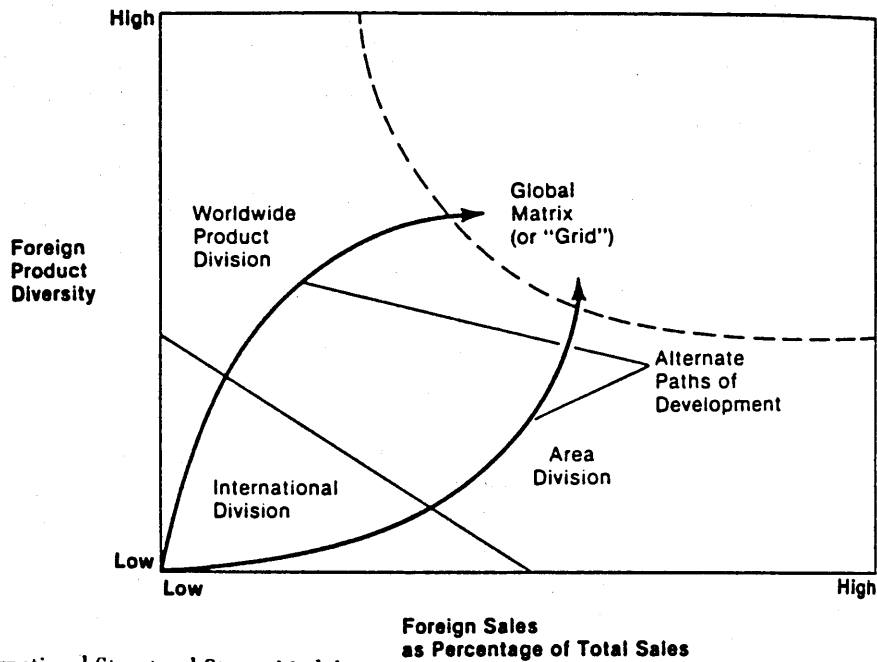
and to engage in pricing wars with competitors. It is a reactive type of strategy.

To the same point, Quinn stated, "strategic decisions are best made incrementally by top management.. strategy totally based on customer reactions, whose loyalties are temporary, will over time lead the organisation to astray from its best strategy too often they react too slow or too hasty for solid planning". The implied strength of this strategy is that firms need a better understanding as to who their customers are, how they think and what they will spend for a particular value. But many innovation can not be valued externally and customers take their time about using them, and values change. Photocopying at one point was a specialty, but now must be valued as a commodity, unless a firm understand the transitional process, its strategy will misfire.

4.8.6 International Strategic Models

There are many different kinds of global strategies. Their variations depend on a firm's choices about configuration and coordination of activities using the the elements of the value chain models discussed earlier.

The earliest one was developed by Stopford and Wells (1972) as a descriptive model in an effort to simplify the choices between the development of products overseas or at home. Their model (Diagram 4.13 below) outlines the paths of development that a firm may choose in becoming an international firm. The key feature is that the amount of foreign sales and diversity of foreign products will dictate the best global or area strategy that a firm should use. Its major weakness is the use of universal simple solutions to the diverse and complex problems of co-ordination of production and marketing which internationalism demands.

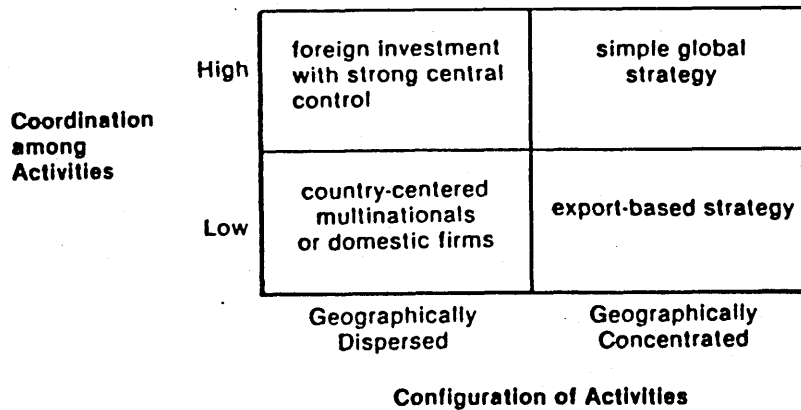


Stopford's International Structural Stages Model

This structural model depicts the foreign product diversity and foreign sales can dictate the overall strategy of a firm. The need to spread escalating technological development costs over shorter product life cycles tend to create the need for greater global coordination of effort between operations. Other than the problems of production, management and distribution, the strategic issue is which paths of development should a firm use to innovate. Should research and development (R & D) be done by either a worldwide product division or local divisions? Should it be done within one international department or across many departments in many different divisions?

Later attempts by Porter and Fuller (1986:338) determine that there is a pattern of international strategy that dictates how activities (such as R & D or new product development) should be done and by what type of an international company. Diagram 4.14, on the next page, shows several possibilities of the many options available to an international firm.

Diagram 4.14 Patterns of International Strategies



The model indicates that international firms with a high foreign investment in top left corner may seek to develop R & D activities parallel to or in concert with a home firm. Whilst firms located in the lower left-hand corner of Diagram 4.14 will seek to form coalitions with other firms in other countries which require little co-ordination.

On other hand, firms in the top right corner may seek technological joint ventures as a method to innovate or grow. In each case, the structural characteristics of an industry and the range of a company's activities can work for and against globalisation. The elements that favour concentrating an activity in one or few foreign locations are as follows:

- (i) economies of scale in each activity
- (ii) proprietary learning curve in each activity
- (iii) coordination advantages of co-locating activities such as R & D, marketing and production.
- (iv) government assistance and political environment
- (v) relationship with foreign buyers and suppliers

The major limitation of the international stages model and configuration of activities models is that they (as Stopford's model) purport to provide universally simple solutions for diverse and complex business problems. A company can not develop an organisation that can innovate, analyse, and respond to the complexity of the international environment on such simple rules of thumb relating to product, configuration or geographic diversity. They are only effective when combined with other strategies.

4.9 SUMMARY

Specific examples of strategic models reviewed in this chapter were those of the gap analysis, situation appraisal, product life cycle analysis, and the portfolio strategic approach for SBUs.

In this review, it is important to note that all of these models provided a systematic approach for a firm's decision-making units to evaluate and assess its strengths and weaknesses (internally and externally). Internally, it enables the firm to identify its critical success factors such as core skills, and other resources. The external analysis enables a firm to assess its strengths and weaknesses against competitors, with customers and suppliers, and the advantages of its location. These form the environmental elements of strategy-making.

Equally important is the desire of a decision-making unit (DMU) to want to close a gap between a current competitive position and a future one using a gap analysis model. This is a motivational element which compelles a DMU to train and motivate others within the firm to want to do the same.

Further, it was determined that effective strategy and objectives making were influenced by five specific elements: (1)

measurability; (2) acceptability; (3) flexibility; (4) feasibility; and (5) precision.

Others distinct elements which created strategy were the limitation and allocation of resources imposed by the size, previous experience, and wealth of the firm. These formed the depth and range of the vision held by a DMU, the overall organisational structure and whether special programmes were used to support a stated mission of the firm to grow, to innovate, or to diversify.

This review revealed that the four broad groups of generic strategies (building, holding, harvesting and divesting) were condensed into many of the matrices type of models. Also, the portfolio planning theory entails the identification of these same four strategies in the management of strategic business units, SBUs. They would include funding patterns, how departments were managed, and the culture in which the staff operated. These same guidelines as contingent elements were embodied in many of the portfolio planning frameworks such as the Boston Consulting Group, McKinsey/GE, and other Value-based Models.

A word of caution is necessary in using these matrices. Misinterpretations abound with regard to reasons for classifying a business. For example, labelling a business as a Cash Cow is neither informative nor strategic and does not assist in managing the business. It takes more than the management of cash, but also skills and investment in plant, equipment, and people's time.

The additional misuse of these matrices is the widely held belief that any business can become a Star. This and the lack of experienced personnel for understanding this method of strategic portfolio management limitations, make it an expensive and dangerous game. The true value in the matrices are in their

abilities to classify a business into opportunity and threats categories by a constant measurement and to know how to rank other competitors, strategically.

4.9.1 Implications Arising

Several implications arising in this study concern how the Product Life Cycle (PLC) may also be used as a strategic method to establish a life cycle for key technical information and employee obsolescence. These are the secondary themes in this thesis.

The other implication is how the growth-introduction phase of a PLC can be delineated into sub-cycles comprising of threshold, creation, leverage and revitalisation stages rather than the typical one or two stages with an introduction and growth cycle. These implications become evident if the principle that all business products and ideas have a finite life span becomes a strategic rule of thumb. By such a rule of thumb, a firm would project over some type of time scale that a strategic usefulness of either a product or idea should start to decline.

Thus, a firm would realise that it must engage in sometime innovation on a regular basis in order to stay competitive. A feature which is missing in most of the strategic models reviewed. This is significant for a couple of reasons.

First, it supports the discovery in this review that product life cycle theory, some aspects of the experience curve and a strategy for innovation are closely linked. Despite some critics, PLC has much to contribute for it emphasises as to how each product or market has a limited life in which to earn profits.

Second, it reflects that more than one PLC curve may be evident in certain markets and strategists should use the theory of PLC analytically and creatively by developing various profiles of products in their product ranges. This also means that general administrative concepts, marketing, corporate image and other intangibles are subject to a period where they began to suffer a decline in their usefulnesses, the same as a product.

CHAPTER FIVE

INNOVATION: EXTERNAL ELEMENTS

5.0 AIMS

This chapter introduces the environmental elements which stimulate innovation. These external elements form the market structure which is modified by a firm's size, and its relationships between suppliers and buyers residing there.

First, it examines the classic arguments about the larger firm versus the smaller one as to which should be more innovative. Then, it reviews the external elements: environment, market structure, firm size, and the pattern of an industry's growth as they relate to the stimulation of innovation.

5.1 INTRODUCTION

Innovation - creating and introducing new solutions for existing problems or new products for an emerging market - is one of the greatest of challenges facing both the larger and smaller firm. But do they meet it differently ?

This raises the question what is the difference in size between a small firm and a large one. From here on, the international classification for a firm size as developed by Chandler (1986:410; SDA:1987) will be used: a small firm is one with less than 300 employees; a medium-sized firm is one with 301 to 1,000 employees and one with more than 1,0001 is a larger firm.

Innovation: External Elements- Chapter Five

In order for a firm to be innovative, a linkage should be established between the environment, and those elements which stimulate innovation within a firm. This relationship between a firm 's environment, its size, its structure, its competitors, and customers is one argument that has intrigued business specialists and economists for a very long time. The argument has five dimensions to it.

The first dimension argues that most innovations occur through sheer accident. They believe that the role of the firm is only to exploit the innovations of others, by emulating, by purchasing or by licensing them when it is the best interests of the firm to do so. This dimension could be described as the "serendipity factor"

The second dimension argues that it is the presence of some internal elements (rising from a motivated workforce within a flexible and flat organisational structure) which stimulate innovation best. They believe that a firm creates an environment where the innovator, intrapreneur and product champion are nurtured in their self-imposed efforts to innovate. This is countered by those who believe that it is the self-motivated individual, who acts to his/her own needs, in spite of an organisation's efforts to stimulate innovation. They argue that innovation can never be planned. This could be described as the argument of "random events by individuals" being the major force for innovation.

The third dimension argues that the market structure and the environment are the forces which create innovation within a firm. They believe that when large firms operate as a monopoly in a market, they tend to stifle innovation and technological progress. Thus, smaller firms are the true innovators. This could be described as the argument where " the size of the enterprise determines its ability to innovate".

Innovation: External Elements - Chapter Five

The fourth dimension argues that smaller firms may be the forces to advance an industry technologically, but they often fail to implement the proper marketing-technological strategy needed to fully exploit this advantage. And if an innovation is to have commercial value to its users, then it is best done later on by larger firms stimulated by the reward of greater profits.

They believe that innovation occurs in two major ways: (1) when an industry has excess resources in the sunset period (maturity stage); or (2) in the sunrise period (early growth cycle) when the industry is just emerging and needs new applications for its resources. They argue that it is the interaction of the market place, the survival mode of the firm, and the maturity of the industry that create innovations. This is described as the argument that "the lure of market place" will periodically and informally stimulate innovations rather than any type of formal strategies of firms to produce innovations.

The fifth dimension is the argument that a firm using a formal strategy incorporating the distinctive elements of strategic management (measureability, precision, unity, and continuity) with a formal programme for innovation can stimulate a firm to be innovate with a higher than average probability.

They believe that the key external elements are a firm's relationships to buyers and suppliers in their business environment. They argue that there is a causal link between these elements and an innovative workforce, the visionary practices of management, the organisational structure of a firm, and that a corporate strategy creates the unifying force to stimulate innovation. This dimension is described here as "users of formal strategies to stimulate innovation".

Innovation: External Elements- Chapter Five

Setting aside the first two dimensions as being outside the realm of this review, much of the literature on this debate started with Schumpeter (1942) and his fifty year-old concept of "creative destruction". He argued that sheer size makes big firms captives of their own successes, and they cannot change as fast as smaller rivals. So when opportunities for innovation arise, the smaller firms will seize them first.

Time has changed since the literature of Schumpeter was first published. It could be contended in his time that big firms had less incentive to change. But circumstances have changed, turbulence in the fast-changing world economy has levelled the playing field, because it penalises big firms when they refuse to change. Bouncing currencies, fast-changing technologies and international competition can hurt any firm, big or small. However, the realization by many big firms that they must change to survive is itself a new force for innovation not considered by Schumpeter. Bigger firms are shaken apart by such turbulence, whilst little firms can ride the waves of change. It is conclusive in today's business environment that both need to develop some type of technological marketing strategy to grow.

This type of findings has not been the case with research supporting market structure and innovation. Those studies (Kamien and Schwartz 1982; Hope, 1985) which have investigated the relationship between innovative activity and market structure have been inconclusive. The main criticism is that these studies vary too greatly in terms of approach, scope and methodology to be totally conclusive. But they were able to measure innovation as a dependent variable in relation to firm size, market position, and industrial concentration of buyers and suppliers.

The other part of the argument in the fourth dimension is that innovative activity will tend to be led by the smaller firms in a market because the larger firms elect to delay an

innovation, letting smaller firms first try out the new ideas. Then the larger firm will imitate in a marketing effort to catch up with and supplant the smaller innovator. This raises the question whether this is a deliberate strategy (delay) rather than a lack of innovation being practiced by larger firms. Some pundits (Kendrick, 1961) believe it is the strategic thinking of larger firms to innovate and wait to see by market changes whether an innovation is worthy of further involvement. He argued that this delayed action gives a false indication that they are reluctant to innovate, when in reality, they are just as determined to innovate as a smaller firm.

In exploring the issues in the fifth dimension of the argument, researchers (Burgelman, 1984; Pinchot, 1985; Drucker, 1986) indicate that larger firms are turning more and more to the use of formal strategies combined with specific programmes to stimulate innovation. These are used with a set of management policies for training and motivating employees to be innovators. Likewise, recent articles (The Economist, 1989; The Harvard Business Review, 1990) indicate that smaller firms are using some of the same elements, informally and formally, to accomplish the same. Their studies prove conclusively that users of formal programmes to stimulate innovation can receive up to 25 percent of their revenue from new products and services not being offered by them just three years previously.

5.2 THE ARGUMENT ABOUT INNOVATION AND A FIRM SIZE

Published data on the relationship between firm size and market performance to being innovative through effective research and development has a long history.

A frequent starting point for the investigations of market conduct and performance is market structure. The basic theory found in economics is the fifty years- old contention that a

large-scale establishment should be hailed as a stimulating and invigorating force for expansion and growth. The most distinguished proponent of this position would be Joseph Schumpeter. He argues in his writing (Schumpeter, 1942) that "we must accept that a large-scale establishment in modern industrial condition is the most powerful engine of progress for long term output".

Schumpeter stated his theory in rather general terms, and because of this there has been a lot of discussion and disagreement over the precise contents of his theory. A major source of confusion is that he did not pay enough attention to the distinction of the absolute size of a firm as opposed to relative size in relation to its market. Or to put it differently he did not distinguish clearly enough between structural conditions relating to a firm as a separate entity within a competitive environment. He no doubt differentiated between firm size and market power in his analysis, but was not explicit in disentangling their separate effects.

However, there can be no denying that he meant that both the absolute size and market power would encourage innovative effort by a firm and could lead to a higher rate of technological progress.

His argument can be distilled down into two basic elements. First, he argues that the monopoly position of a firm will stimulate it to a greater demand for innovation because a monopolist can use its market power to obtain a higher profit from the innovation than under competitive conditions. This type of firm is in a superior position to a newly entering firm to determine what the potential returns and impact of an innovation would be. Secondly, he argued that a monopoly firm will be able to generate a larger supply of innovation using the economies of

scale which a smaller competitive firm would not have at its disposal.

Supporters of the Schumpeterian system (Galbraith, 1952) have taken a somewhat different direction with the emphasis moving to some extent from relative size to absolute size. As an example, Galbraith, who is a celebrated modern follower of Schumpeter gave a forceful statement of this shift," the large firm in a modern industry is almost a perfect instrument for inducing technical change. It is equipped for the financing of technical development and its organisation can provide strong incentives for undertaking such development"

Firstly, it is fair to state that while Galbraith and other Schumpeterian followers never managed to convince the majority of economists and business specialists of the comparative advantages of monopolies in furthering innovation, their arguments were strong enough to outweigh any counter argument of the innovation-scale function.

Secondly, it is clear that by Schumpeter's claim that the large firm (which by the implication also has the greater market power) is normally considered the basis for the argument that large firms are better innovators in general. This is the belief that a larger firm has more resources, and opportunities to innovate than a smaller firm. This belief is based on the relationship between competition, monopoly, and innovation.

One of the first formal analyses of this relationship between competition, innovation, and monopoly was done by Kenneth Arrow (1962), who stirred up some controversy arguing that environmental conditions affect innovation.

This converse argument by Arrow is that monopoly power may be giving larger and dominant market leaders increased profits

and thereby reducing their incentives to invent and be innovative. He arrived at the conclusion that "the incentive to innovate is less under monopolistic conditions than under competitive conditions". He used econometric testing and formally introduced the concept that it is the type of strategy used by a firm which determines whether it is innovative. However, he failed to include "the concept of technological opportunities" and the use of a product life cycle model as being developed by the field of marketing. They are important factors to be overlooked. Clearly, it would be helpful to have a reconciliation of these conflicting arguments, though once again it is unlikely that any clear-cut conclusion will be found.

Now after setting forth the basic argument, the external elements related to innovation arising from environmental forces are discussed as follow:

5.3 EXTERNAL ELEMENTS: INDUSTRY GROWTH AND CHANGES

Research (Drucker, 1985; Kanter, 1986) does indicate that there are three major visible signs of change in the industry structure which indicate conditions that are favourable for growth by innovation. When these changes are present, existing firms with a certain type of marketing strategy will share in this growth even when new firms are entering this industry. Other firms without a scanning system to pick up these changes will probably expire. However these changes may be just as visible to outside firms as well as existing firms within the industry and are as follow:

Firstly, the most reliable indicator would be a rapid growth of an industry. When an industry grew significantly faster than the economy or population as a whole, it could be predicated with high probability that its market structure would change drastically. If its volume has doubled, there is almost certainty

that the bulk of the customers will accept and embrace any type of innovation that is reasonably priced. Only when existing firms ignore the signs of better than average growth or fail to innovate, can "newcomers or outsiders" change the market structure by capturing new customers. The most likely path to capturing some of an industry's growth is by innovation.

Secondly, another indicator is the convergence of technologies which hitherto were seen as distinctly separate. An example would be the application of computer technology to telephone switchboard operations. A breakthrough by innovation displaced Bell systems in America from a sixty-odd percent market share to less than thirty percent in less than four years by a small firm, ROLM. It took Bell systems more than 10 years to gain back some of the market share captured by this new competitor in the field of telecommunication. In the end, it had to become known as being just as innovative as ROLM to do so.

Thirdly, an industry is ripe for basic structural change if the way in which business is normally done has changed. Medical and financial industrial sectors have some examples (scanning devices for medical problems and cash dispensing machines being used by newcomers into the market while the older and larger producers and suppliers cling to practices which ignore the electronic innovation of the day).

These examples show how innovation can exploit and bring about changes in industry structure when a few large manufacturers or suppliers dominate a market. Even when there is no true monopoly, there is a tendency by dominant "insiders" to dismiss newcomers as insignificant and fail to diagnose the first visible signs of emerging innovation.

This failure to foresee a changing industry generally does not occur when there is a market-driven strategy being used

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by a company. Precisely because such a strategy encompasses the need for a scanning and measuring phase which audits all customer or technology shifts (no matter how small) as part of its business strategy (Kotler 1976:447).

At its worst, when such changes are noted, a larger firm can make a strategic decision to measure such changes, delay and later exploit innovation when it reaches a certain critical volume mass.

It is clear that when larger firms are aware of a changing industry, it becomes a simple matter of timing for them to know when to harvest an innovation which others have developed. But the timing must be impeccable. Such timing requires a Decision Support System (DSS) as recommended by many marketers (Little 1982: 50) which incorporate three important elements: (1) managerial capability and resources to measure such shifts; (2) an analytical system to forecast alternative strategies under a variety of market conditions; and (3) the flexibility and speed to adapt quickly to changes.

5.4 THE ADVANTAGES OF THE LARGE FIRM AND BEING INNOVATIVE

Before discussing those elements which form these advantages, the basic argument for being innovative has four points to it: (1) that a large share of innovations will occur through research and development activities outcomes (R & D).

The other parts of the argument are: (2) that an established and large marketing network enables a firm to launch a new product more successfully; (3) the financial power of a larger firm often provides the funds for a long to develop and costly innovation; and (4) the large and diversified customer base of a larger firm will provide better inputs as to when an innovation is needed.

The first point is that larger firms generally spend larger amounts on R & D than smaller firms and in doing so generate a more probable outcome that they will be more innovative. Therefore, it is fair to state that larger firms may well have important advantages in R&D outcomes when one considers the economies of scale in having more resources and greater profits to invest when needed to exploit a new product or process.

The next two points are about the residing market support and financial powers enjoyed by the larger firms in which there are greater opportunities for them to reap the rewards of successful innovation. By the virtue of their size financially large firms are better prepared to stand the failures and to feed long lead times before a project is expected to become profitable. Their financial strength may be important for the successful innovation and marketing of a new product and to help them overcome the negative cash flow often associated with the development and launch of a new product.

The final and fourth point had been suggested (Schott, 1974:380) that the larger firm which is more diversified may find advantages because inventions tend to occur in unexpected areas. He further suggests that the diversified organisation has therefore a superior scanning system and a greater likelihood of capitulating upon these opportunities.

Equally it has been stated (Littler, 1988: 121) that since most large firms do not generally operate within a niche and have a more stratified customer base, they can detect patterns of consumption that will indicate where an innovation will be commercially viable or when market forces indicate they are needed.

Against these points, it is still argued that the larger firms have some disadvantages in being innovative. They may well

be more bureaucratic and consequently less likely to perceive new opportunities and may have a high risk aversion preference, concentrating upon projects with a short period of pay-off or proven market appeal. They may well have a vested interest in existing methods and products and may be unwilling to proceed with an innovation that threatens their own existing investments.

They may also find it is difficult to attract and retain sufficient entrepreneurial personnel needed to be more innovative. Operationally the managers of the larger firm will be selected, rewarded and promoted when they maintain profit margins and market share than to destroy either or both by being innovative, unless they operate under a policy that any efforts to innovate will not be held against them.

5.5 THE SMALL FIRM VS. THE LARGE FIRM AS INNOVATORS

Research (Pavitt, 1984) does give some reasonably clear conclusions about the relationship of firm size and new product development. He suggests that small firms are more likely to have the edge in invention, whilst the market position and financial strength of large firms are likely to gain the advantage in innovation and in the diffusion of an innovation. Other research (Drucker and Porter, Jawekey et al) supports the fact that small firms remain still the most important sources of inventions though not of innovations.

While the actual level of threshold size varies from industry to industry, one finds that the amount of research expenditures per firm increases absolutely as the size of the firm increases. This is often used to argue that the larger firm is better at new product development than the smaller ones. However, when the proportion of sales for research is used the largest firm spends no more or possibly even less than a medium sized firm within the same industry.

The other argument against the small firm is the body of statistics (Hall, 1986:34) that show the total amount of new product developments achieved and their sources would indicate that larger firm are better innovators.

Yet, the role of the larger firms as innovators could be argued in several ways even though the large firms' innovations account for a greater share of innovations in relation to the total inputs of innovation launched. First, it is argued that they are slow to take up developments that are offered to them by smaller firms. Second, research (Littler, 1988) indicates that the level of new product development by the larger firms is less than the level of medium sized firms.

Third, the literature (Hall, 1986) shows that smaller firms are more effective in new product development when measured in terms of R& D inputs or the number of new products per research dollar outputs. Based on these facts, some argue that for more efficient new product development, larger firms should be restricted from growing too big past a critical size where new product development will flourish.

Whether dismantling the large firms into medium sized ones or assisting a number of smaller firms to become larger, and thereby gaining a certain critical size, would speed up innovation or new product development is still an open question. But in some industries, such as chemicals and large durable goods manufacturing, this is not the case because there it is the larger firms that are responsible for most innovations. This creates the issue whether it is the firm size, its desire to grow, or the maturity of the industry which stimulate innovation better.

Research by Freeman (1981) does suggest that industry conditions, whether they are favourable for new product

development, or hostile is what determines a firm's rate of innovation. Most literature agrees that a business firm should innovate in order to grow, but there is a healthy disagreement as to how far a firm should persist in its growth.

The pursuit of growth, generally, must be a major objective for a firm. To gain this growth, a firm has a choice of two alternative and fundamental methods to do so, either by internal or external means. To grow internally, many firms seek to expand by increasing their activity in existing product markets or to diversify by moving into new markets by offering new products and service. Others believe that external growth by mergers and acquisitions is the best way to grow.

Some commentators (Penrose, 1974) suggest that the decision to grow is more a response to particular opportunities or pressure rather than simply a managerial objective. Others such as Barna (1962) and Richardson (1964) project that the effects of technological change leading to rising productivity and growth cause a firm to seek new ways to use their surplus capacity as a stimulus for growth. However, Leyland (1979) argues that the primary reason for the pursuit of growth is the desire to preserve and occupy an existing management team. All of these are factors which have absolutely no relationship with a firm size and market structure as much as they have to do with a strategy for growth.

The disadvantages of the smaller firms in new product development are in many cases the obverse of those discussed as advantages for the large firms. But three possible advantages of the small firms are worthy of being noted.

First, research (Kanter, 1988:248) indicates that organisationally, they may have a more creative staff with a stronger commitment to the job since the employees feel that

there is a thin line between their firm's success and job security.

Second, there may be less of a bureaucratic structure which facilitates a closer coupling of R & D activity to other departments. This type of structure will allow a better coordination between the different product development activities and invention and innovation.

Third, the owners of the small firms may be less motivated by monetary considerations, more willing to take risks and may be more willing to cooperate with other organisations in order to gain information, assistance and industrial research when it decides to be more innovative.

5.6 EXTERNAL ELEMENT: MARKET STRUCTURE

Market structure is defined mainly by the size and distribution of firms within the market. Its importance strategically was addressed by Bain (1968) who states " market structure is one of those external characteristics of the industry that seem to exercise a strategic influence on the nature of competition... and market conduct is a pattern of behaviour that enterprises follow in adapting or adjusting to the industry in which they sell".

These external elements include the concentration of buyers, sellers, product substitutions and entry conditions, and how a firm designs, prices, and sells a product or service. On the basis of the writings of Bain and others, the main elements comprising market structure are: the market share of firms, concentration among the larger ones and the barriers they raise to new and potential firms to compete. This structure ranges from pure competition with many firms to loose and tight oligopoly, dominant firms and complete monopoly.

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Whether an industry is perfectly competitive, monopolistic or oligopolistic may have some impact on the rate and nature of technological change. But when it comes to the absolute and relative size of the firms comprising that industry, there are four other factors which should be considered

First, in the long run, if not the medium time frame, the intensity of competition may be not related to market structure. For example, the most highly concentrated industries (shipbuilding, steel-making, aircraft) cannot afford to be complacent because there is always the risk that a new firm from outside the industry (through its development of and its use of a new product) may overturn the market positions of established firms. Even a monopoly position established through patents is not totally secure since competitors may be stimulated to develop alternative technological solutions in order to bypass the patent.

Second, the stage of development of the innovation or technology is likely to be a significant influence on the nature and vigour of technological development and its marketing strategy. During the embryonic phase of the development of new technology, there is usually considerable scope for further technological improvement. This means the "innovating firm" would use a market-skimming prices strategy with high prices initially to skim the market, but it should not be too high as this will attract more competitors. Eventually, the scope for further technological improvements becomes limited, and it is likely that there will be diminishing returns to efforts to develop the technology further. Prices are lowered by a gradual introduction of a cost-effective distribution and production plan. At this point R & D resources may then be more productively allocated to alternatives, in particular newer technologies.

Third, certain innovations may demand a minimum high level of expenditure as an "entrance fee" for a firm to market it. For instance, the cost to develop a new airframe will be in the billions, whereas the development of a food innovation may be in the order of a few thousand pounds. Thus those industries which involve larger scale innovation may require large firms which can afford the costs and smaller firms are attracted to industries (such as food, leisure, electronics, textiles, paper, and furniture) where lower amounts of investments are needed to make an innovation worthwhile. These types of industries rely more on ideas and skills than expensive research and development efforts as sources for new products.

Fourth, technological development and innovation are stimulated by the social and political factors of a country, by its policies of regulation, funding, population growth and environmental concerns. Industries such as in the pharmaceutical sectors and motor car manufacturing can be significantly changed by either demographic or governmental pressures which affect a firm and all competitors equally. So in these industries a firm's size, its rate of growth, market position and industrial concentration are not affected by the nature and path of innovation. It is more the case they are forced to survive by the process of innovation.

This review does indicate that industrial changes, market structure and size of the firm does stimulate or disable innovation in a couple of ways. First, a smaller firm may seek to be the first with the newest by developing an innovation which will fully exploit a market niche. Secondly, a monopolist, defined as a large firm dominating its market, can delay all the values of an innovation in its industry if it has a scanning system in place to be aware that the said innovation is emerging. The delaying strategy used by IBM when it refused to allow its

hardware to be compatible with the "easy to program " capabilities being offered by Apple Computer is a prime example.

Therefore, the argument that a monopolist, generally, will apply a restrictive policy to inventions and innovations of a smaller firm may hold true. And as Fellner (1975) argues, the competitive firms smaller in size will tend to innovate more fully than monopolists may be true. However, the larger firm should be more concerned about the fact that a new innovation will destroy some or all of the value of its existing technology. For example, satellite communication can make telephone cables worthless or at least worth less; or that a new computer model can alter the value of conventional measuring equipment.

5.7 EXTERNAL ELEMENTS : BUYER AND SUPPLIER RELATIONSHIPS

The market structure is comprised of buyers and suppliers which are external to the firm. Research (Myers and Marquis, 1975; Hall, 1986) argues that innovation occurs in response to these external elements.

Innovation occurs either by the needs (pulling) of the buyers or the thrust (pushing) of the suppliers. This process of innovation, considered at some length in Chapter Three, has been shown neither to flow purely from market to producer (need-pull) nor purely from basic research to market (technology-push). Both elements are involved in a complex buying and supplying relationship. It is more an evolutionary process than a revolutionary one.

Myers and Marquis, went on to explore the evidence that most technological changes occurs in response to perceived market needs, concluding that 75 percent of the 657 innovations

examined in five different industries "could be classified as responses to their buyers' demands". Other researchers (Chisnall, 1989; Hall, 1986; SAPPHO, 1972) have reached similar conclusions, and the single most important external factor determining successful innovation was the close monitoring of actual and potential buyers' needs.

It is central to a Schumpeterian development process that there is a long waiting period until the buyers are convinced of its value. This "wait and see" period starts once an initial innovation is offered, and one reason for the delay rests in the uncertainty about the innovation in general.

As Hoffman (1949) put it, all potential consumers have to acquire information about the innovation and learn new patterns for its application before they purchase a new product. Further, he argued that an industry may experience a rapid rate of growth "because it is a young industry busy creating a market for itself in the place of other products; in contrast to an old industry where the buyer has had a long time to decide on how much to use". So with new innovations, the risk is how much to order initially and at what cost.

It is not only the risk-cost factor working against the diffusion of an innovation, but lack of information by the buyer about how much to risk with the integrity, and quality of their own products. It is the poverty of information about an innovation that creates most buyer's uncertainty. This uncertainty tends to retard the development of the buyer's organisation as well as the early commercial success of an innovation. This, also, places a buyer in a dilemma regarding innovating products because their value to assist his/her own organisation have not been proven.

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It is for these reasons that the buying process for an innovation may include a technical review, and a trial period of use before making further commitments to buy. This is supported by research (Cunnigham and Elling, 1983; Cunnigham and White, 1974) which indicates that over 60 percent of all machinery purchases surveyed in the UK went to suppliers of which the buyers had previous experience. These surveys, also, highlighted the fact that in the purchase of machinery and material considered innovative, the buyers picked the innovations being offered by larger firm 82 percent of the time versus only 17 percent of the time with smaller suppliers. Over a ten year period, this trend to pick larger firms and former suppliers over smaller and new suppliers has changed very little regardless of industries surveyed.

On the other hand, there are some buyers, who prefer to try new innovations at will, regardless of cost. This supports the adoption pattern of an industry that some will buy because it is new and others will reject for the same reason. This pattern was noted by Stoneman(1983:41) in quoting Welbournen "when a new thing is offered, some men will pay more than it is worth, because it is new; other men will not buy it at all, even if you give it to them free- for the same reasons that others will buy, because it is new".

This pattern of adoption, researched by Rogers and Mansfield and as noted in Chapter Three, is outlined to show how some buyers represent pioneering firms, traditional ones and so on will consider buying an innovation based on three factors: (1) the technology of an industry (complexity offers the greatest opportunity while offering greatest reluctance to change); (2) the management policies of the buyer dictates whether that firm will, by past practice, welcome new ideas or not; and (3) the amount of educational effort exerted by the innovator in telling

the industry as a whole of the benefits of an innovation in the marketing phase of the innovation chain.

Regarding as to how buyers of innovation should be persuaded, Abratt (1986) identified four techniques: (1) innovating firms as part of the innovation process must recognize that the purchase of an innovation, in most cases, is a "high-risk" decision, and they should develop an early and close relationship with the most innovative segment of their potential buying market to overcome this; (2) the salesmen of innovation must realise that the buying process includes many more layers of management than the normal buying process so their presentations should be directed at technical and service managers as well as buyers; (3) From time to time, innovating suppliers should survey potential buyers to determine which of their problems could be solved by innovation before offering it to the market place and slant their selling material accordingly; and (4) innovators should share in-depth technical information about the benefits and features of an innovation as to how it would solve problems within the buyer's organisation.

Naturally all suppliers become buyers so the techniques for one are the same for the other.

5.8 EXTERNAL ELEMENTS: BUYING INNOVATION FROM OTHERS

Within the environment surrounding a firm are elements which could be acquired which may stimulate innovation: They include (1) innovating competitors acquired by either a merger or an acquisition; (2) innovating firms that have organisational and marketing skills that the firm does not possess, but need; and (3) firms and institutions which engage in basic and applied research.

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When using external methods, the acquisition of innovation, the firm may seek to buy new ideas, new products or to acquire "spin-offs" of other firms (i.e. small entrepreneurial firms). However, the literature (Economist, 1983; Peters, 1982; Burgelman, 1983) provides three reasons as to why a firm should hesitate in selecting this (buy-into innovation) as a corporate strategy for innovation.

Firstly, a firm relying on external methods, reduces the abilities of its employees to see and embrace internal opportunities to innovate within the firm. The most productive way to growth and profits by innovation is "home-grown " innovation.

Secondly, when external methods are used, innovative activities are put aside internally. Then the most creative and entrepreneurial persons will see this as a sign to leave. Thus, such a strategy will result in a brain-drain and the remaining employees will seek to be even more non-entrepreneurial. They not see any reward for being innovative as individuals.

In the purchasing of innovation, a firm does not build up the " experimenting- teaching -and- learning " experience necessary for developing the entire process of innovation from conception to commercial acceptance. A firm, without these learning experiences, increases the risk in the future that it would create a workforce which can not innovate even when management wants it to do so.

Thirdly, a firm should be aware that the purchase of a license or a right to exploit an innovation, provides a limited strategic advantage and should be considered carefully. Partnerships, and coalitions with universities, research laboratories and other firms should be approached with a full view of their costs as well as their benefits. Also the

conflicts between the goals of dissimilar firms create many administrative and organisational problems which discourage this external method as being viable.

5.9 SUMMARY

This review indicates that there is ample evidence that the external elements for the stimulation of innovation and the causal links of these relationship have not been explored enough by its proponents in sufficient detail to justify many of the conclusions they reached, except for the following three observations:

1. Most firms within an industry should employ a scanning system to detect what is happening in the environment with sources of supplies, customers and technological development. This element to determine the key needs of customers seems to be the most important factor determining successful innovation. It is critical that the process of innovation requires a close monitoring of the environment, whether it is done by the larger firm or the smaller firm.

2. The ability to purchase or license innovation from others is an option which many larger firms can employ successfully, if they are aware of what is happening in the environment. Their size, reputation, and marketing experience ease the adoption of the innovation.

3. A firm's size and whether its industry is entering a sunset or sunrise period can dictate its overall ability to innovate. A larger firm in a sunrise phase of an industry has a better than average chance of being innovative.

Many of the different studies cited confirm most of the innovations require some type of financial and marketing support

from the firm, and the larger firm can offer more of them. However, there is more than ample evidence to show smaller firms generally have greater capabilities to invent than larger firms.

Further, it is argued that if one cuts through the heart and soul of the Schumpeterian theory, it can best be described as a threshold theory where a firm should be a certain size because of its marketing expertise and distribution system to flood a customer base with new technology. However, Schumpeter never did define a threshold level or quantitatively attempted to determine what would be the best firm size, concentration, diversification, or technological mix of firms to reach "peak" innovative activity as an industry. He only said, "a large firm in a modern industry". Besides, fifty years ago, the largest of firms would probably be outside the realm of possibility to Schumpeter as to what they are today in scale, employees, turnover, geographic area, etc. His description of a large firm of yesterday may be a medium-sized firm by today's dimensions and is relative to the industry, and country, etc.

The other concern is the way the body of literature expresses itself about the size of firm and innovative activity. There has not been an attempt by the literature to project the effects of size differences between a small firm and a large one as to marketing methods, and financial resources. Neither has there been an attempt by the literature to show links between the size of a firm, buyers relationship, R & D and incidence of innovation. It seems a more fruitful approach would be to find out what specific advantages or disadvantages, a particular size of a firm or organisational structure would receive if and when it reached a certain rate of innovation.

5.9.1 IMPLICATIONS ARISING

This section questions the argument advanced by Schumpeter that market structure is an overriding factor against the rate of innovation, which most modern business writers no longer accept. In support is Michael Porter (1980:169), who argues while market structure is a strong influence and often dictates the type of strategies to be used by a firm, "it is not the most important force".

However, he offers little comment on how market structure affects the rate of innovation except to acknowledge that "the strongest force of all is the rate of innovation" as they relate to his five competitive forces governing industry structure competitiveness as discussed in Chapter Four.

This reviews supports the concept which requires a firm to scan its environment and for innovators to develop an information sharing relationship with its suppliers and customers. These are the key external elements to be incorporated in any strategy for the stimulation of innovation in the process chain of innovation.

CHAPTER SIX

INNOVATION: INTERNAL ELEMENTS

6.0 AIMS OF THIS CHAPTER

This chapter introduces three types of general elements found within a firm which could be used to stimulate innovation: distinctive, contingent, and motivational.

First, it presents those elements, either used independently or combined, which will distinctively stimulate innovation. These distinctive elements may be used by a top manager to accomplish the following six purposes: (1) to create an unique structure and strategic plan for innovation; (2) to stimulate innovation amongst a firm's workforce; (3) to develop culture which stimulates innovative action and a special type of human controls that best enable innovation to occur; (4) to provide an information system to assist innovation and its market process; (5) to assist a firm in selecting a distinctive technological strategy; and (6) to provide a feedback system with outputs as to whether the firm is meeting its mission.

Second, this chapter explains how those contingent elements are those embedded in a firm's decision to innovate and by their presence will energize the modes, life, form, and powers of this decision. This group of elements are operational and have to be continuously reinforced in four different ways: (1) by a firm's funding patterns; (2) a firm's culture created by the vision of its management; (3) the risk-time factors considered by its middle managers; and (4) a coaching type of relationship exhibited by a firm's supervisors to their work groups.

Third, this chapter outlines the motivational elements used to stimulate innovation. These elements are the summary of human resource strategies used by innovative firms to reward and to motivate their employees accordingly.

This chapter will, also, indicate how these elements contribute to the strategic direction of the firm. The contents of this will reflect some current theories for structure, innovation, controls, and employees' behaviour and will attempt to balance the difference of opinions expressed on these topics.

6.1 INTRODUCTION

The mission of a firm and its structure are the building elements for stimulating innovation. From these elements, a firm's efforts to be more innovative start with some underlying idea and conception on how innovation is stimulated.

In formulating a strategy for innovation, the manager seeks to develop a link between its structure, the environment and at the same time create a vision of how innovation is stimulated. Then, the workforce is motivated to meet the firm's current operating plans while at the same time is encouraged to innovate for the future. Each of these tasks require a different element and when these elements are working together for the same mission, a strategy for innovation evolves.

In practice, those elements formulating structure, strategy, policies, human behaviour, and objectives operate much more loosely than as described in the theories of management from Mintzberg, Andrews and others.

In theory, these relationships are sharply defined, but in reality they can not be precisely measured and so many managers must plod ahead by trial and error to meet the objectives of a

firm as if they had not done so earlier through a formal planning system. This is particularly true when the firm is complex and its business environment is highly uncertain. Then there is a high probability that their judgements will be based on such trials and errors.

For instance, the literature (Cyert & March, 1963; Downs & Mohr, 1976) has pointed out how a strategic goal may vary from one company to another. They argue that most goals are contingent based on the resources of the firm, its organisational slack, its culture, and the ease (timing, averse to risk, etc) in which decisions are made.

Further, the literature (Burns and Stalker, 1961; Lawrence and Lorsch, 1967; Quinn, Mintzberg and James, 1988; Freeman, 1974; Ouchi, 1983) indicate that there are three distinctive business theories which clearly reflect which types of companies are most likely to be successful in being innovative: (1) how the company is organised; (2) how formal is its strategy for innovation; and (3) the selection of a technological strategy which best suited a firm's environment, experience, and management style.

To the first theory (see para. 6.2) of how the companies were organised, and whether they were hierarchical and structured formally or whether they were more flexible provides an assumption that:

Under changing conditions, a firm which is tightly structured in a bureaucratic sense (mechanistic) would stifle innovation; whilst a firm with a flexible (organic) structure would stimulate innovation.

The second theory (see para. 6.3) reflects the overriding management style of the companies, and their commitment to be

innovative or not will depend on the formality of their strategies. Strategic decisions for innovation will be made on the nature of their environments, programmes, and previous experiences. The overall formality of their strategies provides an assumption that:

The more formal the strategy, the greater the number and variety of employees encouraged to innovate; and the more informal the strategy, the lesser the numbers of employees (generally just the self-motivated individuals) are encouraged to be innovative.

The third theory (see para. 6.4) deals with the type of strategy selected by a firm. The firm's strategy-making style and its effort to motivate employees will reflect the key sovereignty element of that company, its previous experience in being innovative being based on the following assumption:

Innovating firms will consciously adopt a technology strategy for directing and motivating their employees; and non-innovative firms will subconsciously select a strategy without any plans as to how they will direct or motivate their employees

Note: A firm has more than seven technological strategies to chose from: pioneer, fatalist, opportunist, follower, imitator, dependent, and traditionalist (see Appendix B for details)

Reviewing these three theories could provide some useful insight into the character of a company and the extent to which the company is innovative. From their examination, the following questions arise:

When innovation is stimulated under changing business conditions, what happens to the firm 's structure? Does it

becomes disjointed and form more of a "nexus" type of relationship (linked by brand names and corporate identification) to others? Or does it become more flexible ?

If this is the case, does the organisational structure evolves and changes its classic adaptive strategies to those of a "punctuated type of strategy? The punctuated strategies being those (Forster, 1985) which propel a firm forward in developing a particular innovation to fruition by spurts of fits and starts: experimentation by trial and error that will reinforce a desired behaviour.

Can the behaviour patterns of some of the managers/employees within a corporation which generally initiate change and innovation within a firm be stimulated? Are these innovators distinctly different in managerial style and personalities from other employees? If so, to what degree and in what type of organisational structure, do they thrive best?

This chapter should provide some answers to the questions as to what is needed in implementing a strategy for innovation, and it starts with strategic structuring.

6.2 DISTINCTIVE ELEMENTS

6.2.1 ELEMENTS OF GOALS, STRUCTURE AND INNOVATION

Strategy planning and strategic management are often considered a major task (if not the sole responsibility) of top management (Ansoff, 1984; Day, 1984; Schendel and Hofer, 1979); this is reflected widely in many of their writings.

Some disagree and argue that it is a company wide task and not just the role of top managers (Waterman, 1988; Quinn, 1988), but both agree that one element of strategic planning which is

the province of top management, is the setting of goals.

However, there are two salient distinctions between the goals developed by an executive and the formal goals developed to measure outputs. Etzioni (1971) and Perrow (1972) argue that there is a distinction between implied goals and operative goals. Implied goals are the official ones as put forth in the charter, annual reports, and public documents of a company. Operative goals are different. States Etzioni, "they reflect the mission of the firm and tell others within it what the organisation is trying to do, regardless of what official goals say or what secondary goals emerge".

Granted, in order to achieve an agreed to strategic goal, the organisational activities have to be directed and coordinated by top management in two ways. First, by strategic goals which when they are treated as mission statements will influence culture, and dictate whom will be hired, promoted, and rewarded. Secondly they determine how people will work, and in what type of organisational structure that they will be managed with to reach said goals. In short, they bring order to a firm.

Thus, the structure provides routine, rules, and constraints to ensure people are working toward a common mission. Then, it could be interpreted that structure evolves from the mission of the firm and the mission of the firm evolves from the people in them. There is a volume of research (Handy: on Weber, 1963:192; Burns and Stalker, 1961) which indicates that people plan and work differently depending on whether they are in a hierarchical or an organic type of structure.

In these different types of structures, do they work differently because their tasks are different? Absolutely not, but the literature indicates that they do manage the stimulation of innovation differently (Wilkins and Ouchi, 1983). They argue

that while the organisational characteristics and structures may vary, the tasks of most persons within them are more or less specialized, but.. .."it is how they manage and view their environments that is different".

They further state, "in most large firms, the low and middle levels of employees hold limited perspectives of the total set of strategic activities taking place within the firm as being directed by top management. This is because of structure".

To the interaction of structure to innovation, Ouchi and his associates argue that there are three different types of structure, i. e. the market, the bureaucracy and the clan which may impede the internal coordination of a strategy. They argue each affects the organisation differently, the employees in them, and the resulting activities radiating therein.

The various activities and skills, subsumed under a strategy, require that each individual employee at least knows what to do and how to do it in support of its success. Ouchi, further states in order to do so each organisation has to suffer an operating cost, at some point, to gain the motivation of each employee. But it must be done within the structuring imposed by the firm, yet the structure must allow employees to innovate against the routine imposed by the structure.

6.2.2 The Dilemma of Structuring versus Strategy

The crux of the dilemma, which frustrates most firms, is at what point does the structure become a disabling element rather than an enabling one to a firm's ability to innovate.

When a firm has rules and controls established by its structure and an employee wants to deviate from them in an effort to be innovative, does the structure become a hindrance to

internal change and innovation? A common occurrence is the machine operator who develops a new device to simplify his work, but conceals its use because a company's rule states all devices must be evaluated by industrial engineering before use. This creates the interface between the control of the structure to manage and the employee's freedom to innovate.

This interface forms the administrative paradox faced by most business organisations. Moreover, when new innovations (Pinchot, 1985; Drucker, 1984; Kanter, 1986) are in conflict with an agreed- to corporate strategy then what initiatives are needed to balance current goals against change? An example of this occurred in 1964 with the Bank of California, where, the corporate strategy was to increase the borrowing of larger firms, and to ignore the consumer market. Yet, an employee, Michael Phillips, introduced a series of consumer-directed banking innovations: credit cards; certificates of deposit; and interest-bearing checking accounts. They were launched without the approval of his senior officers and only the instant successes of his innovations saved his job (Pinchot, 1988: 58).

When such a paradox is created, management is counselled by certain pundits (Thompson, 1967; Day, 1984; Burgelman, 1983) that the firm must, simultaneously, seek less certainty and more flexibility. Thompson, for example, states " the dialectic component of management is to combine a search for certainty for what is new with a search for flexibility of its present goals ".

Supporting the need for corporate flexibility, Day stresses, "it is necessary for a firm to be a lot more flexible and a little less certain about a strategic objective in order innovation can flourish." And Burgelman writes, "firms must engage in strategic neglect from time to time in order to give innovators the flexibility needed to innovate".

Here arises another dilemma of terms and theories found in the literature. For example, in a discussion of the theory of the firm as it relates to innovation, Cyert and March argue that "relatively unsuccessful firms were most likely to seek innovation than successful ones", but they, later on, supported the contention of this research by stating that "innovation means a new solution to a problem currently facing the organisation". However it is their interpretation of organisational slack which forms a prior assumption of this research.. that "organisational slack occurs away from the expected behaviour imposed by a structure in making a decisionand the more successful firms breed slack" (Chapter 3, pp. 278-9).

While being contrary to their earlier statements about innovation being the province of unsuccessful firms, the second statement supports the arguments of Burgelman, Andrews, Gluck, and this about organisational flexibility. They argue that if the innovation is problem-oriented rather than long-term and directly related to the anticipated needs of the organisation, then the more slack (flexibility) is exhibited. Namely, the more flexible the organisation's structure, the more it can accommodate different types of innovation, and the more innovativeness it exhibits.

6.2.3 DISTINCTIVE ELEMENT: VISIONARY LEADERSHIP

Managers in innovative firms generally exhibit some form of visionary leadership qualities because they realize people under them are looking for a role model on how innovation should be handled.

Corporate and visionary leadership are important because they set a tone for the entire firm. Since most middle managers look to top management for guidance and direction, they tend to

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emulate the style, beliefs, and characteristics of the chief executive officer. In turn, the combination of these factors create the intrinsic culture setting of a firm which is a set of values and beliefs showing others how to act and react to situations, problems, and opportunities. Peters and Waterman (1982:26) reports that "associated with almost every excellent firm was a strong leader (or two) who seemed to have a vision of what was needed to make its firm excellent".

A two year study by McKinsey and Company as reported in the Wall Street Journal (August 29, 1983:12) found the leaders of medium-sized and high growth companies to "radiate enormous and contagious self-confidence about the firm's future ... and would take pain and time to communicate their strong sense of mission to all who come in contact with them".

Those business leaders with a clear sense of mission are often perceived as dynamic and charismatic leaders. They command respect and influence strategy formulation and implementation for innovation because they tend to have four key characteristics:

1. A role for others to identify with and to follow. They set the values and culture concerning the firm's mission and activities.

2. The ability to create an articulated vision and to give a transcendent goal designed to renew the meaning of everyone's work activities toward a strategic goal.

3. The belief that high performance standards are achievable and that these goals are communicated to all levels of the firm. They show that innovation and change are welcome, offering sponsorship by pledging emotional and financial support whenever an innovation is justified and to ensure that it is fostered in a timely manner.

4. A desire to expend monies and time in the training and coaching of employees so each employee can learn to understand, and to process information and to communicate effectively about the benefits of innovation.

The other main element for innovation exhibited by the visionary type of leadership is faith that there will be a future. Deming (1982:22) argues the innovation of a firm is directly reflected in the standard operating procedures of a firm as to how they create "a constancy of purpose and faith for the firm to experiment with new materials, to change methods of production, to up-grade old skills and to train employees. These are the foundations for the stimulation of innovation".

6.2.4 DISTINCTIVE ELEMENTS: KEY PROGRAMMES

Research (Kanter, 1989:211) indicates that there are other types of elements which will, distinctly, stimulate innovation without changing a firm's basic structure. The following indicates there are specific programmes and how they may be used, independently or in combination. Specifically, they are:

(i) The use of working methods that include the redesign of production departments into work teams which help individuals to work in groups for the solving of problems. Job rotation and self-job design are other examples of the methods used. These have been applied to a greater extent by Japanese and Swedish firms than in American, Scottish or English ones (Ouchi, 1981).

(ii) The use of various information exchanging and training activities in order to create a shared understanding of the overall organisational tasks. These include seminars, meetings with the customers, and company-sponsored training on how to be more entrepreneurial (Kotler, 1984; Morano, 1983).

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(iii) The establishment of an operating culture which stimulates experimentation and plays down the failures caused by innovation. This becomes the main component in creating an informal or formal strategy of corporate entrepreneurship (Burgelman, 1983; Links, 1987).

(iv) The establishment of on-site and off-site training courses to complement strategies by combatting the obsolescence of competences and the erosion of those skills belonging to technical employees (Kidder, 1981; Levinson, 1978:155, 249).

(v) The use of corporate venturing techniques to fund new ideas which allow the participants to break the organisational rules imposed by its structure. These include the use of a formal programme for innovation which allocates monies to experiment, grant time away from normal operational duties to develop projects or the permission to travel in pursuit of a new business development (Burgelman, 1983; Pinchot, 1985).

(vi) The sponsorship of product champions by using a formal strategy to reward and fund them based on their efforts to innovate rather than by the commercial success of their efforts alone. In this vein, supervisors are trained to give positive feedback and reinforcement on innovative ideas and activities. (Peters, 1982; Economist, 1983)

(vii) The use of disconnected and informal organic types of organisational structures from skunkworks to matrix -designed as projects outside the regular structure. These encourage small group works and an easy flow of information (Burns and Stalker, 1961; Peters, 1982; Drucker, 1984).

The list, above, is not intended to be exhaustive, but to reflect the common thread of flexibility which is needed to stimulate innovation and intrapreneurship (ways to regain

entrepreneurial activities in large and mature structures). In total, the combination of these factors combat occupational obsolescence (see Appendix B for definition, herein) which will stifle innovation.

6.2.5 DISTINCTIVE ELEMENT: ORGANISATIONAL STRUCTURE

The next issue is which organisational structure (divisional or functional) is deemed best for stimulating innovation.

Chandler (1966) argues that neither way functionally nor divisionally is always the "best ". He determined by surveys and comparisons of 100 top USA corporations that a firm "best organisational structure" reflects on the type and variety of the products, their technical similarity or diversity, the whole firm's size, geographic spread of the operations and the general economic condition of each business unit.

Other business theorists believe business size and product lines indicate what is the best business structure. A one-manager firm may do it all in one level argues Williamson (1970) and do it better than a multi-divisional firm. He states this is typical when the firm has a focus in one or few primary products, but as it grows it may gradually add layers of management and diversity into a whole range of products. At a each business size, he determines that there is one best structure being a "U" or "M" form depending on the degree of diversification that the firm's products have reached.

"U" form is a unified centralised form of decision-making, sometimes referred to a simple entrepreneurial form of organisation and "M" form is a multidivisional with functions and divisions among product lines. The choices between the two are often wide open and debatable. Yet either form can be changed by technology to reflect the other. For example, a large

computerised reporting system can provide the single "U" form decision making in a large firm generally found in a smaller firm.

For a contrasting view, Quinn/Mintzberg/James (1988) argue that it is the combination of the internal forces within a firm, its technical situation and mechanisms of coordination which often determine the best strategic structure of a firm. At best these forces would be situational using five hypotheses based on size, age, standardization of tasks, professionalism of personnel and providing legitimate powers to the stakeholders to challenge and even change its environment.

The main force for change within an organisation is its people. The power to deal with change is delegated to its managers by the firm structure. Whether a firm has tens of employees, hundreds or thousands, there are only two basic ways to delegate this authority. The first is the functional way in which the manager of each subunit of a firm is given the power to perform a special task; and the second way is divisional where each division combines all the functional tasks and reports in parallel to a holding company. For these reasons, management policies must reflect and support entrepreneurial behaviour of its employees daily. 3M Corporation, for a specific case in point, allow up to 15 percent of its employees time away from operational duties as a corporate policy. This is a functional power delegated to each employee via their manager.

Central to these situational influences, Mintzberg (1979) argues that there are six basic configurations in six basic parts around six basic forces which determine the strategy-making modes of a firm. These are basic mechanisms for strategic direction, support staff structure, operating core of competences, and technical systems. How they are managed by the middle management

depends upon the ideology as energized by the culture of the firm and its decision-makers toward a goal.

6.2.5.1 SPECIFIC TYPES OF ORGANISATIONS FOR INNOVATION

In many firms, there are specific organisations within them, whose sole purposes are to investigate and to produce new innovations. These innovation investigating organisations may range from research and development (R&D) departments with hundreds of employees to one person doing new product development within a small firm.

The literature (Littler, 1988:108; Schon,1967:203) indicates that there are two levels at which the organisation for this type of activities must be considered: the position of the R&D function within the firm, and the specific type of organisation structuring the activity, itself.

There are three types of the positioning for these functions investigating innovation within a firm: (1) they can be centralised serving different parts of an organisation; (2) be decentralised with the activities and responsibilities being dispersed throughout an organisation; or (3) be confined into one or more special departments in which R&D, new product development, and new business development are combined under a single manager. In some cases, they reflect the same structure of their parent firm and in other cases they are completely different in structure and focus. Either way, the organisation for these activities can assume one of the several specific structures as follows:

(i) Discipline-based organisation, where the activity is structured according to a dominant scientific or technical discipline. The foremost advantage of this structure is that each employee is somewhat familiar with the tasks of other colleagues

or how they relate to his/her speciality. Secondly, each employee can gain an intellectual stimulation from colleagues; and thirdly, the head of the department generally can assist less experienced members in a technical sense. The chief disadvantage is the narrow focus of the activities.

(ii) Project-based organisation, this means the activities are funded according to a project or task with a defined objective for a particular type of innovation. The advantages are the abilities of each project head to have total project control and budgets can be allocated accordingly. The disadvantage is the project moves or stops according to the availability of funds and the skills of the project without the assistance of outside help.

(iii) Traditional-based organisation, where the tasks are delegated downward ad hoc from a large and pyramidal type of organisation. The advantage is the support of a larger organisation with a greater amount of resources which can be directed when funds or greater skills are needed. The major disadvantage is that the organisation is subject to the pressures and whims of the larger group.

(iv) Venture-based organisation, this is a form of project management where the representatives of various other functions (i.e. marketing, finance, and production) set the task and how it should be managed. The principal advantage is that an innovation is viewed from several different perspectives from application through its commercial development. The disadvantage is that the project will only move ahead by a consensus or controlled by the most powerful member of the committee.

(v) Matrix-formed organisation, where a combination of project heads and disciplines have joint responsibilities for the overall development of a project. The chief advantage is that a

project can be judged from a technical and commercial sense throughout its development, and creates a better information flow between departments and disciplines. The major disadvantage is that some personnel report to more than one boss.

6.2.6 VARIATIONS OF INNOVATION INVESTIGATING ACTIVITIES

It is important to note that any of these organisations can operate within a parent organisation structure if it is allowed to operate in a disconnected way from the larger organisation.

When this is done, they take on the characteristics of a "Skunkworks" function: a leaderless group of specialists commissioned and funded to develop a specific innovation without interference of any kind from the funding source. Others in the larger organisation are warned to stay away and to ask "no questions" unless invited to review, participate with, or to fund a project, but only at the expressed request of the project head. In this way, they operate without the rules, constraints, and routines imposed by the structure of a more formal organisation.

Other variations for innovation-investigating and stimulating functions may include an employee suggestion scheme; task force; special committee for innovation; or a corporate intrapreneurial programme funded and formed to stimulate innovation from any employee of the workforce at large.

6.2.7 DISTINCTIVE ELEMENTS: FORMS OF CONTROLS

Research (Eztoni, 1971; Perrow, 1972) supports the concepts that a firm is a complex set of human relationships formed for a variety of business purposes. They argue that the activities within the firm form human relationships which are dynamic, on-going and changeable.

The combination of these activities and the balancing of these varying purposes contributes to the complexity of the business firm and are addressed in the stakeholders theory. This theory (Freeman 1984:25) argues that the interests of all employees and others on the outside of the firm have to be satisfied and each has a legitimate stake in the survival and growth of the firm. The complexity of these relationships (with suppliers, investors, governments, and customers) varies according to the purposes and the type of organizational structure, in which a firm operates.

Because of this complexity, certain forms, techniques, control and rules are necessary to govern those human activities for the good of the organisation. Most of these rules are flexible. They seek to coordinate those activities needed to produce a product or to deliver a service. A few may be characterized as being very dynamic reflecting the driving force of the founders or the personal goals of its decision-makers to excel. They may be entrepreneurial in behaviour and by their patterns of action.

Others rules are more static and support the formal legal conditions of the firm -e.g. owners rights, organisation charts and responsibilities. In concert, these and certain activities may appear to be fixed and rigid from the outside. But like all human conditions, they express human efforts to innovate, and by being so indicate experiments which are changeable.

6.2.8 DISTINCTIVE ELEMENTS: STRATEGY

Strategy is discussed earlier in Chapter Three as "a plan which uses, allocates, and guides the resources of a firm for growth and survival". However, there are theories that strategy can be further classified into one of several other modes: such as being entrepreneurial, adaptive and functional.

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One of these theories is Mintzberg (1973) in which he states how three distinct grouping or "modes" are classified. The first and simplest mode is the entrepreneurial mode of strategy-making. This mode is typically dominated by the search for new opportunities in a dynamic environment. Its strategy is manifested by a series of bold steps toward growth with centralised one-man rule.

The second mode of strategy-making was outlined by Mintzberg as being "adaptive". This is best described as creating a web of relationships (stakeholders) which have an above average interest in the type of strategy a firm will use. The strategic focus is more to resolving problems received from the stakeholders rather than exploiting new opportunities. It is more a "putting out of fires" and done in incremental steps using the skills and knowledge of most stakeholders but with little coordination between them. Coined by Lindblom (1959) as "muddling through using a disjointed nibbling type of strategy venturing into the unknown " one employs a familiar method as a starting point as to how a problem should be solved. The decision-makers seek to cope and negotiate with this complex environment rather than change it, reacting to it without clear objectives as the guide for its strategy.

The third type of strategy is called the "planning mode". It is a combination of the entrepreneurial and adaptive modes, but uses a long term fixed objective. It is deliberate with formal programmes and generally used by older and larger firms, who can control their business environment. Systematic in nature, it seeks to create a coalition of decision-makers generally led by a professional planning department or an analytical decision-making and strategic mechanism. It thrives on information, and reaching a critical size for the deployment of the economies of scale to its advantage. Its strength is setting and implementing operational goals and generally

operates best in a stable environment. It seeks to have control over its suppliers and to negotiate with employees and customers from a position of strength. As outlined by Porter (1986), these are its main strategic goals.

6.2.8.1 PUNCTUATED STRATEGIES

Between the planning mode as a type of strategy and the adaptive type of strategy are some other strategies which are considered to be short term, and more flexible. Forster (1985) defined them to be "punctuated ones" which operates differently from the adaptive strategies of action (triggered by changes in the environment) and strategies of structure (internally- focused to achieve the best configuration for a unified response to anticipated events).

He argues that these punctuated strategies can be divided into three generic types: (1) technological; (2) financial; and (3) human resources. Technological strategies offer longer term advantages (1-3 years) when they exploit a particular technology, in a consistent manner; financial strategies which group assets into a configuration for an immediate advantage (less than 1 years) ; and human resources strategies which offer advantages for a medium term (1-2 years) by using human resources to combat occupational obsolescence.

Two of these punctuated strategies (technological and human resources) can be supported by employees when they choose to take training courses or engage in off the job learning to cope with the advance of technology.

An example of this was written by Kidder (1981), who indicated in his two year seminal study of Data General how its employees innovate in short random spurts of advancement toward solving a problem. He writes,

"to reach a solution, they worked independently without an formal organisational structure, in some cases, or in small groups in others, but all utilized self-learning techniques to master new information. For weeks on end, they worked long hours, disappear for days and then go again. In turn, they were motivated by the reinforcement and feedback of their supervisors to continue and/or received some type of reward from the organisations for their efforts. In most cases, they were personalised strategies reflecting an employee's quest for personal solutions to current problems using new sources of information".

In a sense these strategies resemble the tactics from the ancient military concept of manoeuvres with short bursts and starts to gain a compressed competitive advantage. They are highly flexible, dissimilar, and feed off a flow of new information and a motivated workforce. They are different from military ones since they never end, but start all over again (whereas the military terms for tactics implies one short and final effort). But these are strategies with patterns of bursts and starts; which when reactivated after a time are extremely suitable to the human resource management area. For example, when these types of strategies are reiterated every five years, they can support and train individuals' quests to be innovative as the source of their power and upgrade core skills from time to time throughout the careers of employees.

IBM is an example as Sandra Chace of the Wall Street Journal(April 8, 1982) writes:

" Besides its great success with computers, IBM has a reputation for an almost proprietary concern with its employees' individual efforts.. Achievement and efforts of the employee to learn anew for personal development by company sponsored training programmes are followed by immediate rewards... People works their brains out..Supervisors are taught to give immediate feedback... Innovation is welcome. These in the true sense are the long term strategies of IBM".

6.2.8.3 TECHNOLOGICAL STRATEGIES

Firms, based on their previous experiences, will over time develop a particular type of technological strategy to coordinate all its activities needed to create, develop, upgrade, and to market its core skills. They reflect how any firm may exploit an innovation rather than being strictly used by high technology firms.

These strategies are used by service firms, non-profit institution, manufacturing, and research firms. They are consciously or subconsciously formulated by a decision-making unit as a method to investigate, evaluate, and launch new innovations. They range from the review of a technical proposal for a new computer by a non-profit entity to the development of a new research laboratory by a manufacturing firm. But they all have a strategic purpose behind their formulation and implementation, whether a firm is aware of it or not.

Freeman (1974) argues that these strategies reflect the extremes of the dominant orientation of a firm whether it is to be the first with the newest, or to be a follower within a market or industry. They are a combination of a firm's culture, management style, complexity of its product/service, competitiveness of its industry, education of its workforce, and its core competences.

In the past, researchers (Hofer and Schendel, 1978:28) classified a technological strategy as a functional strategy on par with an administrative, manufacturing, or marketing strategy. They argued that it has less importance in determining the scope of a firm's mission when compared to a corporate or business strategy. However, over the past two decades, it has been elevated by several firms (i. e. 3M, IBM, Glaxo) to be the unifying element (synergy) as to how they conduct their

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innovation-investigating and developing activities to create a competitive advantage. The classification of the various technological strategies is shown below in Table No. 4.

Table No. 4: CLASSIFICATION OF TECHNOLOGICAL STRATEGIES

STRATEGY	IN HOUSE SCIENTIFIC AND TECHNICAL FUNCTIONS WITHIN THE FIRM						
	Fundamental Research	Applied Research	Patents	Economies of Scales	Scanning the Market	Marketing Systems	Use of Information
Pioneer:	strong	Very strong	Very strong	strong	Very strong	Very strong	Very strong
Follower:	strong	medium	strong	strong	Very strong	Very strong	Very strong
Imitator:	Very weak	weak	weak	strong	strong	strong	Very strong
Fatalist:	Very strong	strong	medium	Very strong	Very strong	Very weak	Very weak
Dependent:	Very weak	Very weak	Very weak	weak	Very weak	Very weak	Very strong
Opportunist:	Very weak	Very weak	Very weak	Very weak	Very strong	Very strong	Very weak
Traditional:	Very weak	Very weak	Very weak	Very strong	Very strong	Very strong	Very weak

Sources: This table adapted from Freeman (1974), Kanter (1989), and Burgelman (1985)

Table No. 4 summarises the strengths and weaknesses of a technological strategy, the principal features of each are as follow:

1. Pioneer: This strategy is extremely offensive, and seeks to be the first with the newest product /service whenever possible. It uses a mission statement, and tightly coordinated by a formal strategy for innovation which is supported by training and other human resource strategies.

2.Follower: This type of strategy is where a firm seeks to delay its marketing of an innovation until there are gaps in the market. Then it improves on a feature of a product developed by the Pioneer. Its position is to follow a leader and prefers to innovate around products that are in short demand.

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3. Imitator: This strategy is to copy, but tries to improve on a product whenever it can. Its use of marketing information is very strong.

4. Fatalist: This type of strategy follows the pattern of innovation by selected competitors because it must innovate to survive against similar-sized firms within the same industry.

5. Dependent: This strategy is a passive one reacting to certain customer's needs and to innovate only when their specifications are clear and explicit.

6. Opportunist: The chief feature of this strategy is its ability to receive high profits by entering the market during its early growth phase and exiting before early maturity. It is used most often by marketing-oriented types of firms.

7. Traditionalist: This strategy is geared for high volume production and earns its profits by using economies of scale. It does not plan to develop new products, but prefer to investigate how existing products can be made quicker and cheaper. It is most effective in a stable and benign environment.

More details explaining the way each strategy works can be found in Appendix B (the glossary of terms and strategies) and in Chapter Eight.

6.3 CONTINGENT ELEMENTS

These elements exert their pressures to innovate based on dominant beliefs, funding patterns, current configuration of the activities and the mixture of technical and function personnel, within a firm at any one time.

6.3.1 CONTINGENT ELEMENT: CULTURE

Corporate culture has been defined (Wheelen and Hunger, 1986:113) as "a collection of beliefs, expectations, and values shared by a firm's members and transmitted from one generation of employees to another".

Culture create norms of conduct that defines acceptable rules of behaviour, views, myths and rituals which separate one firm intrinsically from another. The extrinsic culture of a firm's location by country or nationality takes on a entirelyly different meaning when impacted by a firm's culture. For instance, an American-based firm can take on the conservativeness of the British or the emotional management of an Italian's firm if its firm culture is based on its leader rather than where it is located.

For example, Dension (1984:22) found certain companies with a participatory culture (i.e. strong employee involvement in corporate decisions) not only had a better performance record than firms without such a culture, but the performance gap between the two types widened each year.

His research indicates that culture has four main functions: (1) creates a sense of identify for employees; (2) furnishes a guide on how to act and helps to generate commitments from employees and suppliers;(3) adds to the stability of the organisation; and (4) serves as a point of reference for an employee to make sense out of a firm's business purpose.

This supports the literature (Smircich, 1983:345; Wheelwright, 1984:79) that corporate culture generally reflect the mission of the firm and the vision of its leadership. The culture sets the dominant orientation of the firm. Some companies

are market-oriented (e.g. IBM and John Deere). Others companies are material or product oriented (e.g. Ford Motors, ICI).

Still, others are technology-oriented. These companies define themselves in terms of the technology that they are organised to exploit. Eastman Kodak, for example, ignored the development of xerography because of its strong commitment to only film technology. Similarly, hi-tech firms in the Silicon Valley of California or Silicon Glen of Scotland think of themselves as "innovating entrepreneurs".

William Newman (1967:77) of The Columbia Business School, argues that "an understanding of a firm's culture is imperative when a strategic change is being implemented". He believes that a firm's changes in mission, objectives, policies, and strategy are not likely to be successful if they are in opposition to a firm's culture. This does not mean that a strategy should never be started if it is in conflict to an accepted culture, he states, "... but it should be realised that it is a major weakness if not considered in a firm's strategy-making".

6.3.2 CONTINGENT ELEMENT: STAFF BEHAVIOURS

One of the key elements for stimulating innovation within the firm is the behaviour pattern of its staff. A considerable wealth of research information has been accumulating (Kirton, 1982; Drucker, 1965) which gives credence to the fact that there are different and distinct types of personalities within the organisation. Their research indicates that these employees' behaviour patterns can range from innovators to adaptors.

Within this body of research, for instance, Kirton has devised a continuum of scores ranging from highly adaptive to highly innovative which can identify those whom are innovators

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from those whom are adaptors. This rating scale is called the Kirton's Adaption-Innovation Inventory (KAI). This scale identified "the adaptor" as those person who initiate changes because they are motivated by an internal drive to "do thing better".

This group of individuals adapts into an innovation by stretching an existing definition of a problem until a likely solution emerges. Their pattern of behaviour is to look at problems in detail and proceed to arrive at a solution within the established structure (theories, policies, practices) of their organisations.

The other major types of "innovators", whom are defined by Drucker (1965) were those who learned through the organisation how to innovate. His thesis was that if the organisation exhibited a flexible structure (willingness to learn or bend) and this was combined with a formal strategy to innovate using programmes to attract, identify, reward and to nurture corporate entrepreneurship; within time, significant numbers of the workforce would become "innovative".

Both writers' classification of innovators are supported by related research (Pinchot, 1985; Collins and Moore,1970; Kirton, 1985) that certain entrepreneurial characteristics can separate a firm's workforce into either highly, innovative employees (Type II) or slightly, innovative employees (Type I).

They argue two main and common principles: (1) that the most innovative employees (Type II), demonstrated a high degree of independence and a dislike of formal and any type of authoritative procedure; and (2) the bulk of innovations will come from these Type II employees. They, on the whole, represent about five percent of the workforce and will innovate to their highest levels possible based on the information and freedom

given them. By so doing, they will propel an organisation forward, entrepreneurially.

In contrast, the Type I employee, which can constitute up to sixty percent of most workforces, will innovate provided the organisation rewards and reinforces them accordingly; but only to the level of these organisational incentives. These observations seem to contradict the power of a formal strategy and whether it is possible to nurture the entrepreneurial behaviour needed to stimulate an innovation within a structured environment.

This suggests for an innovator to install something new it is necessary for them to break with the conformity of the structure or its strategy. This may require them to fight or change an organisation, which is not easy (Kidder, 1981) and the resisting organisation in retaliation may seek to strangle the entrepreneurial spirit of the employee or may even force the most innovative persons to leave the organisation. This is, in essence, the dilemma faced by most structures trying to implement strategy for innovation.

A noted case revealed by Kidder (1981) was how the Data General Company was started by former Digital Equipment Corporation's employees, in 1975. When management decided to keep them from innovating on a new product, this caused them to leave (this was not the innovation that management had agreed to as being needed in its strategy).

6.3.3 CONTINGENT ELEMENTS: TIME, RISK, AND CHOICES

First, one must recognize that all strategies within an organisational setting formulate a future pattern of action which may be creative, difficult, or just risky. These patterns are formed by contingent elements: levels of funding available, the ease of getting approval(depending on timing, risk, departmental

goals) and the middle manager's personal choices on how they should be used.

6.3.3.1 IN THE CONTEXT OF RISK

While it had been mentioned that the formulation of strategic choices, generally, are the provinces of top management (Drucker, 1973; Quinn, 1988; Hofer, 1984). And the first step in making a strategic decision is that a gap exists and action must be taken. But, even after top management has determined a gap is present and needs closing, the cornerstones for taking action are really contingent upon the desires of the managers of the various departments to take risk.

These writers argue that the risk in most strategic decisions can be classified in three main ways: (1) to protect steady sales is often used as an excuse for using a defensive strategy (slightly conservative) to innovate around existing products; (2) to have fast rising sales requires a strategy for innovation which is offensive (risky) for the development of new products for new markets; and (3) that rapidly falling profits, often, dictate a retrenchment strategy (time to take no action) when a firm delays a plan to innovate. These decisions could be referred to the grand strategies of innovation and affected by the following types of risk:

First, there is an individual manager's concept of risk. The context of risk is a part of the time dimension measured by how fast profits can be made or a strategy launched. Avoiding risk is a part of the uncertainty that can be relatively systematic and predictable in a time context but it is still subject to the personal motivation of the manager. Tilles (1963) refers to "risk as as a critical strategic choice which is controlled by the length of time, proportion of resources allocated to any one

project and the overall amount of resources committed... the greater the quantities of each, the greater the risk involved".

Second, each manager has different experiences as to how to handle a risky strategy. This experience determines the speed in which a strategy will be implemented. This can help explain striking differences of how effective a strategy was when compared from one division to another of the same firm. This is often explained in the literature (Glueck and Lawrence, 1984:61) because of the aspirations of the managers and how a rational view of risk is a natural attribute for some and an acquired trait of others. But each manager has his/her own psychological imprint of risk based on his/her own experience, education and motivation which directly impact a strategy.

In theory, Drucker (1973) argues that these strategic elements will operate no better than the risk-averseness of the managers and their abilities under a perceived set of opportunities to create wealth. This means, in its purest form, that strategy requires a manager to act as an entrepreneur using an economist's definition of entrepreneurship as described by Schumpeter (1942) as "to create wealth by shaping a firm's economy without being part of the greater economy", but this task would require special talents not commonly found amongst managers.

Regardless of the grand strategy selected, it is the mindset of the operating manager and his subordinates which will determine whether or not an innovative strategy is too risky; or too conservative; or that its timing is correctly phased. Since many of the managers do not have a history of being entrepreneurial, when a firm selects a strategy to innovate either in a precise or in a rough and ready fashion, it is left for implementation by a manager in the final analysis who is not entrepreneurial. This is a key reason in Drucker's view why most

innovating strategies fail.

6.3.3.2 IN THE CONTEXT OF TIME

Another reason why strategies fail in Drucker's opinion is that a lower level manager views the timing of a strategy differently from top management. He argues that most strategies will, later, be influenced by the time preferences of these managers rather than of top management. He points out that it is the operating manager in the final outcome determines whether a change is being made by a firm's strategic choice is too fast. His performance reflecting this uncertainty about a fast-moving strategic choice.

Most business theorists (Cyert and March, 1963) agree in "optimizing choices" that most managers, regardless of size, structure or complexity generally work in two contexts of time. Whether the strategies should be implemented in post haste or gradually, it is the context of time which directly affects the situational influences for a strategy. This is argued by Quinn and Mintzberg (1988) in the following ways:

The first context of time is the willingness of the manager to move slowly or swiftly in how they will implement a strategic change. The context of time is easily understood as a dominating factor when a manager is responsible for managing current processes, employees and commitment and how they should be managed in the short term. But what about in the long term?

An imposed time factor or a top manager 's preference toward a particular strategic choice will not set the tone for a firm's long-term profit strategy. Trying to managing current resources to a squeezed margin of costs and expenses may be preferred by a manager whether a strategy of "retrenchment" was selected by top management or not. Reducing expenses from current operations can add to a manager's sense of status and affluence much more

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substantially than a successful long term strategy. Even replacing the "tight-fisted " manager with a "far-sighted" manager, who believes monies invested now will be returned in greater amounts will not shift the strategy sharply.

Research indicates (Andrews, 1971; Childs, 1972) that another reason why many strategies fail is the failure of top management to discount the context of time -risk factors and their impact on an operating manager. They fail to determine if a manager's understanding of the gap is equal to theirs.

This gap mismatch does not occur when the strategic objectives are deemed to be attainable and even desirable by an operating manager. Corporate wide innovation is more easily stimulated when all managers in an organisation see the same opportunity that necessitates a new strategy.

Unfortunately, operating managers are too often viewed as ciphers, making mechanical decisions that maximizes profits. A supporting plan to have them internally-motivated is seldom addressed by many strategy-makers. Even though managers' training and experience are to make profits as one of their main goals, it is their personal motivation which may determine the outcomes. Thus, their motives need close attention as noted by Cyert and March, whom argue that there are three areas in which these differences express themselves.

The first contingent element is how managers view innovation, i.e. Whether managers view the stimulation of innovation as a routine task or an extra burden being placed upon them.

The second managerial factor which impacts the viability of a strategy is how the strategist of the organisation determines what is routine and whether a manager agrees with that view. The managerial choice, in the final analysis, will

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determine what is routine as being efficient and maximizing outputs. The linkage between what is routine and what is innovative becomes one of the main concepts of a strategy for innovation.

The third managerial concern is social. Social motives are often implicit in a firm's actions toward a strategy for innovation. These motives can range from trying to create more jobs to a need that a firm must pander to the needs of special outside groups such as environmental or political concerns. Normally profits are reduced when such social aims alter a manager choice. For example, Booz, Allen and Hamilton (1989) indicated in their "Research In Why Firms Innovate" that over 31 percent do so because of social reasons..trying to avoid pollution of a climate or to conform to a governmental directive to do so.

In their study of innovation, they cited the USA example where rubber tire manufacturers had to produce better tire designs to ensure 40,000 miles of wear by a government regulation. Previously, the average tire of a consumer's motor car only produced 18,000 miles of wear; however by using a social-government directive as an incentive to innovate, profits tripled.

6.3.4 CONTINGENT ELEMENT: THE PROCESSING OF INFORMATION

The processing of information between departments is often overlooked as a stimulation for innovation. Rogers (1983) argues that information is of primary importance and should be treated the same as other assets of a firm when he states:

" Whilst information lacks a physical presence on its own: it can be expressed in a material sense (ink on paper or in electrical impulses), but it is just as important as money and/or energy. Information behaves somewhat oddly from an

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economic sense in the fact one can give it away or sell it and still have it.... When it flows horizontally, it is the mother milk of innovation as well as the partner of change".

Information for making strategic decisions can be usefully classified in three broad categories: (1) information from the environment for making corporate strategies (e.g. whether or not to enter a particular market; or to diversify into new markets; or change a product feature-benefits); (2) information for tactical decisions and competitive strategies (e. g. planning of sales territories or new advertising policies or a new pricing policy); (3) information within a data bank of company records which receive periodic updating to ensure that it retains its usefulness (e.g. details of competitive products, market share analyses, demographics of workforce, cash and financial positions). These may be best classified as data needed for the implementation of functional strategies.

The by-products of an active firm are the extreme amount of information generated by its employees, and their activities, suppliers and customers. Some relate to decision-making, the bulk do not. As a result, some initial screening device on critical decisions must be made before entering a firm. Cyert and March argue that there are two aspects for screening and controlling a firm's flow of information: routing rules and filtering rules (p.106).

"Routing rules are formal flows of information and specify who will communicate to whom about what". This is the formal channels of an organisation dictated by positions, titles and departments, often reflecting the standard organisational chart. "Filtering rules on the other hand, are informal rules". They are distorted, have bias to whom is talking and what is not said and the way information is coded.

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Examples of distorted information are how the accounting department talks to sales, and sales to production , and so on; or how a lower ranked person will talk to their superior. Most, if not all, such exchanges of information within a firm are distorted to the type of the power relationship between the receivers and transmitter. This pattern of distortion is the major detriment to a successful strategy for innovation.

Therefore, a major task in the management of information is to be sure that everyone, who has a need, receives accessible and accurate facts. It must be accessible and digestible to the level and sophistication of its receivers-users. To this point, Heller (1975) writes, "Managers are additive to information as alcoholics are to booze. They consume enormous amounts, constantly crave more, but have the greatest of difficulty in digesting their in-takes to a level for proper use ".

Heller warns about the differences between data and useful information. He outlines how data accumulates, confuses and can be masqueraded as information in a tightly-structured organisation. When information is channelled through the formal reporting systems used multi-layered organisations, it inherits the properties of obsolescence. Unless there is a programme to combat this, the data and information will decay with time and have to be updated ruthlessly by company-imposed strategies or self-learning schemes by each innovative employee. Research has determined that useful information flows better in small groups (7 members or less) and in "U" shaped organisational structures (Williamson, 1970), but in divisional structure, it becomes restricted and loses its quality of being useful.

The theories about information in decision-making are set forth by Kaplan, Drath, and Kofodanis (1985). Based on a survey of 22 executives and 18 communication experts, they stated few

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executives seek feedback on how they are doing on their jobs and the consequence of their behaviour on others. Others may seek feedback on their long term decisions, although the bulk of them do not.

This study indicated that the pattern of communication of most managers is to talk rather than listen to their people as to whether a strategic decisions was too risky, or that they are asking for too much from the operating managers. Few, if any, members of top management will seek a different view until a strategy is obviously failing.

The conclusion from this research was the higher you go, and the more structured the organisation, the more constricted the feedback channels became, and the less subordinates talk about problem solving and more about problem-hiding. Within a short period of time, the organisation becomes non-entrepreneurial and begins to resist change bureaucratically.

In contrast, Kanter (1986) indicates that most innovative firms encourage the informal, face to face, transfer of information. She also argued that channels carrying information should be formalised (newsletter, regular group meetings, open files, computer terminal, etc.), but the application of information for the stimulation of innovation means that its use should not be restricted. She referred to the informal use of information as "the airwaves for innovation"(p.161)

In most of the research cited (Quinn, Kanter, Andrews Cyert & March), it was argued that the best methods to control and upgrade the quality of the information (being processed around and through a firm) was to set the control for its use into a strategic mission statement, and to create a feedback systems on decisions made. This body of research indicates that decisions are the best devices for learning about the quality of

information within a firm. If they are based on bad information, the decisions arising from them will prompt an immediate outcry; if the strategic decisions are based on good information, most managers adopt a try-wait- and see position.

6.4 MOTIVATIONAL ELEMENTS

Motivation (Vroom,1964) is stated to be "the forces acting upon an individual to expend an effort, voluntarily". He argued that much of the behaviour in people is motivated by "the expectations in how others will value their action when observed".

His research explained how people behave rather than how their behaviour will be controlled. The main criticism with his work is its failure to define how and why people select one choice of behaviour over another. His theory and existing approaches such as human relations, scientific management, job enrichment, and self-actualisation theories are based on Maslow's theory of hierarchy. They are universalist in their prescriptions. Although some of them have some merit, they embody three implicit and erroneous assumptions:

First that all employees are alike; second, that all situations are the same; and third, the inference by the other two assumptions that there exists one best way to motivate employees (although each theory assumes a different way).

6.4.1 MOTIVATIONAL ELEMENTS: EXPECTANCY OF REWARDS

For the stimulation of innovation and strategy-making, the universalist theory has little value. However, the expectancy theory for motivation as developed by Nadler and Lawler (1977) is based on the belief that man is complex and the organisations they work in are also complex, thus strategies for their behaviour should be complex. This is more useful for it means

that there is not one type of a reward which will please all types of workers. These theorists post four major assumptions:

The first is that behaviour is determined by a combination of forces in the individual and of forces in the environment. This means that how they are hired, their different skills, the different levels of education, where they are hired, and the market forces within an industry dictate how they expect to be treated.

The second main assumption is that people make decisions about their own behaviour in organisations. These decisions are of two kinds. First, there are decisions about membership behaviour as dictated by culture and leadership (see above elements). And people make decisions about how much effort should be directed to the mission of an organisation and what type of reward will be received from this effort.

The third assumption is that different people expect different types of rewards. This does not mean that people are so different that each expects a totally different type of rewards, but they argue that different rewards can be lumped together to impact upon different groups of employees.

The fourth key assumption is that people make decisions among alternative plans of behaviours based on their expectations to what rewards will be given. This means that an individual's response to a management plan to innovate can be summarised in the following three questions:

1. Can I innovate for the company if I try?
2. If I try, what will happen?
3. How do I value the reward which is promised?

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If motivation starts with an observed level of effort by the individual of others, then effort by itself is not enough. Although, the effort alone should prompt some type of reward, it is the continued effort which should receive the largest reward. But it is the experience of the individual and the general culture of the firm that will determine whether a reward is expected.

The reward can come from one of three sources. The first source, extrinsic reward, comes from people and the environment outside the firm, a sense of pride for being hired, arising from one belonging and contributing to the success of a firm known as an innovator. An articulated and publicised mission statement that a firm is an innovator provides this.

The second source, intrinsic reward, comes from the corporate culture of the firm: its supervisors, from colleagues, or from the organisation's formal reward system of financial awards, recognition, and promotions for being actively innovative.

The third source, personal satisfaction, comes from the feeling of accomplishment, and self-learning induced by company training courses, self-study and the entrepreneurial experiences of developing an innovation.

If management determines by its mission statement, selects a proper strategy to stimulate innovation and proves how it will reward, most employees will see the link between these as motivating forces. Nadler and Lawler claims that more than fifty studies have proved the overall validity of this argument. They argue that the most consistent performers tend to see a strong relationship between performing their jobs well, understanding their firm 's mission, and receiving the type of rewards they value.

6.4.2 STRATEGIES FOR CHANGING BEHAVIOUR

As part of a mission statement to innovate, there are organisational development plans designed to meet the current obligations of a firm. Their purposes are to allocate resources and activities to meet short term (less than one year) operating goals.

But they, also, represent coaching opportunities for a firm to start changing the behaviour of its employee in order to be a "polyvalent firm". This is a term coined here for a firm, whose employees can meet current operational needs whilst simultaneously exhibiting behaviour useful in the development of innovations.

Three distinct strategies have been suggested for changing behaviour (Adams and Everett, 1986:751; Chin and Benne, 1976). They argue that such strategies may help managers change the behaviours of both the supervisors and their operative workers: by reasoning to their self-interest; educating the workers to the facts and benefits of being innovative; and exerting the powers of their positions.

They are classified as follow:

1. Empirical-rational Strategies: These strategies assume that people are rational, that they will act in their own self-interest. If managers wish to advance change, they should show employees that change is not only desirable for the organisation, but for the employees' self-interest, too. When employees understand that change will benefit them, they will change their behaviour, accordingly.

2. Normative-reeducative Strategies: Following the empirical-rational strategies are these strategies for

organisational change, besides assuming that workers are rational, they presume that people act as a result of attitudes and values they acquired over time. Thus, changing behaviours involves not only presenting people with facts, but changing their attitudes, skills and relationships within a firm as well.

3. Power-coercive Strategy: This strategy is based on the concepts and the application of leadership, and organisational powers delegated to a manager. The legitimate power (formally delegated) and informal power (without organisational sanction) are brought into play. Pressure from peer groups, informal leaders, and economic realities or the fear of losing one's job are examples of how this strategy works.

6.4.3 MOTIVATIONAL ELEMENTS: CHAMPIONS, JOBS, AND TRAINING

The literature (Schon, 1967; Drucker, 1986; Pinchot, 1985) indicates that there are five other motivating elements which could be used in the stimulation of innovation. They are as follows:

First, there are product champions, who are living examples of how innovation can be stimulated. They motivate others in contact with them and serve to illustrate the benefits which ensure certain employees that innovative efforts and accomplishments will be rewarded accordingly.

Second, there are management policies which grant employees time away and on the job to experiment. This is a method used by 3M Corporation and Intel.

Third, the enrichment of ones' jobs by the employees redesigning their own tasks, can be used to motivate some employees to perform better. When there is a choice as stated in the expectancy theory, this is way for employees to receive

intrinsic and personal rewards which will motivate them into being innovators.

Fourth, the use of training sessions on how to be creative and innovative can motivate the employees to try sooner and more often. They can reduce an employee's anxieties about what to do and how.

Five, the setting of individual goals as to how a job can be upgraded (which are mutually negotiated by the employees with management as what is achievable and their understanding why it is) will motivate employees toward acts of innovation.

The combination of these elements will combat occupational obsolescence (the erosion of skills until an employee is no longer useful) and will help to create one of the driving forces for the stimulation of innovation, an experienced and technically-upgraded workforce.

6.5 SUMMARY

This section examined how the internal elements of a firm must be incorporated in a strategy for innovation. These elements were classified as being either distinctive, contingent or motivational as to how they may be linked in the stimulation of innovation.

The literature was reviewed relating to the theories on the relationship of a firm's structure to innovation, the characteristics of the innovative employees, the motivational factors, and the impact of a firm's technological strategy.

From this review, the point is made that organisations and their subsystems are dynamic and in constant interaction with their environments. Managers must be aware of this process and

how it affects their roles in the organisation.

It is, also, clear that the structuring of the organisation and the formality of a strategy can tend to strangle innovation and weed out entrepreneurship. Mainly because there are some barriers imposed within an organisation which cause them to be expected conditions. First, in fact, many organisations by their structures actively stand in the way of innovation because such activities represent a disturbance to the routine procedures, and commitments toward getting the current work done. Second, most managers and their subordinates will naturally resist change, some more than others.

Thus, all elements which may stimulate change and innovation should be examined. For example, work participation, job self-design, time to experiment and other partial solutions can help to reduce these barriers, but innovation is, still, a formidable challenge.

That is why several aspects of change and the stimulation of innovation must be understood if either are to be successfully managed. First, one must recognize the need for innovation as signalled by internal or external indicators. Next the targets for change- structure, behaviour, and stimulating innovation - must be identified. Any or all of these processes are directly involved in the organisational developmental process.

The strategic structuring process arises from three sources of complexity. First are those arising from the interrelationships caused by its structure, its rules, its culture, and the aspirations of the managers for risk-taking. Second are those stemming from the interaction amongst functional areas (operations, finance and marketing, for example). Third, complexities arise from the inherent interrelationships of strategies and technology.

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The behaviour change process involves the decision to change a certain way by establishing a strategic mission for innovation and implementing a supportive behaviour change. Strategies for changing behaviour and learning on the job may be one or a combination of an empirical-rational strategy, a normative-reeducative strategy, or a power-coercive strategy.

The process of stimulating innovation is based on motivational elements, learning, punctuated strategies, and a system for rewarding a desired behaviour. But recognizing also that stimulating 100 percent of the workforce, at one time, will never be achieved. Nevertheless, certain types of employees will be innovative: Type I, "adaptors" and Type II, "innovators".

6.5.1 Implications Arising

These internal elements with those environmental elements in Chapter Five form the priori research logic for an empirical investigation as to which enabling elements stimulate a strategy for innovation for firms in Scotland.

CHAPTER SEVEN

RESEARCH METHODS AND HYPOTHESES

7.0 AIMS

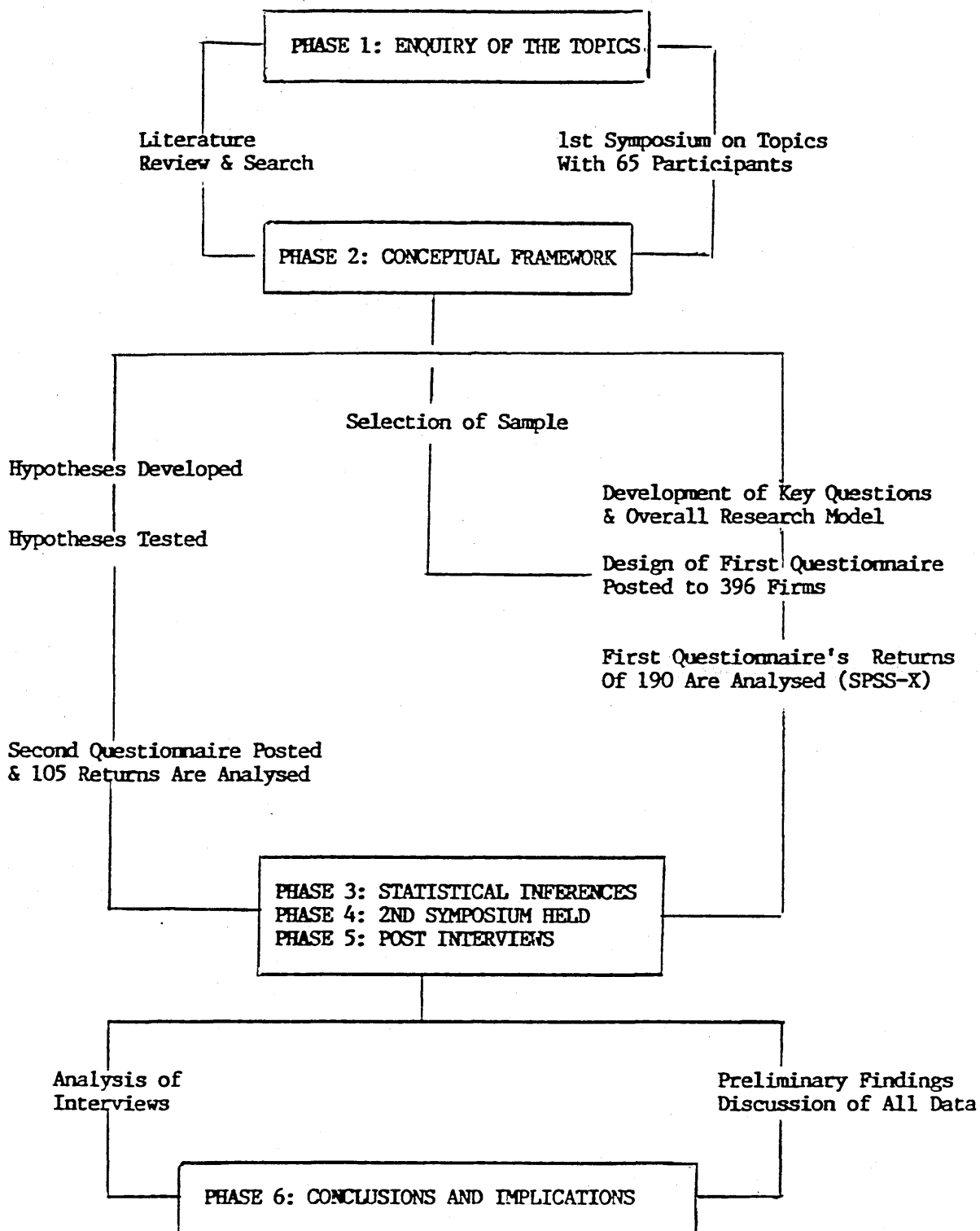
This chapter sets forth the six major phases of the methodological approach used in this study. Its aim is to explain the Methodological Chart (Figure 7.1) as shown on the next page.

The chart shows how in the first phase (enquiry) that a series of research issues were developed from the literature review. Also, in this phase, a symposium was held to discuss the issues of innovation from a manager's perspective and subsequently a questionnaire was constructed.

The next phase (the conceptual framework) explains how the data was collected, why a research model (Figure 7.2) was developed, and why, a combination of survey methods was needed. It explains in some detail the relationship of the variables in the research model and the five sets of variables contained in the survey instrument.

Phases three, four and five (the discussion of the data collected, post interviews and analysis by a series of the statistical techniques for the treatment of survey data and interviews) provide a basis for the final phase. For it is in phase six that the study's conclusions, and implications for further research were developed. These are contained in the next two chapters.

FIGURE 7.1



7.1 INTRODUCTION

The literature indicates that there are many different ways to gather information within the field of management. Each has its own set of problems and approaches. Choosing which method to use among the alternatives is one dimension of the problem.

The methods for gathering information range from reviewing secondary research reports to conducting face to face interviews.

7.1.1 Pre-Survey Stage

The first stage to gathering information (Moser and Kalton, 1985) requires that one of four combinations be considered: Theoretical-Quantitative; Empirical- Quantitative; Theoretical-Qualitative; and Empirical-Qualitative.

"Field-based empirical research within and across firms has always been fundamental and preferred in gaining a better understanding of the practice of management. When compared to other methods, it may be assessed as the most demanding. This method tells us the way business actually does function as well as a theoretical exploration of how it perhaps should function " (The Harvard Business School: Porter, 1986) And... "Comparing & contrasting are excellent for understanding the limitations of theory and concepts" (Hofer, Murray, Charan, and Pitts, 1984:30)

Based on these statements, the primary methodology (see Figure 7.1) was to be empirical-quantitative. This means that the bulk of this research will be guided by the practical experience of others as a primary source of knowledge and reported in a contrasting and quantitative way whenever possible. For that reason, surveys and interviews with operating managers were used and statistical means were employed.

However, there are some information gathering and reporting problems associated with these methods.

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Firstly, many managers of innovating firms do not follow "one best way" as a procedure for innovation. This means the survey method must use a range of terms and expressions to cover a multitude of procedures.

Secondly, the diversity of goods and services being provided by a range of small and larger firms (owned by British and Foreign firms) tends to add to the complexity of the research. With this type of complexity, the use of one survey document is bound to confuse some, to frustrate others, and cause many others not to respond at all because they might feel it is neither appropriate nor has any useful value to their particular firm.

Thirdly, some managers will not be qualified to answer because they lack the education or insight to decipher the types of questions being asked. At first sight, it is widely accepted that the practice of scientific management is confined to a few, partly because there is a limited number of personnel working within each firm who were hired because of their education in the field of management. And there is no guarantee that those few receiving a copy of the questionnaire or agreeing to be interviewed are the best qualified sources either by their education or experience to answer.

Fourthly, many respondents will not qualify their responses by openly stating that their firms had failed in the stimulation of innovation; or they possess some very strong and unusual views about how to manage; or they do not understand the principles of management. Therefore, it is expected that some of the responses will be misleading and biased, accordingly.

7.1.2 RESEARCH PLAN FOR CONDUCTING THE SURVEY

The methodological problems of conducting a survey fall into four broad groups: (1) what is the objective of the survey; (2) from whom should the information be collected; (3) what methods are to be used in collecting the data; and (4) how to process, analyse and interpret the

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data. They should be addressed accordingly.

The first major task was to lay down the survey's objectives to clarify precisely as to what was to be accomplished.

As discussed earlier in Chapter One (see para. 1.2), these took the form of five primary questions: (1) to clarify the objectives; (2) to define what were the differences between a formal strategy and an informal one; (3) to set forth the elements as to how the types of firms surveyed would be grouped; (4) to establish the geographic boundaries; (5) and what limitations should to be imposed on the target population to be surveyed.

Based on answers to these questions, the target population was defined as firms that employed at least 51 persons and had been operating in Scotland for more than seven years. The primary research objective was to identify those strategic elements which stimulated a strategy for innovation. In order to reach this objective, it was decided that there would be four major research objectives: Specifically:

(1) That a series of exploratory discussions would be held with executives from multinational firms and business specialists to discover what factors they thought were important;

(2) That a conceptual research model would be designed to show the relationship of those elements revealed in the enquiry phase of this investigation. The selected survey method would examine this relationship and the discriminating power of each element to stimulate innovation;

(3). That a survey be targeted to an internationally- stratified sample of firms operating in Scotland for contrast and comparsion;

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(4). That the responses from the survey should provide a band of firms comprising an equal distribution of smaller firms, medium-sized firms, and larger ones, and that a follow-up survey would be conducted with up to 10 percent of these to clarify any findings.

The problem about whether to use a postal questionnaire or personal interviews was next considered.

7.1.2.1 The Postal Questionnaire

The major advantage of the questionnaire is that a large number of individuals/ firms can be involved at a relatively low cost. Assuming the questionnaire is well constructed, the data so gathered can be typically organised for numerical analysis on a computer. This in turn enables large masses of data to be summarised and manipulated to show key trends and highlight significant factors. Other advantages of this method are:

1. It promises to secure data with a minimum of time and expense.
2. It affords wider geographical contact.
3. Greater uniformity is obtained in the manner in which questions are posed.
4. A cut-off date for receiving and processing it can be set.

The main disadvantages of the questionnaire are:

1. The responses to the questionnaire can be low.
2. The attitude of the respondents can not be measured.
3. The non-respondents may have differing opinions from those who returned the questionnaire. So there is bias in all responses.
4. Validity of the responses depends on the willingness of the respondents to provide information without bias.

7.1.2.2 The Organised Interviews

The organised interviews represent personal contacts between an interviewer and a respondent aimed to collect specific data. They are generally more difficult to administer (compared to the questionnaire) and are more expensive in time and money (Mayntz, 1976: 100). The main advantages of this technique are:

1. It usually yields a high proportion of returns.
2. It can probe more deeply and can ensure that the respondents completely understand the question, since the interviewer can restate clearly if the answer to a question seemed to be misunderstood.
3. The quality of the responses are higher than from questionnaire surveys, and the amount of missing data is reduced.
4. The topic is of interest to the respondent otherwise they would not consent to an involvement.
5. Its method of administration is more flattering to the respondents so they are more willing to cooperate if a follow-up visit is needed.

The nature of the investigation, the diversity of the data sought, and the need to gain as large a sample as possible dictated that a combination of both questionnaire and personal interviews be used. First that a symposium would be the best method to explore the topics of stimulating innovation within a corporation. After this, a postal questionnaire would be used with a known population that could capture the elements of strategy that stimulated innovation. Then a series of post interviews were to be conducted (see para. 7.9 below) using a list of mnemonic questions as a guide for discussion.

7.1.2.3 How to Report The Data

The problems with how to report the data can be summarised as follow:

1. How to ensure the processing of the data is done accurately and presented in the simplest manner possible.
2. How to analyse the fields of data in such a way that the meaning is clear.
3. How to highlight and discriminate between the more important data and meaningless data.

After considering these problems associated with a field-based research, this investigation proceeds as shown in The Methodological Chart (Figure 7.1).

PHASE 1: FROM LITERATURE REVIEW INTO RESEARCH QUESTIONS

7.2 ENQUIRY OF THE TOPICS

The topics of strategy-making and innovation are such broad-ranging topics, and due to the growing interest by the business community in their exploration, the literature on these topics which attempts to address many of these diverse and conflicting interests is equally broad.

Thus, an enquiry of the literature was needed to review, and separate those topics related to innovation and strategy. Following this, a list of research questions was developed from which a series of statements for a hypotheses was created.

7.2.1 The Enquiry Leading to Research Questions

The enquiry was carried out in two basic ways: (1) in a general way by the literature review; and (2) specifically by a symposium in which the topic of how innovation is stimulated by an organisation was discussed.

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In general, the literature review revealed that there are many questions about the topics of strategy and innovation which should be investigated.

These questions were condensed down to answer four major concerns: (1) why is the research of innovating firms important; (2) how should it be positioned (as outlined in Chapter One); (3) what are the set of definitions for distinguishing firms which were the formal users of strategy for innovation from non-users; and (4) whether this investigation can indicate conclusively that innovation can be stimulated internally and externally by certain elements.

However, the literature was not able to explain how these elements were linked in a strategy. Thus the following five research questions were developed.

First: Whether, in the words of Ansoff (1961), the role of strategy is "to provide the unifying element for all of its activities" included the stimulation of innovation ?

Second: What were the general elements within the field of strategic management which should be incorporated into a strategy for innovation?

Third: Which were the common elements in a firm 's environment that enabled or hindered a firm from being innovative?

Fourth: Which were the common elements within a firm that enabled an innovation to be stimulated?

Fifth: Where specific elements were used in a strategy for innovation and to what degree do they stimulate a perceived innovativeness?

7.2.2 The First Symposium

Using the above questions as a springboard for further investigation, a symposium with managers and new business development specialists was held. Specifically, the symposium explored the empirical implications that innovation is a practice rather than a theory. This being the view of Drucker (1964) that "innovation is capable of being presented as a discipline which can be learned and practised". The symposium attempted to determine which parts of innovation as a discipline can be learned and practised by discussing the following questions:

First: Who used a strategy for innovation? Was there one basic approach in how innovation was developed by them? How should they be identified, grouped, compared and by what methods?

Second: Was there one or a series of elements in explaining how a strategy for innovation could be developed?

Third: Which of the elements were the enabling ones which a manager should incorporate into a successful strategy for innovation?

Fourth: Was a strategy for innovation (change) used by a manager different from one of growth, or one of profit? And why?

Fifth: Why did some firms select to use a strategy for innovation whilst others did not?

Sixth: What were the specific elements at either end of an innovation spectrum (from the most innovative to the least innovative) and how did they differ within those firms which were users of a formal strategy to those firms controlled by the non-users?

Seventh: Where and in which type of firm did a strategy for innovation operate best and in which was it least effective?

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Eighth: What are the most important factors to be dealt with that stand in the way of a company achieving more innovation and progress?

PHASE 2: THE DEVELOPMENT OF THE HYPOTHESES

7.3 HYPOTHESES

It was apparent in the literature review and in the first symposium that other elements such as the risk-experience pattern of the managers, and strategies for changing employees' behaviour as discussed earlier in Chapter Six should be stated in a general hypothesis.

Formally stated the aim of undertaking this field research was conceived of as:

To confirm affirmatively or otherwise the hypothesised relationship between the elements of a firm's strategy-making, its organisational structure, its technological strategy, its culture-orientation, the behaviour of its employees, and a firm's receptivity to externally and internally-stimulated innovations.

Specifically, the statements within the hypothesis are:

1. There is an affirmative relationship between a firm's receptivity for innovation and the application of information gathered from its environment. Specifically:

(a) The greater importance a firm attaches to the collection of new information and the greater this information is disseminated to employees at all levels for application, the greater a firm's receptivity to innovation;

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(b) The greater the importance a firm attaches to the collection of information from buyers in their markets, the more it permits a firm to anticipate and forecast these needs, and the greater is a firm's strategic focus and its receptivity to innovation;

(c) The greater the age of a firm located in Scotland, then a greater effort is needed for innovation-investigating activities, but the greater the effort expended the greater becomes a firm's receptivity to innovation.

2. The more a firm ventures into its environment by cooperating in field trials to test a buyer's needs, exchanges information with outside innovators, invests in ways to educate its customers and participates in joint ventures with other firms the greater is a firm's receptivity to innovation. Specifically:

(a) The more a firm tests newly-developed innovations for the reaction from a group of buyers the greater a firm's reactivity to innovate;

(b) The more a firm exchanges information with other innovators the greater a firm's receptivity to innovate;

(c) The more a firm invests in ways to inform and educate its customers the greater a firm's receptivity to innovate;

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(d) The more a firm participates with other firms in joint innovation the greater a firm's receptivity to innovate.

3. Where there is an affirmative relationship between a firm's organisational structure, its flexibility and its openness the greater a firm's receptivity to innovate. Specifically:

(a) The more openness and flexibility exhibited by a firm's structure the greater is its receptivity for innovation;

(b) The more a firm coordinates its innovation-investigating activities and the less formal its structure, the greater is its receptivity to innovate;

(c) The greater variety of substructures a firm permits within and connects peripherally to its overall structure, the greater a firm's receptivity to innovate.

4. Where there is an affirmative relationship between a firm's strategies to train and motivate its employees by formal programmes to stimulate innovation and its technological strategy, and a firm's receptivity to innovate. Specifically:

(a) The more extensive a firm is committed to training throughout an employee's career the greater is a firm's receptivity to innovation;

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(b) The greater a firm is committed to combat occupational obsolescence created by the advances of technology, the greater is its receptivity to innovation;

(c) The greater the freedom give by a firm for its employees to experiment, to take time away for self-study, and to investigate innovation on the job, the greater is a firm's receptivity for innovation.

5. Where there is an affirmative relationship between a firm's mission to innovate, the vision of its leadership, and the greater number of policies initiated by its leadership to innovate, the greater is a firm's receptivity to innovation. Specifically:

(a) The more specific and far-reaching the stated mission of a firm to innovate, the greater is a firm's receptivity to innovation;

(b) The greater the visionary skills exhibited by a firm's leadership, the greater is a firm's receptivity to innovate;

(c) The more policies initiated by a firm's leaders in allowing a number of a firm's employees to deviate from current duties in their efforts to innovate, the greater is a firm's receptivity to innovate.

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6. The more ways a firm allocates resources to investigate, to stimulate, to reward, and to fund the acts of innovations the greater is a firm's receptivity to innovation. Specifically:

(a) The more funds used in a formal programme to stimulate innovation, the greater is a firm's receptivity to innovate;

(b) The more rewards given for acts of innovation, the greater is a firm's receptivity to innovation;

(c) The more resources allocated to investigate and to develop an innovation the greater is a firm's receptivity to innovate.

7. The more innovative a firm perceives itself, the greater attention and importance attached to manpower development, incorporating technological advances and the recruitment of certain types of individuals, the greater is a firm's receptivity to innovation. Specifically:

(a) The more innovative the culture exhibited by a firm in incorporating and purchasing technological advances embodied in new equipment, materials and systems, the greater is a firm's receptivity to innovate;

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(b) The more a firm's culture is perceived as being innovative, the more innovative candidates will be attracted, the more will be hired, and the greater becomes a firm's receptivity to innovation.

(c) The more a firm attracts, rewards, and trains entrepreneurial employees the greater is a firm's receptivity to innovation.

8. Where there is an affirmative relationship between the technological strategy selected by a firm, its previous history in using this strategy and the risk taking experiences of its managers, the greater is a firm's receptivity to innovate. Specifically:

(a) The more experience that a firm has in using a technological strategy, the more effective its strategy will be and the greater will be a firm's receptivity to innovate;

(b) The greater the success achieved with a selected technological strategy, the greater is a firm's receptivity to innovation;

(c) The greater the experiences of a firm's managers with using a technological strategy, the greater is a firm's receptivity for innovation.

9. The more a firm seeks to purchase innovation by acquiring licenses, patents and other innovating firms and the greater its diversifies, the greater will be a firm's receptivity to innovation. Specifically:

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(a) The more a firm seeks ways to diversify the greater a firm's receptivity to innovation.

10. The more a firm encourages small work groups and self-job design schemes and stimulates its personnel on ways to innovate using outside experts, the greater is a firm's receptivity to innovate.

11. Where there is an affirmative relationship between a firm's strategy-makers abilities to incorporate all of the assumptions stated above into a formal strategy to innovate (users) and a firm's receptivity to innovation. A progressively more negative relationship (non-users) will be exhibited when any or all of these assumptions are absent.

On the basis of these and other assumptions, the investigation proceeded along the following lines.

7.4 OVERALL METHODOLOGY

The first symposium also showed that there should be little difficulty in distinguishing innovating firms and the type of strategies used by them.

Accordingly, the following methodology was followed to distinguish "users" of strategy for innovation from "non-users" firms. Specifically:

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(a) Select, survey, and interview a stratified group of firms which are essentially profit-motivated, had more than 51 employees in an unit, and had operated for more than seven years in Scotland;

(b) Ask each firm surveyed to identify itself as either being an user or non-user of a formal strategy;

(c) Re-classify the firms based on their responses to nine distinguishing elements taken from the literature;

(d) Identify a group of firms generally recognised as being highly innovative;

(e) Examine this group and isolate those elements which are common to all within that group;

(f) Rank the specific elements as having either high or little discriminatory power so that a firm can be classified as either highly innovative or exhibits a lower value of perceived innovativeness;

(g) Reject all specific elements common to both the users and non-users of a formal strategy and analyse the residual elements respectively: by group; culture; behaviour of the employees; programme to combat obsolescence; receptivity for innovation; structural openness; use of information; special programmes; methods of handling technology; and strategic thrust.

7.4 SURVEY INSTRUMENTS AND DETAILS OF METHODOLOGY

What follows, and described in some detail, are the survey methods used in this investigation. It starts with how and why the first interviews and symposium were held and ends with the construction of a research model.

7.4.1 Pre-survey Interviews-Focus Groups and Literature Review

Exploratory discussions on the topic of innovation-stimulating measures were conducted in two distinct and different ways:(1) a series of interviews was held with subject matter experts such as Professor James Brian Quinn of Dartmouth's Amos Tuck Business School in the USA and five managers of the UK's most noted firms for their record of innovation as listed in Appendix C; and (2) A symposium in Glasgow in June, 1989.

The first set of interviews were held from May, 1988 through December, 1988. From these interviews as shown in Appendix C, 10 findings were developed as The Leadership Rules for Innovation By an Employee . These rules were used to develop the questions to be asked at the first symposium and as a mnemonic guide for post interviews (para. 7.9) in the final phase of the investigation where conclusions are to be developed. As a reference, the findings are stated above each question which was to be asked in each post-interview.

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Second, 100 Scottish-based firms were invited to a symposium on innovation and intrapreneurship on the 8th of June, 1988 at which a total of 65 participants attended. They were asked their attitudes toward the stimulation of innovation within their corporations and what techniques, issues, and concerns should be considered in the investigation of this topic. They identified themselves as either users of a plan to innovate or non-users.

The format for the symposium used a modified delphic type of questioning in which participants were asked to record their ranking of the factors they believed contributed the most to innovation. The all-day (10am to 4pm) session, and discussions of the topics in small groups of six persons, was audio-taped.

The topics were presented similarly to the research questions stated above (para. 7.2.1) The final ranking to the last question "What is the most important factor to be dealt with that stand in the way of your company achieving more innovation and progress ? ". The summary of the results are shown in Table No.5.

TABLE No. 5: RESPONSES OF 65 PARTICIPANTS AT FIRST SYMPOSIUM

<u>Topic-Factor</u>	<u>Frequency Mentioned %</u>	
	<u>Users</u>	<u>Non-users</u>
1. Obsolescence amongst workforce	59	49
2. Culture of the firm/problem-solving	38	47
3. Organisational Structure Openness	24	26
4. Resource Allocation of time/Programmes	23	22
5. Lack of risk-taking/ Market Uncertainty	19	14
6. Poor Leadership/lack Vision	10	14
7. Lack of Financial Support/Sponsorship	8	5

Based on the seven factors outlined in Table no. 5, a research model was designed to determine the relationship of these variables as factors needed to stimulate innovation and growth. It was constructed inductively and is illustrated below in Figure 7.2.

AN MODEL OF ENABLING FACTORS FOR INNOVATION WITHIN A CORPORATION

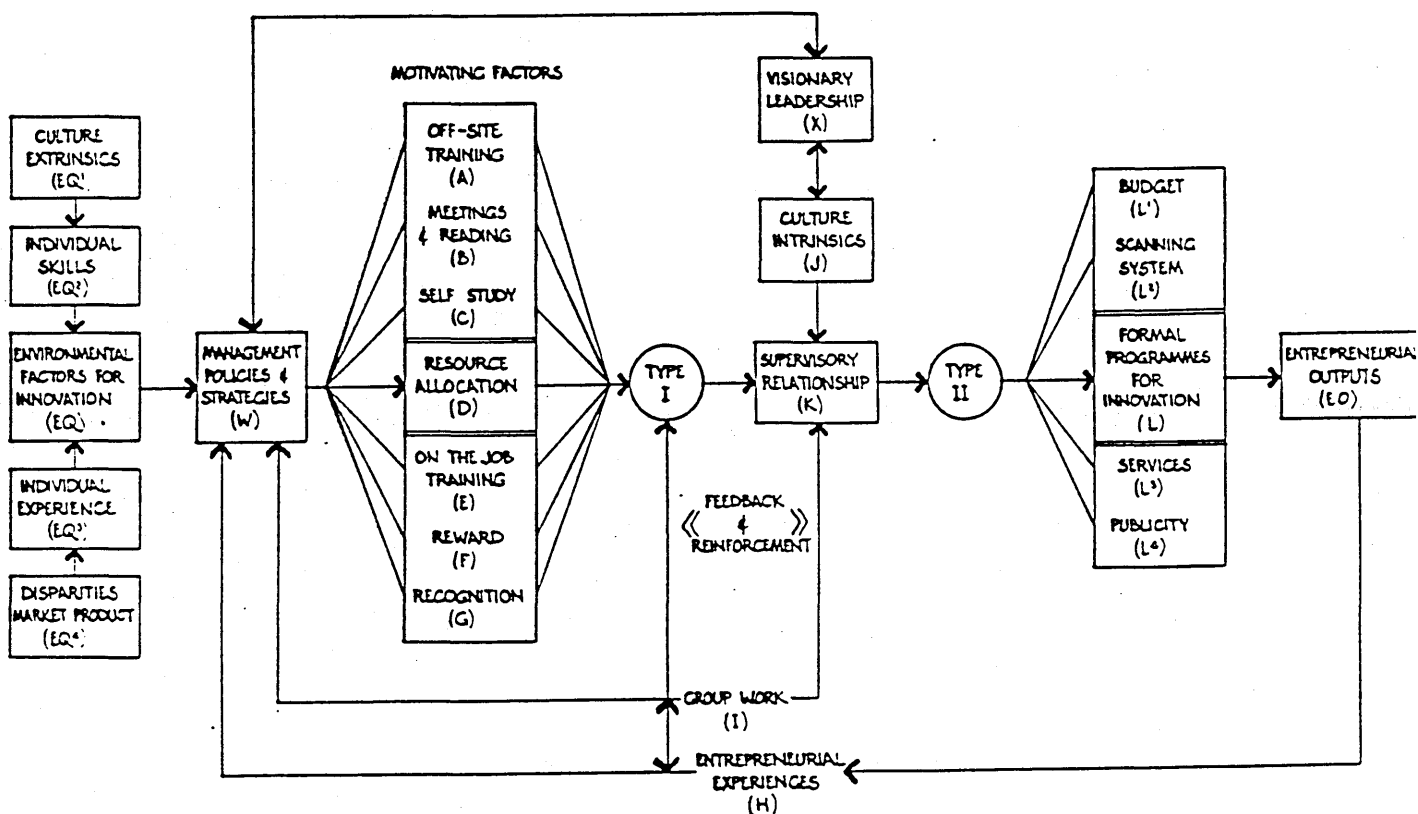


Figure 7.2 Diagnostic and Research Model

This model outlines the relationships of factors cited by the managers as to how they believe that an innovative firm works. It illustrates the behaviour reinforcement patterns needed and the inputs of an overall strategy to create a multi-dimensional process involving six groups of elements: Environmental Factors (EQ); Management Policies and Strategies (W); Motivating Factors (A-G);

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Supervisory Relationship (K); Formal Programmes for Innovation (L) and Entrepreneurial Outputs (EO).

Legend for Equation Codes for Model

- EO = updated fully innovative person (system outputs)
- EQ = individual entering into the system (input)
- W = Management policies and strategies toward the environment which a firm operates and attract new employees accordingly.
- K = Supervisory operating methods
- I = Group Work reaction
- H = Entrepreneurial experience related to group work
- A-E = Motivating Factors to combat obsolescence
- X = Visionary leadership exhibited by overall strategies
- J = Internal culture originating from parent company
- L = Formal programmes components for innovation
- F-G = Rewards and recognition given for updating

The systems approach of this model (Figure 7.2) can be reduced down to three main variables: the individual, the firm, and the environment. Achievement motivation is the principal individual variable involved in this model as shown by the entrepreneurial outputs. The environmental and situational variables used in this model are: motivational aspects of supervisory behaviour, organisational climate, on-the-job problem solving, peer and group interaction, and management policy.

The input to this system is the individual. Box EQ shows how the formal education of the employee is affected proportionately by four sub-elements: (a) the type of home country culture which the employee resides in (EQ1); (b) the individual skills as reflected by formal education at the time of entry (EQ2); (c) the level of experience that the individual brings in being innovative (EQ3); and (d) the current business environment as it impacts on the market conditions for the type of product to which the skills of the individual would be applied (EQ4).

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Continuing into the main system, Box W represents the influence of management on possible methods to be used in recruiting, training and on how and where the individual will be used to advance the overall company strategy of innovation. It reflects the firm's previous experience in being entrepreneurial, method of organisation, supervisory methods, and visionary traits of top management.

Next are Boxes A through E which represent the various up-dating practices. These boxes represent the extent to which the organization provided employees time away from work or financial resources (Box D) for on-the-job training, time to experiment, group learning, the taking of courses, reading, off-site training at conferences, schools, professional associations, attendance at seminar and workshops. An individual can go through a combination of these internal motivating factors simultaneously or one at a time. The key external motivators are the types of reward (Box F) and recognition (Box G) that a person expects to gain by engaging in the up-dating of their skills and knowledge

Boxes I and H represent the positive effects of group and peer interaction as determined by the overall entrepreneurial experience of the firm. These are directly affected by Box K which represents the type of supervisory reaction to individuals engaged in updating their skills /knowledge. Positive feedback and reinforcement may or may not occur due to personality of the supervisor.

In the event no feedback occurs due to poor group interaction, inadequate supervision and/or lack of one's self-achievement, the process can cycle back to the main system via the third feedback loop. Then the corporate culture intrinsic in Box J which directly nurtures the visionary practices and value system for innovation or self-achievement would over ride this lack of feedback. At that point, expressed and explicit management policies will reinforce the need for updating. The result is a Type I individual

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who is completely updated to the level of the company's requirements compatible to its overall strategy for innovation.

Type II individuals develop when they as self-motivating individuals propose to or act under a corporate entrepreneurship programme. It is a main feature of these programmes such as at 3M, Apple Computer, ICI and others that "on-line organisational supervision will have little control over a truly "enterprising employee nurturing a new idea/innovation". Provided approval is given by the programme manager for the individual to exploit, experiment and develop a proposal to its commercial acceptance. At this stage, the employee does not work under a formal structure, and tends to make all decisions necessary to develop a complete new business venture. Also in this stage of development, the company can reward the person by funding the project directly or launching a spin-off business with the Type II person in charge.

In order for these types of innovation programme to work, the sponsoring firm should supply four sub-components: separate budgets (L1); a formal system of scanning to determine the strategic implications of a new product/idea being developed by the Type II employee (L2); support services to advise and motivate the employee (L3); and a network system to publicise the programme and the employee effort regardless of the success of the project (L4). In essence, this supports the effort of a highly motivated self-imposed drive by the employee to learn new information and undertake risk in an incubatory environment.

7.5 CONSTRUCTING A QUESTIONNAIRE FROM THE RESEARCH MODEL

From the research questions and the the original hypotheses (para. 7.3), a 137 item, five-tiered questionnaire was constructed as shown in Appendix -Exhibit No. 1. The survey instrument was designed to capture the following five broad fields of data:

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1. Descriptive elements of the respondents	8
2. Discriminating elements for separating firms	5
3. Elements as to how strategy is formulated	40
4. Elements as to how innovation is stimulated	30
5. Elements linking innovation and strategy	<u>54</u>

137

These fields were divided into five sets of elements (variables) which were relevant to this research: (1) typological elements to categorise the firms in the sample into homogeneous groupings; (2) organisational elements to provide a demographic profile of the firms in each group; (3) the strategic elements to indicate the type of technological strategy being used by a firm; (4) those distinctive elements linking strategic elements to innovation; and (5) the other general elements (i.e. distinctive, environmental, contingent, and motivational) used to investigate potential differences among the groups in terms of how they motivated their employees to stimulate innovation.

A brief description of each set is shown in Appendix-D.

7.6 RESPONSES TO THE FIELD SURVEY

7.6.1 Returns from The Posted Survey

The survey was mailed to a named executive within 396 companies which were located in Scotland. Their names were taken from a list of firms furnished by the Scottish Development Agency (SDA 1987).

The questionnaires were posted in two batches: 200 in the last week of January, 1989; and 196 in the first week of February, 1989. The cut-off date was the 23rd of February, 1989.

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This national sample yielded 190 usable replies, representing an effective response rate of 52.4 percent as returns and mislabelled totalling 32 executives/firms were excluded.

7.6.2 Sample Stratification

The breakdown using the gross sample of 396 firms is displayed in Table No. 6 below:

Table 6: PARENT OWNERSHIP BY NATIONALITY OF SAMPLE

	<u>Number of Firms</u>	<u>Original Sample (% of 396)</u>	<u>Replies (% of 190)</u>
Scottish	200	50.5 %	45.8%
N. American	95	24.0	26.3
Other Overseas	40	10.1	7.4
Other UK	61	15.4	20.5

Table 1 indicates that the responses were adequately stratified with an international representation of foreign and other United Kingdom firms when compared to the overall targeted population as shown in Appendix E. This sample represents about 1.5 percent of the British firms in Scotland (excluding retailing and firms employing less than 51); and about 50 percent of North American-Overseas firms employing more than 51 employees in Scotland.

7.6.3 Band of Respondents by Size of Parent Company

The frequency and percent of the reporting firms by number of employees is shown in Table 7.

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Table No. 7: Reporting Units by Number of Employees

<u>Sample Band</u>	<u>%-Projected</u>	<u>%-Actual Reported</u>	<u>No.of Firms</u>
51 to 300	33.3	31.6	60
301 to 1000	33.3	32.6	62
1,001 and over	33.3	35.8	68*
	99.9	100.0	190

* the actual numbers of firms over 1,000: 1000-1,500 were 28; 1,501 - 2,000 were 14 ;and over 2,001 were 26 totalling 68 in all.

Table No. 7 indicates that the survey captured a fairly equal representation of smaller, medium -size, and larger firms as set forth in the investigation's design stage (para. 7.1.2)

PHASE 3: TO DETERMINE THE STATISTICAL INFERENCES OF THE DATA

The questionnaires were analysed with a SPSS programme. There were 137 elements (variables) accumulated across all questions which receive both a frequency and cross-tabulation statistical treatment. The tabulated responses for all 137 elements were divided into users data and non-users data as shown in Exhibit No. 2.

7.7 STATISTICAL TECHNIQUES USED ON DATA COLLECTED

Whenever possible, interval and ratio measures were used on the elements as shown in Appendix E. These elements were subject to one of the the following four statistical techniques: (1) a series of tests for goodness of fit; (2) discriminatory analysis; (3) cross-tabulation; and (4) Varimax factor loading.

7.7.1 Goodness of Fit Measures

There were three "goodness of fit" techniques used to test whether statistically significant differences exist: Chi-square (χ^2) was used for nominal data, Mann-Whitney-U (U-M-W) for ordinal data and in the analysis of interval and ratio measures for grouped data, t-tests were employed.

7.7.1 Discriminant Analysis

Within this analysis, only 83 of the 137 different combinations of elements were analysed. It was found that 54 of them were highly correlated and lost their qualities as independent variables. Their presence created a condition of multicollinearity. One of the simplest and best solutions for this problem of highly correlated variables is to discard them until the condition is eliminated.

The key element for this analysis was how a respondent answered the question no. 3 in Exhibit No. 1, "Did your company use a strategy (formal programme or policy) to stimulate innovation or not over the past three years" (answered by yes or no). This was the primary discriminatory element and predictor. This analysis using the variable (Formalst) had two main purposes:

Firstly, an attempt to shed additional light on the characteristics was done by separating the users and non-users (formal/informal programmes), for which a stepwise discriminant analysis (WILKS) was used. For the assessment and the validity of the discriminant function, four standard measures were used:

The Eigenvalue. This measure tests the total variance existing in the discriminating variables. The higher the eigenvalue the better the function standard.

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The Canonical correlation. This measure indicates the association between the discriminant function and the variables which define group membership. The closer the coefficient is to 1.0, the better the function.

Wilk's Lambda. This measure indicates the statistical significance of the discriminating information not accounted for by the function. The higher the measure the better the function.

Chi-square. This measure is used to test the significance of lambda into an approximation of the chi-square distribution.

Secondly, the other useful function of a discriminant analysis is its ability to classify and confirm whether a firm belongs to a users or non-users group. In the sample, 103 firms used a formal strategy and 87 used an informal strategy. From this sample ratio, each respondent's discriminant score was compared with a cutting or criterion score to predict group membership based on nine distinctive elements as set forth in Chapter One.

7.7.3 Cross-tabulation Analysis

A cross-tabulation analysis (using SPSSX) was later performed. It provided a series of sub-tables using the nationality of the parent company, and one of business-marketing strategies used by the firms as independent variables. This business/marketing strategy was selected by each respondent from question no. 12 which contained a list and a description of seven different strategies (see Appendix B, i.e. Pioneer, Follower, Fatalist, Opportunist, Imitator, Dependent, and Traditionalist).

7.7.4 Varimax Rotation Analysis- Attitudinal Survey

This analysis was used to examine an attitudinal survey measuring the interrelationship of culture, decision-making, and efforts expended on new product development by a firm and its overall orientation to innovativeness activities. This analysis is a factor loading rotation procedure (Varimax) meaning that it will find any hidden relationships by loading heavily on one variable (to its maximum) and as low as possible on the other variables.

The importance of this additional questionnaire to the investigation became apparent during a field interview with one of the respondents, who argued that motivation and the attitude of users versus non-users would contribute immeasurably to this investigation. It was decided to develop a short "attitudinal measuring" questionnaire with ten statements and two questions.

7.7.4.1 Attitudinal Survey

This additional questionnaire (Exhibit No. 3) was designed differently and tabulated separately from the first one. The ten statements related to attitudes toward innovation were developed using a Likert-type rating scale from 1 through 5. The two questions were designed to reflect the reasons why training was taken.

Each respondent was asked to register the extent of their agreement/disagreement with each statement posed. On a supplementary basis, there were two questions asked. They were to probe the motivation for taking a training course and to test if there was a relationship between training and a firm's orientation toward new product development activities.

For example, the first question dealt with training courses used to combat obsolescence by asking, "Please indicate your foremost reason (a list of six indicators were given) for attending a course

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which may up-grade your skills or others as stated ". The second asked, "Overall, how important are new ventures and new product development to your firm?". The complete questionnaire is shown in Exhibit No. 3.

This questionnaire was dispatched to 130 different respondents with an invitation to attend a follow-up symposium on the 5th of May, 1989. They were selected for this mailing because on the first questionnaire they had indicated that they had achieved some type of innovation accomplishments over the past three years.

This sample was comprised of 93 "users" of a formal programme to innovate and 37 "non-users" of a formal programme. From this mailing, 105 firms returned this one-page survey for a 80.1 percent response rate; 74 of these firms were from "users" and 31 of them were from the "non-users". These findings are presented in Chapter Eight.

PHASE 4: TO DISCUSS IMPLICATIONS ARISING FROM SURVEY

On the 5th of May, 1989, a 2nd symposium was held at the University of Glasgow to gain a further insight on the implications arising from the findings of the first questionnaire. It was attended by 22 different managers, and 14 other parties of interest (universities, SDA, and specialists).

The self-classification of those attending were as follows:

Academics from Universities	10
Managers within a UK-owned firm than Scottish	9
Managers within a Scottish-owned company	6
Managers within a North-American firm	4
Managers within an Overseas-European firm	3
Other specialists and interested parties	4

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7.8 FORMAT FOR SURVEY AT THE 2nd SYMPOSIUM

Before a presentation of findings and theories, participants were asked to rank their reaction to 22 statements as shown in Exhibit 4.

A five point scale was used: (1) strongly agree; (2) agree; (3) no opinion; (4) disagree; and (5) strongly disagree. After a presentation and discussion of each statement they rank the same scale again. A summary of results is discussed in Chapter Eight.

PHASE 5: POST INTERVIEWS TO CLARIFY THE PRACTICE OF INNOVATION

7.9 POST INTERVIEWS

There were 26 different respondents who agreed to a series of 2 hour interviews to discuss the 10 findings in the leadership's rules as shown in Appendix C.

All in this group had responded to the first and second questionnaires, and nine of them had attended each symposium. Based on their own self-descriptions, they are classified as follow in Table No. 8:

Table No. 8: POST INTERVIEWS OF 26 RESPONDENTS

<u>Technological Strategy Used</u>	<u>% Of Strategic Group Respondents (n=190)</u>	<u>No. Interviewed</u>	<u>% To Strategic Group</u>
Pioneers	38.0	7	9.4
Dependents	19.1	6	15.0
Imitators	12.2	3	11.1
Followers	10.0	5	26.3
Fatalists	8.7	2	11.1
Opportunists	7.2	2	15.3
Traditionalists	4.8	1	11.1

Table No. 8 confirms that greater than 10 percent of the total respondents of 190 received post interviews, and that each strategic group was fairly represented. It, also, indicates that the interviews of the Followers exceeded the 10 percent goal as stated above (see para.7.1.2).

These interviews (conducted from July, 1989 through November, 1989) concentrated on the survey's findings, and how to construct a strategy for innovation. They proved to be useful in developing a conceptual strategic framework as to how a firm stimulates its

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workforce for innovation as presented in the conclusions of this investigation.

Other issues that were discussed included:(1) what was the best way to motivate their workforce to become more innovative, (2) the best type of organisational structure, and (3) which methods for training personnel/supervisory were being used by other industrial leaders in technology and manufacturing. The strategic use of the product life cycle theory and the effects of having or not having a management policy / strategy for innovation were, also, discussed. A summary of the post interviews is shown in Chapter Eight

7.10 INDEX FOR DETERMINING THE MOST INNOVATIVE FIRMS

Using those elements identified in the discriminant analysis as being present in the responses of firms known to be highly innovative (i.e. 3 M Corporation) and absent in a known non-innovating firm, an index was constructed accordingly.

This weighted scale was tested against a random sample of 10 respondents: 5 users and 5 non-users of a formal strategy to determine whether the index was able to rank firms progressively. It was calculated further that 14 firms scored over 80 percent of the possible maximum points allowed. They were ranked as the most innovative firms of the 190 surveyed. The index and the names of those firms rating over 51 percent are shown in Appendix G.

7.11 SUMMARY

Using the methodology described above, this investigation assesses whether the innovative (entrepreneurial) firms can be distinguished from non-innovative and (non-entrepreneurial) firms.

Firstly, the research will identify a group of enabling elements generally accepted as contributory to a highly innovative firm.

Secondly, the following hypotheses will be tested: (1) when those enabling elements for innovation are related affirmatively in a firm, will it exhibit a greater receptivity to be highly innovative; and (2) when those enabling elements are related negatively in a firm, will it exhibit a greater receptivity to be non-innovative.

CHAPTER EIGHT

OBSERVATIONS AND FINDINGS

8.0 AIMS

This chapter discusses the observations, assumptions, and findings of the investigation in this order.

It starts with a series of observations gleaned from the literature review of the field of strategic management and strategy as a discipline. Then, a preamble to the investigation's findings is presented in which assumptions are made about the responding firms, strategic focus, and environmental turbulence.

The chapter ends by presenting the highlights of major findings from the surveys (Exhibits No. 2 through 4) which form an empirical data base for the conclusions set forth in Chapter Nine.

8.1 FINDINGS AND OBSERVATIONS FROM THE LITERATURE REVIEW

There has been much written about innovation and about how management needs to adapt in order to meet the challenges of the 1990's or even to survive.

Some writers in the literature even go so far as to suggest that these challenges represent a paradigm shift in the strategic philosophy from the "old order" such as efficiency, authority and

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conformity to a "new order" where employees' initiatives, visionary leadership and innovation will become essential. A common theme in much of this writing is the importance of the individual employee as a strategic element and, as a consequence, the need to nurture and develop this resource.

We observe that the findings from the literature could be classified into three main types. The first are those axiomatic observations which have been accepted by a dominant proportion of researchers. The second types are those themes which are debatable because we think each lacks a balanced perspective and probably will be re-examined by the field of management in the next decade. The third type is the group of theories emerging in the field which have not been confirmed by researchers or accepted completely into practice by managers (e.g. Porter's five forces of competition).

For example, one of the first developments in the field of management was the separation of managerial activities into different categories (Fayol, 1949), They are best known as planning, organising, directing, and controlling activities. Up until recently, it was believed that each level of a firm would be responsible for different aspects of these activities. Top management would do the planning, middle management would do the controlling, and the directing of personnel would best be left to first level managers. Most writing through the 1980's reflects this concept.

8.1.1 THE TASK OF STRATEGIC MANAGEMENT

In the review of the literature as it relates to strategy, we believe four general findings should be stated about the field of strategic management.

The first is evident after reviewing the work of Quinn, Mintzberg and James (1988) and others, it is a clear observation that all

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levels of management perform all of the classic four activities: planning, organising, controlling, and directing. These tasks are not restricted to the province of top management, as some practice. We, firmly, believe that only the gap analysis portion of planning should remain solely a task of top management. However, portions of this task being delegated down (but not abdicated) to other levels when it is most appropriate.

Second, we observe that the controlling and planning process of strategy-making requires much more human system management and behaviour guiding activities than most current writers of strategic management address. And we argue that the stimulation of innovation requires even more of these activities than any other type of strategy.

Third, the strategy-making and planning activities have fast become a series of bureaucratic, costly paper-shuffling exercises divorced from the actual process of management. This observation holds up well when it comes to the stimulation of innovation which is stifled by such meaningless energies.

Four, we observe that an overwhelming amount of management literature concentrates on developing two extreme schools of thought when it comes to strategy. On one side is the rational management science school of strategy-making developing more and more sophisticated models and at the other side is the nescient school's approach using recipes, portfolio grids and quick solutions. Whilst both may be contributing to the advancement of management as a theory, they lend little support to the empirical evidence as to what managers believe in or practice.

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8.1.2 Axiomatic and Corroborated by Literature Review

Earlier, we observed that there were some findings in the literature which were axiomatic and are directly transferable into the field of strategic management.

We called those findings "axiomatic" when two main tests are met: (1) when they reflect theories which are self-evident and universally recognised as being applicable whether the firm is small or large; and (2) when they have been corroborated by field research and are generally accepted by most theorists in the field as being of value, except those, who practice the principles of neisience management.

Based on this definition as to what is axiomatic, the following seven observations are offered:

1. The structure of an organisation follows its strategy or lack of it. The success/survival of an organisation depends on an interface between a firm's ability to fit within its environment. This has been corroborated by (Chandler (1962); Channon (1972) Williamson (1975); and Rumelt (1974). As the field of management has advanced over the past 25 years the force of their conclusions had not been weakened. Indeed, we believe that they are impervious to any new research any where on the horizon which may discount their research.

2. The expectancy motivational theory about the behaviour of the individual within an organisation indicates that each of us are motivated by the aspiration for security and some type of a reward. The strength of an organisation to move forward depends to a large degree on the bulk of individuals within it being motivated accordingly. This means strategy-making must depends on rewarding and motivating those who work toward its goals. This axiom has been

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reinforced by the research of Vroom (1964,1968); Likert (1961); and Maslow (1959)

3. Research indicates that a structure of an organisation takes one of two basic forms: (1) Mechanistic; and (2) Organic. The first reflects a mechanistic and bureaucratic structure with hard rules to follow. They must be obeyed without questions or deviation from its procedures and rules. When such rules are followed the organisation becomes more efficient in producing its core products/services (e.g. Macdonald Restaurants).

But in direct contrast, the second structure is an organic one which is flexible and dictate that rules, at their best, are only rough guide lines for the routine. More over, employees when they deviate from them for a specific cause or to solve a problem, their behaviour is tolerated. Thus, the more flexible organic structure is generally best for the stimulation of innovation.

However we observed that some theorists point out that most organisations are not at either ends of this continuum at all times, but a pattern of how it prefers to operate does develop. Yet, to a degree, we argue that an organisation over time can be identified as having the symptoms of being either mechanistic or organic in how its manage its workforce. The research of Burns and Stalker (1961); and Weber (1942) corroborate this axiom.

4. We accept as being axiomatic the observation that innovation can best be defined as a new idea challenging existing ideas and only has to be perceived as being new by the individuals involved. Although there are many other definitions offered in the literature, we prefer the view of Van de Van (1986) "as long as the idea is new to the people involved, it is an innovation, even though it may appear to others to be an imitation of something that exists elsewhere". The acceptance of this finding is supported by Zaltman, Duncan and Holbek (1973); Mansfield (1977); and Rogers (1982).

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5. All innovations must be actively welcomed as good things by management. I argue that this is an essential first step in a gap analysis needed to stimulate innovation. The second is the constellation of circumstances theory in which an actor decide to take action on a problem and does not find an existing answer, then innovation starts. These factors must be incorporated into a gap analysis which establishes the background for most strategic formulations and for a strategic decision to innovate. This attitude "to take action" is generally formed and emotionally-developed by management before implementing a company wide plan to innovate.

Those, who accept that only good commercially-valued and immediately useful innovation is welcomed, are doomed to failure. Unfortunately most non-innovative managers view innovations two ways; if it works, it is good, but if it does not work it is a punishable mistake. However even before these types of dichotomous judgements (that innovation is good or bad) are formed, an attempt may be made because certain circumstances are leading people to take action. This view is corroborated by Braun (1981); Drucker (1985); Kimberly (1981); Maitland (1982); and Schon (1971).

6. There is a contingency theory about how firms behave in negotiating and as to how they set goals within an organisation. This theory liberated managers and management theorists from being prisoners trapped in the view that "there is only one way". Basically, we argue that most organisations, managers, goals and strategic situations are not identical. Thus only a firm in that exact situation can decide what is best.

Even though we understand that sometime the contingency theory can be a theory of excuses and rationalising and that it can become overly-deterministic, to the point, that where every manager believe that they can decide which variable of strategy-making is important, we still support it. We support the principles of this theory because it does reflect a theory of choice. Thus, it allows a

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decision-making unit the opportunity to absorb the impact of technology, its environment, and the type of management structure it wishes to operate in, etc. to the degree that it feels is important when formulating a firm's goals.

The main criticism we have with this theory is that it does not take in full account the differing aspirations of managers and employees when they were in conflict over a strategic goal. This is one of the major features of a contingency approach to strategy-making as to how some firms are able to develop a series of closely-coordinated programmes of training, stimulating, funding and investigating to support a strategy. They are trying to motivate and get as many of their employees involved as possible in working toward a common goal.

However some pundits of this theory do not recognize that people within an organisation may have conflicting goals as to how they will operate within a firm. Thus, it only becomes axiomatic in our opinion for its use in the stimulation of innovation when that does occur.

This recognition of conflicting goals other than profits combined with the seminal research of Cyert and March, the theory does indeed become an axiomatic observation. This is because their research of strategic choice and behaviour is an extremely important development in the advancement of the contingency theory. For its acts as an antidote to the tendencies of some managers to over work the use of setting strategic goals without taking into account the personal goals of people working within an organisation. The contingency theory in the past 15 years has been reflected in a plethora of articles, but (Cyert and March (1963); Simon (1964); Kanter, (1985,1988) and Waterman (1989) have corroborated our observations.

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7. Strategic management has three distinct and separate levels of strategies and they contain, no less, than nine essential elements. And an effective strategy must go through the following type of development: it is formulated, implemented, and monitored accordingly. Both British and American academics have established this. A summary of these elements are listed below in Table No. 9.

TABLE No. 9: Essential Elements of Strategic Management

1. Formulation: a formulation of gap-filling goals is the first step. Supporting a firm's mission statement.
2. Multi-tiered Goals: goals must be established at three levels (corporate, competitive and function).
3. External Assessment: some type of environmental assessment must be made of forces in a firm's industry. They would include the social, economic, competitive and technological advances a firm must face.
4. Internal Assessment: a firm must make an analysis of its strengths, weaknesses, opportunities, and threats (SWOT) and a strategic-marketing appraisal of its critical success factors (CSFs).
5. Assumption-based: certain scenarios, assumptions and forecasts must be made either qualitatively or quantitatively about a firm's future.
6. Contingent Plans: a variety of alternatives and conflicting strategies must be developed.
7. Selecting the Best Choice: a one- best choice of the alternatives must be written into an organisational development plan for current operations and a long term plan in support of a mission statement.
8. Resource Allocation: an allocation of how a firm's resources will be used should be specifically addressed in both sets of plans.
9. Monitor: both set of plans should be reviewed periodically with an objective and accurate feedback system for each.

Adapted from Taylor & Sparkes (1977) and Ansoff (1961)

Table No. 9 outlines the essential elements in a firm's strategy regardless of size, age, geographic location, product mix, workforce, management style, or customer base. These are corroborated by Anthony (1957); Ansoff (1961); Taylor, (1973), Hofer (1980); Porter (1989); and many others within the literature.

This concludes the last of those axiomatic observations which can be corroborated by the literature. They form a conceptual foundation for the assumptions and findings of the investigation.

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What follows are those observations which can be debated without reaching a clear conclusion.

8.1.3 Debatable Observations Within the Literature

There is no escaping the tensions between the views of strategic management and the challenges outlined in the literature that debate whether this discipline can handle a complex and changing environment as predicted throughout the 1990s. Nor was it possible to overlook the substantial differences in the conflicting theories as to how strategy-making should be done, once the essential elements of strategy-making are agreed to.

In an effort to outline those issues in which there are some disagreements surrounding strategy and innovation, we will discuss nine of them as follows:

1. Whether or not that strategic planning based on strategic business units, and annual corporate review schemes are valid, and if the setting of corporate goals by using an experience curve is a sound method of management. Despite many within the academic community questioning the impact of these principles, it is an empirically-induced fact that most executives in the twentieth century uses one or more of them daily.

Further and in support, most of the managers (84.2%) responding to our surveys agree that strategic planning is of value. For example, respondent AA stated:

"....Before I became a managing director, I questioned the value of corporate planning for long term goals, a portfolio approach to management, and strategic planning in general. But I would find it extremely difficult to understand and manage so many different products and markets without them".

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Although, we question the paper-creating process of strategy, we will make the observation that the analytical techniques and the formulation of goals required in many of these planning schemes do help a firm to select a proper strategy. This, in our view, is their best and true value. We found that this view of strategic planning having similar values was corroborated by Hammermesh (1986); Wheelen and Hunger (1986); and Quim, (1988)

2. The view that technology, environment, and structure are the primary determinants within a firm are debatable observations. Their importance as confirmed by individual pieces of research are accepted but not balanced in our view. The complete failure of earlier writers (Wooddard) human resource specialists (Perrow) and current technologists (Roberts) to balance the power of the individual to innovate and over look the desire of some to resist innovate because it threatens their organisational power, is a major flaw.

Equally the views that content-descriptive school of strategic management comprising the scientific view or the procedural-school of management sharply divided our thinking as to which method is best. On one side writers such as Ansoff (1961) Hofer and Schendel (1980) (Caves (1980) and Porter (1980) explore the content and outer context links of strategy-making as a rational process, but substantially ignore the intuitive process of strategy/innovation. And on the other side are the process strategic researchers such as Pettigrew (1985), Quim (1980) and Mintzberg (1978) with their backs turned away from the rational deliberate strategy-making process.

For example, we observed that the functionalist's view of technology or the humanist's view of innovation are so far apart that they are almost impossible to balance. We were intrigued by the eagerness of some theorists (Peters, Pettigrew and et al) to distort, twist or construct new definitions in mid-air (or mid sentence) in order to balance their varying views.

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We treat with caution such statements as 'technology affects structure or structure affects technology'. These statements require those theorists to demonstrate either empirically or axiomatically that each element has a separate integrity if they are to avoid the charge of tautology or the circular argument going nowhere. Our view from the literature on the contingency theory during and after the investigation is mixed.

2. The product life cycle concept as a method of new product management and stimulation of innovation has to be accepted but with a jaundiced eye. We observe that the length of the introductory period depends on external features which have absolutely nothing to do with the product development itself. The sales force's distribution system, product complexity, positive market awareness, advertising and promotion and the wealth (budget) of an innovator are prime examples.

We believe that a product's usefulness can not be viewed on the basis of one product life cycle. Further, we believe that a product life can be terminated prematurely by the strategy of a competitor to replace it or to reduce its value as a profitable item.

The literature suggests that a product reaches obsolescence when the market for it is saturated and that market is considered saturated when sales slow down. To us, it is a chicken and egg type of argument. However, we sometime think that it should be called a market describing cycle model rather than a product life cycle. But it's merit is based on one common element found in describing the market or product process of deterioration and that is by the concept of time. Thus, we support the concept if the literature is trying to stress that each market/product has a definite period of development measured in a time dimension. If that is the case, then the literature should indicate how speed of the process of its development from a idea into commercially- distributed product is the key.

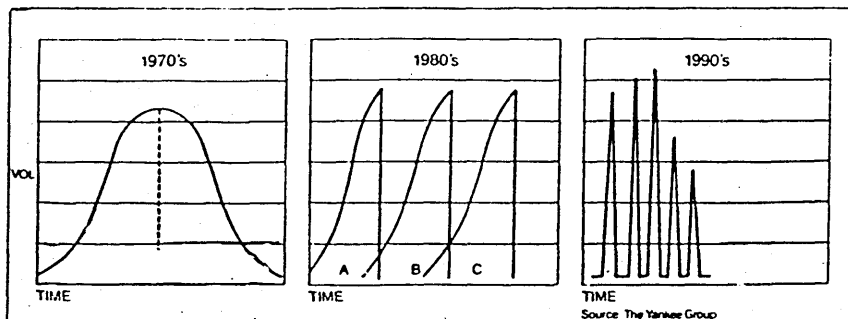
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It is speed at all costs, speed in making the decision to innovate the moment that an existing problem is identified is the point that we observed is critical. But for a firm to develop speed in its strategy for innovation does not just happen as it requires a different way of management.

In the past, when a firm decides to seek a new product/solution, the question arises does it want it fast or just want it right were the typical managerial responses to this type of a decision. Now in the 1990s, the strategic answer is that a firm wants it right the first time and faster than any other firm. Yes, both ways; quick and right. We argue that a firm can be fast and right if they are working on many different innovations for a few years. This sets the tone that if everyone is working constantly as part of their daily task to innovate then it is more likely to be right the first time and faster. In this type of culture, the development of an innovation is not held up unnecessarily for lack of funds or approval to move ahead. By establishing such an entrepreneurial culture, then firms can go from conception of an innovation to market consumption in the shortest possible time. Indirectly they have extended their product life cycle already. The faster they get the product developed right, the longer the product cycle. The literature fails to balance out this observation.

The literature portrays it as a bell-shaped curve or a s-curve balanced with a definite beginning and end. This is not the observation held by most managers as how they see the product life cycle as shown in Figure 8.1 versus as to how it is portrayed in the literature.

Figure 8.1: THE SHRINKING PRODUCT LIFE CYCLE



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Figure 8.1 supports our observation on the product life cycle as does the views of Respondent EE, a Follower, and a manufacturer of electronic equipment and software, He states,

" Presently strategy in our industry is set to the wrong measures. An example is the fabled product life cycle curve. In the 1970, we would engineer a product, develop it and distribute it to the market. The R&D costs were paid back in the first half of the product life cycle; the second half was a time for profit harvesting. By the 1980's we saw more and more rapid development times and there was no back half of the product cycle (he furnished a copy of the diagram in Figure 8.1). You can see that in the 1990s it is in spikes, not curves, products that exist with life cycles of months, not years as before".....

4. The other observation we noticed was the absence of human resource strategies as an essential element within the literature of strategy-making. We argue that even the best strategies are meaningless if the employees do not have the skills to carry them out or if jobs are not designed to accommodate the available workers. Their prominence as a strategic tool was enhanced by some writers, but depressed into a subsidiary role by others. The literature is uneven, at best, on this issue and several authors of strategic management textbooks (Glueck, Hofer, Wheelen and Hunger) fail even to include a chapter on the people training- matching process which strategy requires.

The failure of the literature to substantially link human resource management strategy to innovation or change is noticeable. Or even for its failure to state how a strategy which is required to meet a gap-filling goal must strongly rely on the performance of its employees.

We argue further that any strategy will fail if an employee either can not improve his/her performance because they are not motivated to do so or they are motivated and do not know how. Both are training issues which require a specific element within the strategy-making process. Neither is the issue of occupational obsolescence addressed even when we accept the literature view that "innovation is either skills replacing or skills enhancing" (Littler).

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This raises the issue whether or not those within the field of human resources management are writing of the connection between training strategies and innovation in separate journals. If this is the case there is little triangulation between themselves and strategic researchers and managers's practices. Otherwise, we feel that this is one of the major weaknesses in the field of strategic management.

Our view as to the importance of training and the human performance as a strategic element was shared and echoed by Respondent MM, Pioneer, and a manufacturer of semi-conductors,

"Strategy only occurs one way through everybody performing to the same goal.... Human performance can only be improved in two ways- by good quality, and relevant training and by personal motivation. As an illustration of this, I would like to quote Matsushita Koto of Japan- one of our worldwide competitors, 'First we make people and then we make things' This precisely what we have been doing the past 10 years as our competitive strategy and probably why we are considered a leader".

5. The flip flop posturing by the literature as to whether certain individuals are stimulated into acts of innovation intuitively or rationally is another major weakness in the field. No lesser experts than ones such as Henry Mintzberg and Herbert Simon admit that this is the case. (Mintzberg 1989:61)

The literature outlines no less than five different schools of thought about the innovative individual as the core ingredient needed for innovation. They range from the sole genius to the corporate entrepreneur. There seems to be a host of theorists that agree about a flat organisation, free flow of information and freedom to experiment, but there is scant research about a functional strategy of identifying and developing one type of employee to innovate over the other. We also observe the willingness to assign every possible description why some firms are successful in innovation, except in recruiting and developing the innovative employee. A case in point is IBM where writers produce

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reams of case studies about its strategic strength, but little about what IBM consider their strength, the quality of its workforce.

6. We observe what several business strategy theorists feel is the greatest of sins committed in the literature. This occurs in two ways. The first is the failure of many textbooks and articles to consider the concepts of military strategic principles as they relate to business, and the second is the confusion of military terms with business ones. In the words of Anthony "they should not be used interchangeably" and we accept this after realising the military term for tactics means short and final movements during the battle and not to be repeated too often as it loses its value as a manoeuvre. Where in business, a short term strategy should be repeated to gain the principles of efficiency and effective advantages.

7. We observe the ways that the literature confuses the definitions of business policy with strategic management. An issue settled after some considerable debate by the American Assembly of Collegiate Business School, some 15 years ago. The key difference being that business policy tends to look inwardly at a firm's strategy whilst strategic management looks inwardly and outwardly with a heavier orientation on environmental and strategic emphasis. This re-direction of how strategy should be developed was even adopted by an international association of corporate planning executives. Yet, confusion still reigns about what these terms mean.

8. We question some of the universal propositions that form the core of traditional management theory. For example, Katz's proposition (1970) and Glueck's (1984) of the five strategy-making principles: (1) always lead from strength; (2) concentrate resources where a firm already has an advantage; (3) only the narrowest possible market-product scope should be selected; (4) for dominant firms in an industry, the best strategies (in order) are innovation, intense marketing, the least are confrontational; and (5) acquisition strategy is best when the firm has

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little knowledge of the product when speed is vital, or other firms own key patents or control key resources.

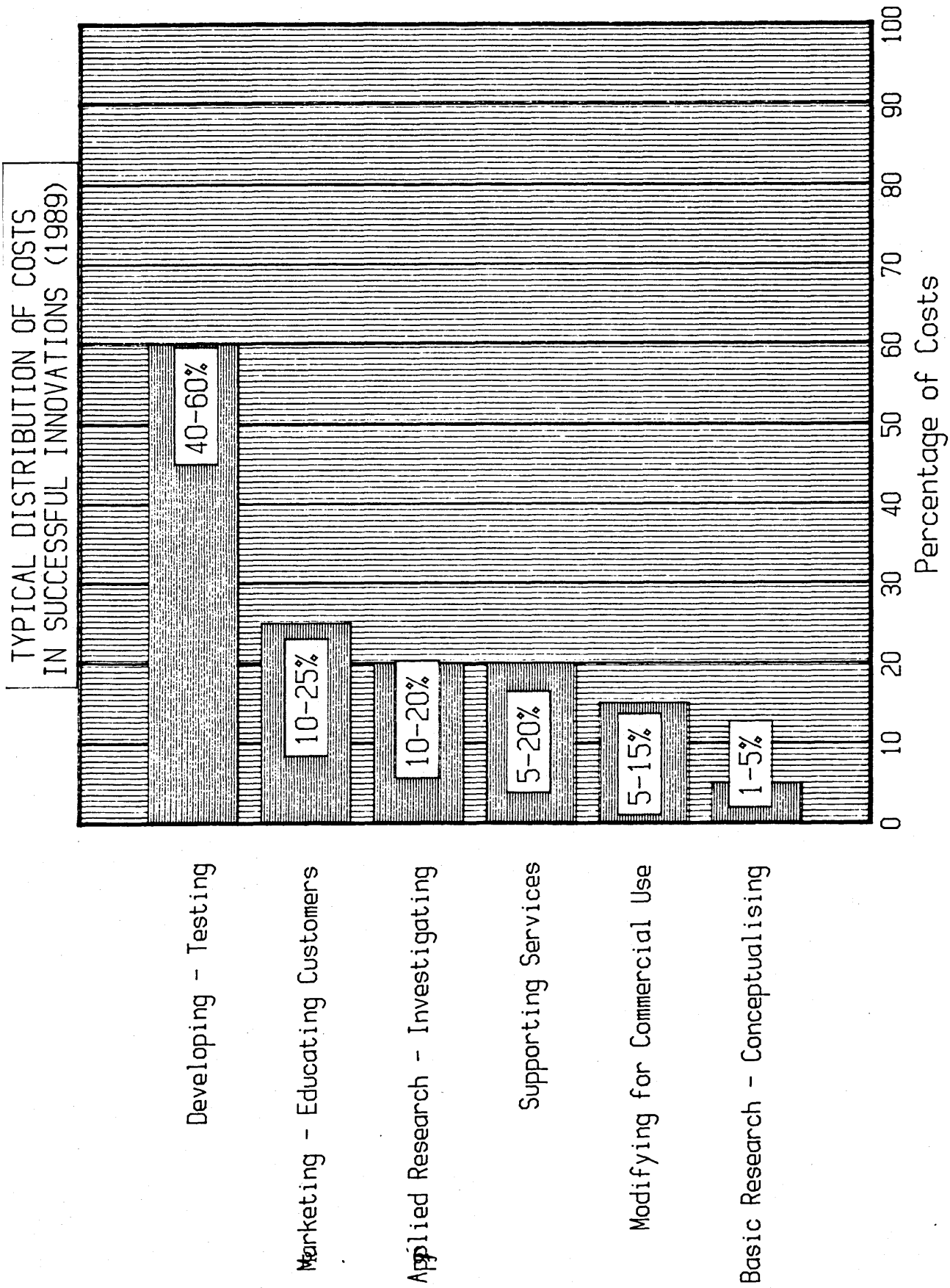
Upon the face of these, we observe that the high ranking of innovation holds true even today, some twenty years later. However such normative strategic propositions are, at best, situational or general. They may be used to refine a strategy, but no universal propositions or contingency-based propositions have been conclusively demonstrated to be valid.

The example of Apple Computer (new to the industry) innovating to dislodge IBM (dominant firm) who in turn were able, by confronting and by innovating themselves, to beat back Apple's advances, indicates that all such normative propositions are treated with a healthy tongue-in-cheek attitude by managers. According to Katz and Glueck, it was apparent that neither IBM or Apple Computer were acting in concert to their strategic propositions. This gap between the theoretical and the empirical was further confirmed in this investigation by the following post interview held with Respondent RR, Pioneer, and manager of a Scottish-based division of a worldwide pharmacological company,

" One of the biggest changes in our strategic thinking was to stop using mathematical models or set guide lines for predicting what new market share and products were available to us... We became sceptical about relying on predictive techniques and start using current information as a basis of policy making. Naturally you make some predictions in order to establish direction but it is vital to retain flexibility to change your mind if new factors emerge or your assumptions become invalid..."

9. We observe that there is a hierarchy of costs associated with successful innovation which can be divided by descending order into five basic areas: (1) developing the concept; (2) marketing of the innovation; (3) investigating or applied research; (4) modifying the innovation for commercial use; and (5) applying basic research where the innovation is conceptualised. The literature provides a range for these costs as shown in Exhibit No. 5 on the next page.

EXHIBIT No. 5



Source : Technological Innovation Studies - HBR (Nov-Dec) 1989: 101
(USA Dept of Commerce Washington DC)

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This distribution of costs depends on whether the process reflects a technological innovation or a strategic innovation. We understand that a firm attempting to establish what costs will be associated with innovation can reasonably project that the marketing of it will absorb on average about 50 percent of all costs. However the literature is not always clear when talking about innovation costs whether it is the technical process or a managerial one being referenced.

This observation is understandable since private firms are reluctant to divulge their costs, and larger firms may be adding in overhead costs not truly associated with an innovation. There are industrial differences, and regional differences as well as how costs are accumulated and by whom.

8.1.4 The Shifts and Emerging Patterns Within the Field

We are not much better at seeing the logic of an emerging paradigm before it begins to develop than any other investigator. However we observe that in the 1990s, one may find the key assumptions in the field of strategic management type of thinking have reached the end of their useful lives, even when it is understood that most are offered to be true up to a point, or for a time. We illustrated earlier the evolutionary principles of strategic management over the past 90 years in Table No. 1. We outlined as to how each stage of its development had been heavily influenced by the way managers think and that strategy-making reflected their thinking. The four main points were as follows:

1. We believe that a shifting paradigm to a disconnected way of making strategy is underway from the deliberate all-encompassing theories for strategy-making used in the past. To establish this shift, we reviewed trends from 1900 to 1990 by examining previous managerial practices.

Table No. 1 shows that from 1900 on for the next fifty years, the focus of management shifted from acquiring and consolidating a firm's assets to one of standardizing them. In this period, products were

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largely undifferentiated and the ability to produce at the lowest unit cost was the secret to a firm's success.

This table, also, indicates that by the 1960s most strategies began to embrace the market orientation phase of management, and how consumer-retailing, services, and technologically-dominated industries began to promote the virtues of strategic management, planning and strategies to control their business environments. By the early 1980, the structure and dynamics of the business environment started to change so rapidly that planning, and efforts to control one's environment, became futile.

We observe that firms are now becoming so increasingly confronted with novel and unexpected challenges that are so far-reaching that Drucker (1985) called this the new era of business as the "Age of Discontinuity". Today, change continues at a pace which makes it safe to predict that the current escalation of environmental turbulence will persist for another 10-15 years. This has become the age for a firm to innovate or perish. These shifts became very noticeable when the post interviews were being conducted. There, some managers indicated a few shifts which were not discussed in the literature on strategy-making such as training, work force shrinkage, and corporate entrepreneurial programmes.

2. We observe a shift due to the change in the product life cycle as it affects strategic thinking. Respondent KK, who talked above on the shift in how the product life cycle works, when asked what in his view were the implication of this, he stated,

"...We, as other companies, are being forced to manage differently. Our strategy is to get the product earlier to the market and to increase the profitability at the front end, by having increase innovation amongst the workforce is the answer. By extending technology from the efforts of employees straight through to the customers we gain market share and it differentiates itself".

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3. A different attitude is emerging within the managerial ranks on how the labour force is viewed. It was implied in most strategies from the past that people and their skills could be purchased in the quality and quantity to match the needs of the strategy as it unfolded. Respondent ZZ, Dependent, a manufacturer of parts for the automotive industry states

"Due to the predicted shortfall in school-leavers in Scotland over the next five years, our firm for the first time in my working life (28 years) is starting to believe that our labour force is not easily replaced. It now make economic sense for us to invest time and money in building up the skills and commitment of the individuals even though the pay-off is long term. In the past we laid-off people at will and would buy them again when we needed them. But now our strategy is to recruit, train, develop and try to keep them with us for a 25 service record. We now hire the type of employee that we used to discourage...No more shopping for skills at the local market, our people are going to be home-grown".

4. We observe that the creation of a single market in Europe by the end of 1992 will accentuate the need for a new paradigm for strategy-making for some 45 industries directly and many others indirectly (Rajan,1990). Creating a rise in human ingenuity to innovate may become the most critical factor in business strategy, alongside capacity restructuring. A fact that has yet to be fully recognised by the business and educational communities. This is the most serious threat to the value of a deliberate long term strategy being used for efficiency and dominance by market share.

The best example to project what could happen is the experience of the tariff-free motor vehicle industry in Europe over the past decade. It resulted in fewer producers, concentration of capacity at fewer locations, a range of customised products (or services) on the same production lines, using more advanced technologies that minimalise down-time between product lines. Their object would be to achieve economies of scale with customised batch outputs.

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This resulted in a different type of strategic thrust being underpinned by more research and development, marketing, distribution and financial strategies than ever before as an industry pattern. This is complicated by an increase in the skill content of work over the whole research-design-production-distribution cycle. This is likely to continue to obtain even shorter product life cycles in the future.

There are at least six indicators of the response to this shift:

1. Changes in work design, leading to the performance of many functions by one person through the efficient use of existing technologies.

2. Changes in the organisational design, leading to flatter structures and more flexible rules, will be given to those in skill-intensive, knowledge-based occupations to innovate around and through organisational rules.

3. Changes in the repertoire of skills, making it wider and deeper in terms of their number and intensity. There will be a need for more strategic elements to be built into the formulation process of corporate strategies to combat occupational obsolescence.

4. Changes in the personnel function, leading them to have a greater role in the formulation of strategic goals. A pattern being used by firms such as Honeywell (post interview indicated that they conduct talent surveys to ensure they have the right mix of talent to implement a planned strategy) and the electronics industry in general, which will be emulated in other industries worldwide.

5. Changes in the training emphasis, resulting in a multi-strand approach that develops critical competences beyond learning by doing. This would include experimenting on the job, and freedom to work on part of the company time to own your own ideas.

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6. Changes in rewarding the more innovative employees, leading to the use of a corporate entrepreneurship programme to identify, encourage and retain the more innovative employee to innovate under bureaucracy-free corporate subsidiaries or in spin-off firms.

8.2 FINDINGS FROM THE FIELD-BASED SURVEYS

In this investigation we conducted a broadly-based survey to business unit managers, corporate planning directors and managing directors using a questionnaire as shown in Exhibit No. 1. It was geographically-limited to reflect the views of international and domestic firms operating in Scotland. At this point we can report on the following five major findings:

First, most companies (84.0 % overall) in our sample of 190 firms remain firmly committed to some type of operating business plan, even though only 54 percent have a formal strategy for innovation as shown in Exhibit No. 2.

Second, there were 21 different strategic elements which were identified as enabling factors for the stimulation of innovation.

Third, 103 firms identified themselves as users of formal strategy for innovation and a mission to innovate was an essential part of their own corporate strategy. Thirty one of these firms were highly innovative.

Fourth, 92.2 percent of the users of a formal strategy to stimulate innovation reported that they had some type of innovation accomplishment over the past three years. In contrast, only 18.2 percent of the non-users of a strategy to innovate reported any type of innovation being accomplished in the same period of time.

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Fifth, 158 firms could be classified into a typology of seven different technological strategies using measurable attributes as to how they formulate, implement and monitor their strategies.

As a theoretical backdrop to the interpretations and exploration of these findings, the following assumptions were made:

8.2.1 ASSUMPTIONS

We assume that innovation is necessary and good for the survival and growth of a firm.

In the preceding chapters, we explored a number of elements which were reputed to be the essential forces and influences that determined the strategic behaviour of a firm in its effort to stimulate innovation. After identifying these elements, we conducted a survey to gather an empirical insight into how these elements were being used by firms operating in Scotland.

We subdivided these elements into two groups: external and internal factors. The first are more properly called environmental elements (Chapter Five) since they reflect the resources and information about future innovation coming from the environment into a firm.

The second set of elements were internal (Chapter Six), which reflects the choices available within a firm based on the performance and culture aspirations of its managers; the power and responsibilities delegated by a firm's structure; and the combination of strategies needed to channel the behaviour of its workforce.

In total, these elements represent a firm's strategic thrust to be innovative by seeking a fit to different levels of environmental turbulence as shown below in Table No.10.

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TABLE No. 10: Levels of Environmental Turbulence

Levels of Turbulence:	Stable	Stable and Changing	Reactive-low Uncertainty	Reactive-High Uncertainty	Very High Transitional
Market Structure:	monopoly	oligopoly	oligopoly	Multi-tiered	Unknown
Customer Pressure:	none	weak	strong	very strong	sporadic
Growth Rate:	slow	increasing	oscillating	accelerating	discontinuity
Product Life-Cycle:	long	long	short	shorter	shortest
Economies of Scale:	high	high	moderate	low	low
Frequency -New products:	very low	low	moderate	high	very high
Critical Success Factors:	market control	market share costs	response of key buyers distribution	opportunities new market	new needs novel

adapted from Littler, 1989; Burgelman, 1984; and Ansoff, 1979

Table No. 10 indicates as to how the five different levels (ranging from a stable level of turbulence to a transitional one) affect market structure, customer pressure, and so on. We observe that the strategic focus must be adjusted to three key areas: (1) economies of scale; (2) the frequency that a firm should offer new products; and (3) critical success factors needed to be innovative.

8.2.2 Assumptions About The Firms to be Surveyed

In an effort to measure a firm's attempts to be more innovative, we have assumed the firms to be surveyed have the following common features:

1. Sell products or services to a buyer for profit.
2. Buy their resources from a pool of suppliers
3. Need a body of knowledge called technology
4. Obtain most of their workforce from Scotland.

Also, we have assumed that most of the firms to be surveyed would welcome an improved performance from their present position to a more desirable one, no matter how small or how large. We project that when a firm seeks an improvement of any type, this constitutes an opportunity gap. The closing of this gap has the following dimensions:

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1. Innovation is one of the choices available to a firm, but it is the best option; even though, it is the most difficult to achieve;
2. If a firm fails to be innovative at some stage in its corporate life, over time, it will receive either a reduction in profits, or suffer a decline in its market share;
3. A firm can never start too early in stimulating acts of innovation amongst its workforce;
4. A firm can start too late because its human and financial resources will start eroding away in a declining industry.

8.2.3 Assumptions about the Strategic Elements

In exploring the stimulation of innovation as a gap closing opportunity, we assumed that people will resist attempts to innovate unless they perceive a reward for a change in their behaviour. Further, we assumed that a formal strategy would deal with the following elements (variables):

1. Environmental need (buyers/markets)
2. Structure for innovation-investigating and assisting
3. Strategic culture
4. Visionary leadership
5. Information processing
6. Managerial and logistic capabilities
7. Behaviour strategies to combat obsolescence
8. Goal-setting
9. Problem-solving

Based on these variables as determining elements for innovation, we assumed that each element would work under any of the following conditions:

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1. Whether the environment is in a stable condition for certain firms (requiring defensive innovation), in a high level of uncertainty requiring innovation investigating, or in a state of transition to a new level of opportunities requiring a more offensive innovation;
2. If the resources in firms were in scarcity or in surplus to support a strategic thrust;
3. That the leadership is creating a culture that is innovation-investigating and seeking;
4. Whether the innovation investigating activities (R&D, ventures, etc.) were either centralised or decentralised;
5. Whether the core skills of a firm were up-graded or gradually eroding while a firm was trying to stimulate its workforce into innovative behaviour.

8.2.4 Assumptions about Strategic Thrust of A Firm

We assume that each firm must develop some type of strategic focus. This focus would reflect the mission of a firm and should attempt to match one of the five technological strategies which is the most suitable to create a given strategic thrust based on one of the levels as shown in Table No. 11 below:

Table No. 11: Levels of Strategic Focus

Strategic Focus:	(1)	(2)	(3)	(4)	(5)
Its strategy:	Defensive	Offensive	Adaptive	Diversifying	Innovative
Its thrust:	Protecting	Expanding	Controlling	Scanning	Stimulating
Goals:	Stability	Growth	Coordination	New Markets	New Products
<hr/>					
Firm's life-cycle:	growth	rapid growth	stable growth	decline	revitalised
Growth rate:	sporadic	accelerating	slowing	fast	steady to fast
Changes-Technology:	slow	slow	fast	accelerating	unknown-novel
Rate-Obsolescence:	slow	slow	moderate	high	very high
Firm Structure:	simple	centralised	decentralised	geographic	matrix-project
Management Style:	personal	directive	delegating	Analytical	participative
Control System:	profit-led	standards	cost centres	5yr. plan	goal-setting
Types- Technology:	none	few	moderate	high	very high
Reward System:	ownership	on merit	bonus	stock options	team bonus

Sources: adapted from Burgelman, 1984; Greiner, 1973; Chandler, 1962; and Channon, 1973

8.3 GENERAL CATALOGUE OF RESPONDENTS

The data was captured into five broad sets of elements using the survey instrument as shown in Exhibit No. 1. Earlier, the scope of these sets was explained in Chapter Seven and in Appendix D.

We placed the bulk of the data from this first survey in Exhibit No. 2. There, the data is dispersed across 66 different fields and divided into two major headings: (1) showing how the users of a formal strategy to innovate responded; and (2) to contrast how non-users of a formal strategy responded. Their overall responses by strategy of the respondents are shown in Figure 8.2.

The general catalogue for the 190 respondents is as follows:

The breakdown of all responses indicates that 87 of them were from Scottish firms (45.8%); 50 were from firms with parent companies in North American (26.3%); 39 were from United Kingdom Firms (20.5%) with headquarters based elsewhere in Britain; and 14 were from European and Overseas firms (7.4%) located outside the North America. This is indicated in Figure 8.3 to follow and as shown in Table No. 6.

The number of respondents classifying themselves as users of a formal strategy were 103. In general they were from mid-sized firms in the 301 to 1,000 employment banding. The mode for the position held by these respondents was that of a Managing Directors/CEO representing 65 percent of this group (Exhibit 2:1).

The number of respondents classifying themselves as non-users were 87. They differed from users by a greater number of

Figure 8.2: STRATEGY COMBINING BOTH USERS AND NON-USERS

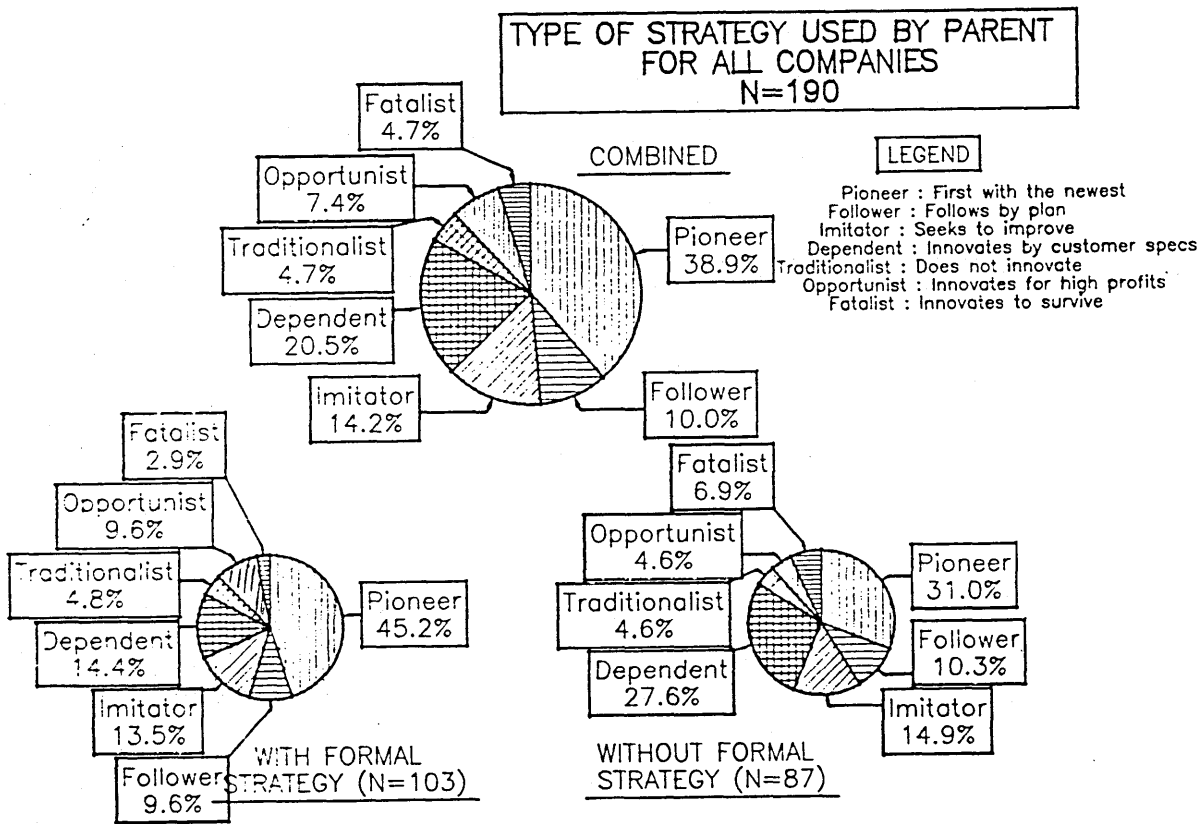
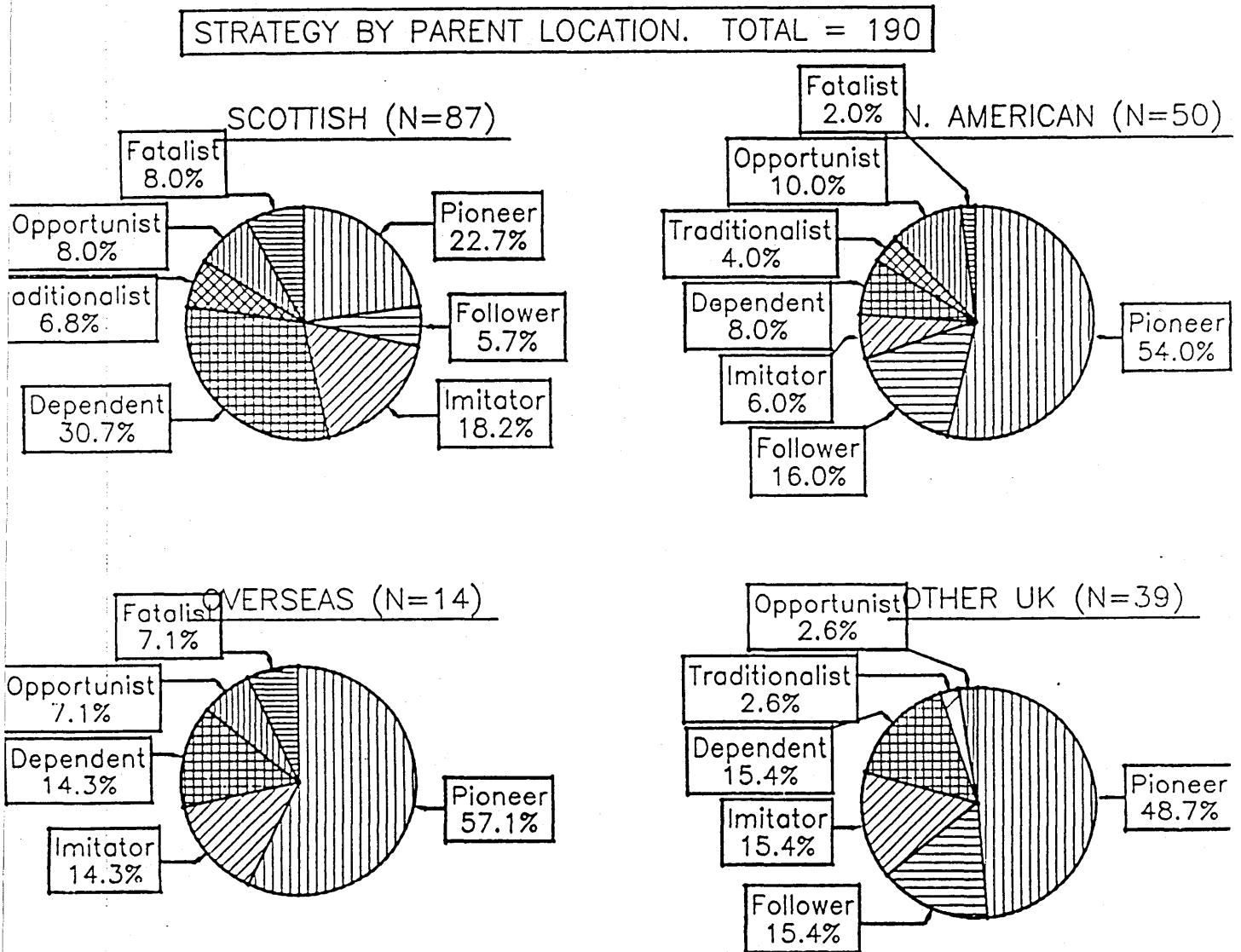


Figure 8.3: TECHNOLOGICAL STRATEGY BY PARENT LOCATION



specialists and chairmen reporting. We observe that this may be representative of this group due to its mode size of less than 300 employees and the fact most of them were closely-controlled from Scottish Firms (55.2%).

The stratification by ownership and employment banding indicates that the mean size for a reporting unit was 600 employees and the mean size for a parent company was 2,750 employees. The largest reported parent had 700,000 employees and the smallest had 51 employees. The mean age of firms reporting was 35.7 years. The mode of size for all firms was 51-300 employees as reflected in Table 7.

8.4 CATALOGUE OF STATISTICAL FINDINGS BY NATIONALITY AND STRATEGY

We thought it may be useful to divide the responses by typological groupings based on nationality and type of strategy that each respondent self-selected as describing themselves, foremost. Specifically, by group they were:

8.4.1 Scottish Firms' Respondents

The Scottish group (n=87) had the highest percent of (18.2%) firms classifying themselves as "Imitators". This is where a firm seeks "to improve an existing innovation to fill to a demand within a specified niche" as its overall strategy.

Over 30 percent of the Scottish National firms (n=87) were more likely to describe their overall technological strategy as "Dependent". This description was used when a firm "innovates to customer specifications" rather than engages in R & D. This self-nominating description was reported to be three times more often than the North American firms, double that of Other Overseas firms and other British Nationals.

Approximately 13.7 percent of the Scottish firms indicated they were users of a formal strategy, and 22.7 percent of them classified themselves as "Pioneers". This is an overall strategy to "be the first with the newest". This business-marketing strategy exhibited itself (formally or informally) by the desire of a firm to be the first to try new lines, products or processes; to use bold strategies to develop new products for new markets; and to finance high risk projects to gain a competitive edge over competitors.

The Scottish firms as a group had less firms which classified themselves as "Pioneers" than any other nationality parent-owner. This group represented less than half the percentage of similar groups found in Other Overseas or North American firms. Of the 14 percent of the sample (N=190) which indicated a high rate of being innovative, Ten were Scottish Nationals. They were centred in the areas of manufacturing engineering, pharmaceuticals, and electronics.

The Scottish respondents (61%) registered lower than the responses of N. American firms (82%) or Other Overseas Firms (72%) in how important they thought expansion into new markets and the development of new products were for their survival over the next three years. Only other UK firms indicate the lowest response as a group (58%) compared to the Scottish respondents.

8.4.2 North American Firms' Respondents

The North American firms (n=50) have the second largest numbers of users (n=31) and the largest number of firms (n=27) selecting the "Pioneer" as their foremost strategy. These firms as "Pioneers", however as a percentage of their group (54%) ranked below those in the Other Overseas Firms. The reporting unit size's mean was 800 employees, some 200 employees more than the mean of all respondents.

The North American respondents had the largest percent of firms selecting the "Opportunist" at 10 percent of their responses. This is the strategy where a firm seeks "to innovate in the expectations of receiving a higher than normal amount of profits". Out of the firms ranked as being the most innovative, eight were North American firms.

8.4.3 Other U.K. Firms' Respondents

This group of other than Scottish firms with headquarters in the United Kingdom had the third largest group of pioneers.

We observe that Other UK respondents (n=39) were different from the other groups by the complete absence of any firms which classified themselves as "Fatalists". This strategy is where the firm believes it must "innovate to survive". This is generally selected when a firm views itself in a extremely competitive position but without having either a government or a dominant size to protect it.

The mean of the Other United Kingdom firms' size was 700 employees and about 100 employees more than the overall mean for all groups. Three of this group were rated as being innovative overall.

8.4.4 Other Overseas and European Firms' Respondents

In this group no respondents viewed themselves either as a "Follower" or as a "Traditionalist". The Follower's strategy is a where a firm selects to "follow by a deliberate plan not to be the first to offer an innovation". On the other hand, the strategy of a Traditionalist is used when a firm prefers "not to innovate, but to incorporate tested and proved methods to improve efficiencies". These are generally used by high volume, mass producers of products and services.

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However we observe that others within this group, by contrast, registered the highest percentage (57.1%) of Pioneers within any of the groups reporting.

The Other Overseas firms were the smallest group by a percentage of the aggregate to classify themselves as users of a formal strategy to innovate (6.8%). We observe that the mean of their reporting units at 275 employees was considerably lower than the overall mean of employees for all groups reporting. The users of a formal strategy to innovate indicated a higher than average (mean) years for using a strategy at 14.9 years versus 3.4 years for all groups as a whole. Five of this group were rated as most innovative.

8.5 CATALOGUE OF STATISTICAL FINDINGS FOR ALL FIRMS

The statistical findings which reflected empirically the responses of the overall survey can be grouped accordingly:

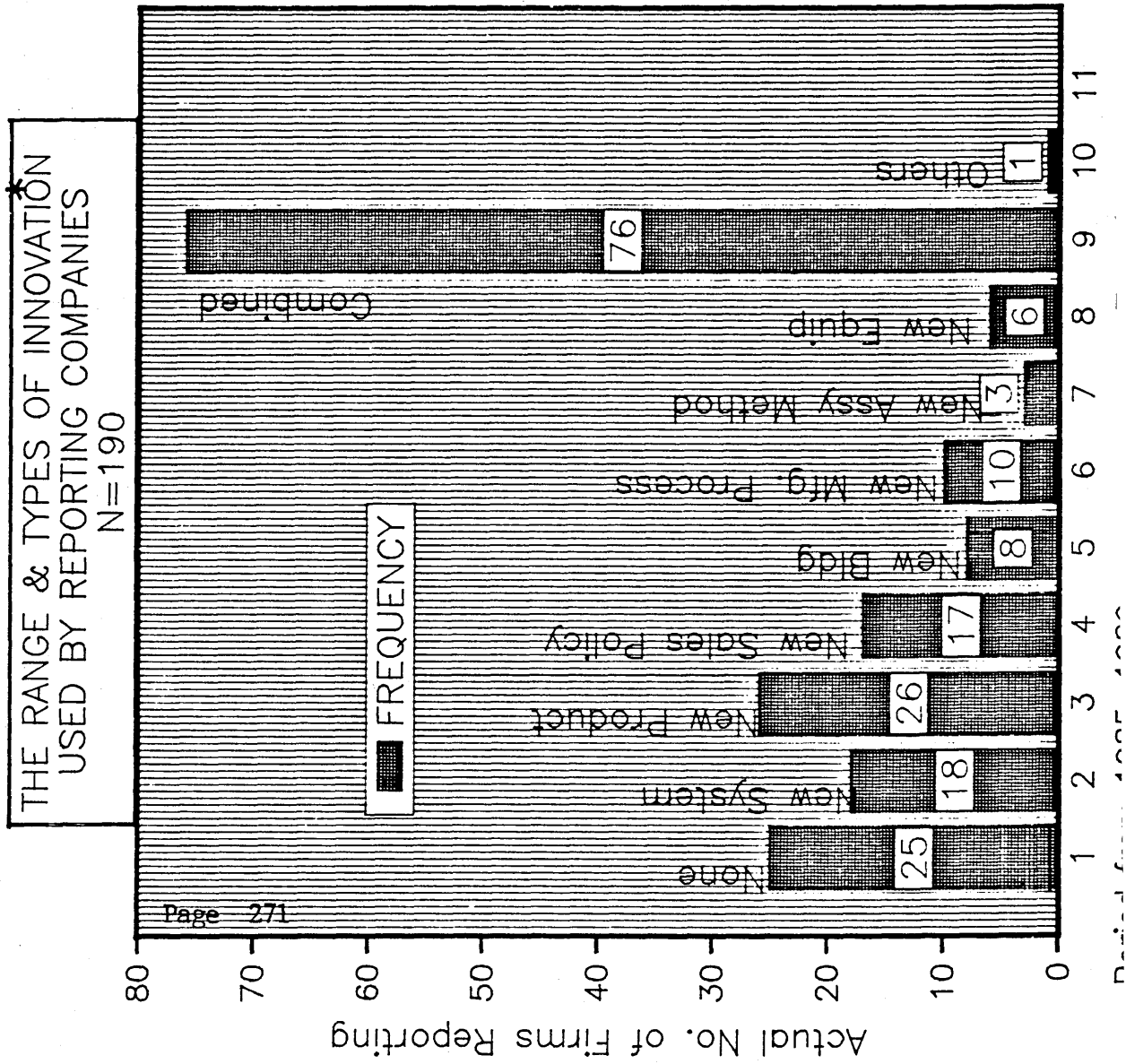
8.5.1 The Range and Types of Innovations Reported

Over 55.2 percent of all firms reported that sometime in the past three years they have accomplished some type of innovation. We observed that this may reflect a bias as those firms with something positive to report were more likely to respond to the questionnaire. The ranking of ranges and type of innovations is shown in Exhibit No.6.

However we observe in Exhibit No. 2:9-11 that the users of the formal strategy (92.2%) reported a five times greater receptiveness to innovate than non-users (18.2%). The reasons for innovation indicate that the users will innovate in a combination of ways and were more likely to innovate to reduce costs and to protect their markets than non-users.

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EXHIBIT No. 6



8.5.2 Ways in Which Firms Analysed Their Organisations

The questionnaire probed nine different ways in which firms could analyse their organisations. As shown in Exhibit No. 7, the number one method reported by frequency was "that of comparing outputs to a formal plan". Over 70 percent indicated this was used by them. However, it was more likely to be done by a Scottish firm than, for example, by an overseas firm.

Most of the nine methods ranked in descending order were fairly representative of the sample except the assigning of a special department to analyse a firm's strengths and weaknesses; using outside experts and reviewing trade publications to determine how they did against others in the industry. Exhibit No.2:12-19 reflects the differences by contrasting users with non-users.

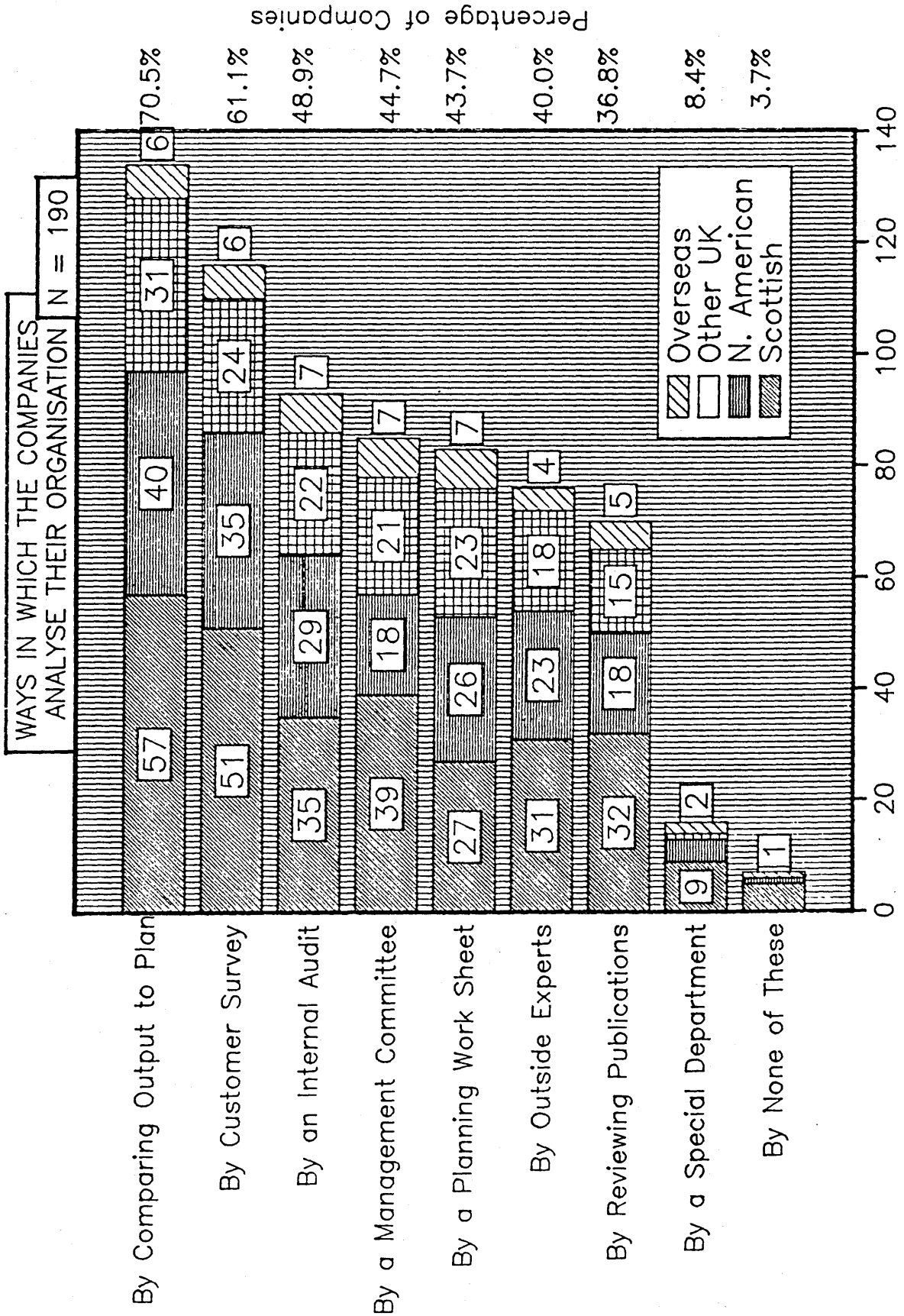
8.5.3 How and Where Firms Projected their Needs for the Future

The literature revealed six approaches a firm could use to project its needs for the future. We observe these areas reflect the ranges and ways that a firm could use to do its planning. They were key indicators of a firm's strategic thrust.

There was an overwhelming agreement that both users and non-users, use financial measures, equipment, and manpower needs in planning their future as shown in Exhibit No. 8. We observe that the literature on strategic management did not reflect the importance to manpower planning that our sample did. In Exhibits No 2:31;33, we observe that the users planned for marketing activities and efforts to incorporate technological advances were significantly different from those of non-users. Users (by some 20 percent) were more likely to plan for marketing, and will plan to incorporate technological advances by more than 23 percent than non-users.

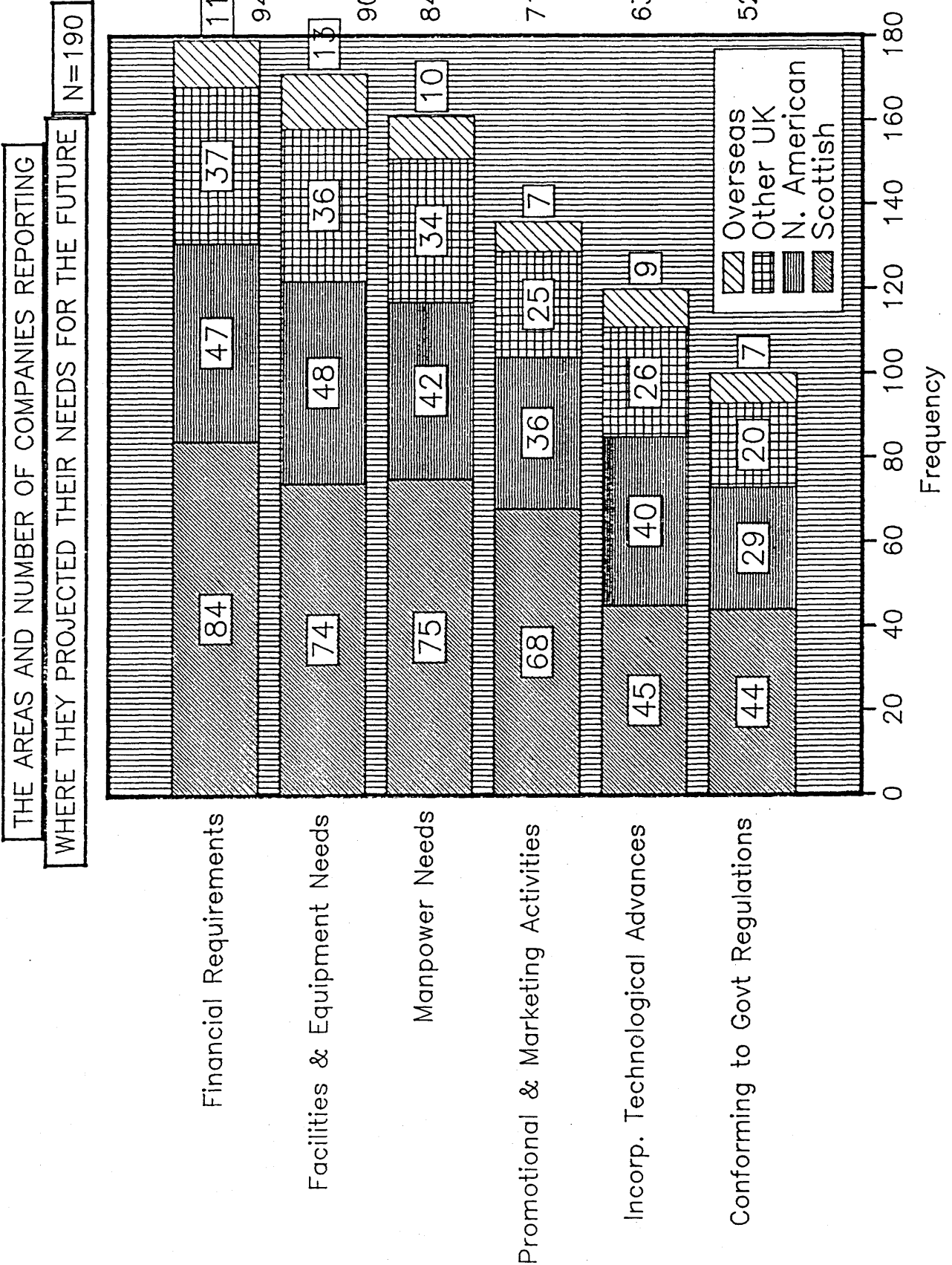
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EXHIBIT No. 7



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EXHIBIT No. 8



8.5.4 What Were the Most Important Factors Needed to Be An Innovator

We listed some ten factors reputed in the literature which are needed for a firm to be a successful innovator. This is shown in Exhibit No. 9. Only the factor (Strong Visionary Leadership) received a 30 percent rating as being the most important when considered to others.

We observe that the range and dispersion of the factors listed indicated that there is not "one best way" used by the managers surveyed. However in Exhibit 2:45, we observe that users selected leadership and the use of a formal programme to innovate over non-users by a measurable difference. The higher percentages (approx. 8%) of non-users selecting small work groups may reflect the domination of smaller firm size or a general industrial practice.

8.5.5 The Best Way To Motivate Employees In being Innovative

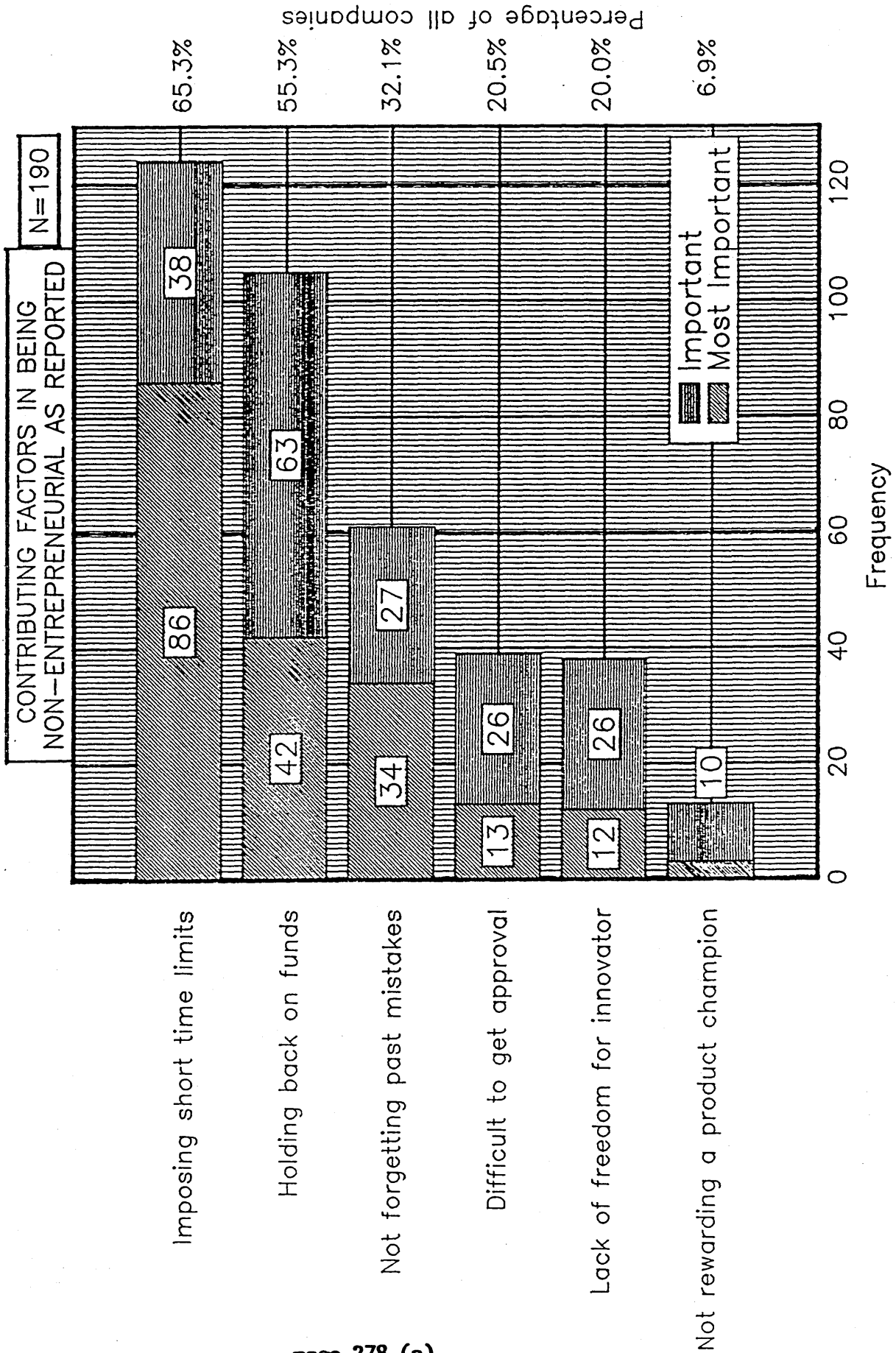
Dispersed throughout the questionnaire were 14 different methods reputed in the literature as ways to motivate an employee in being more innovative as shown in Exhibit No. 10.

These were placed in juxtaposition to other methods to see if one best way would rank overall. The two methods used by most firms and ranked as most important were: (1) to attract proven entrepreneurial types into the workforce; and (2) to engage in open communication in solving problems.

3M Corporation was the only firm in the sample which used all 14 methods. Firms which used 11 or more of the 14 methods available were Hewlett Packard, Digital Equipment Corporation, Wang Laboratories, and Glaxochem.

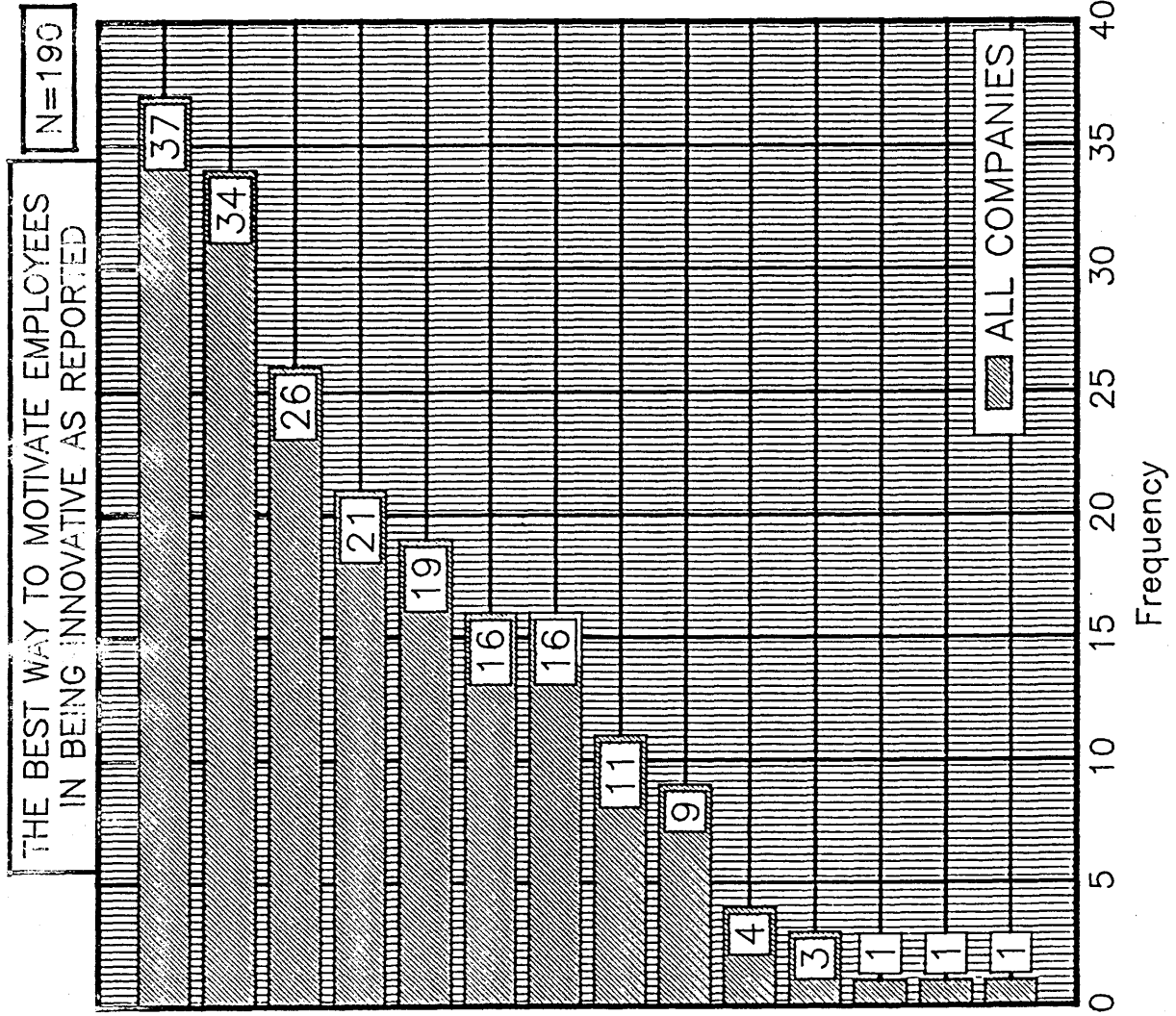
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EXHIBIT NO. 9



Observations and Findings- Chapter Eight

EXHIBIT NO. 10



Attract proven entrepreneurial types
 Open communication on problems
 Bonus rewards to employees
 Recognise formally efforts
 Nurture product champions
 Boss encourages others
 Small groups & goal setting
 Promote problem-solvers
 Off-site training
 On-site training
 Job rotation & self-design
 Funding employee's ideas
 Outside experts
 Give time to develop ideas

8.5.6 What Were the Key factors Reported For Successful Innovation

The literature indicated there were 12 key factors that successful innovators exhibited. They were listed throughout the questionnaire. As the results show in Exhibit No. 11, it was the monitoring of customers' needs which was reported by over 41 percent of firms surveyed as the leading key factor. The second ranking factor was the use of entrepreneurial leadership at the top as reported by 51 firms.

We observe in Exhibit 2:56 that there were significant differences (about 20 %) between users and non-users in two leading factors: how customers needs are monitored and how important was leadership at the top.

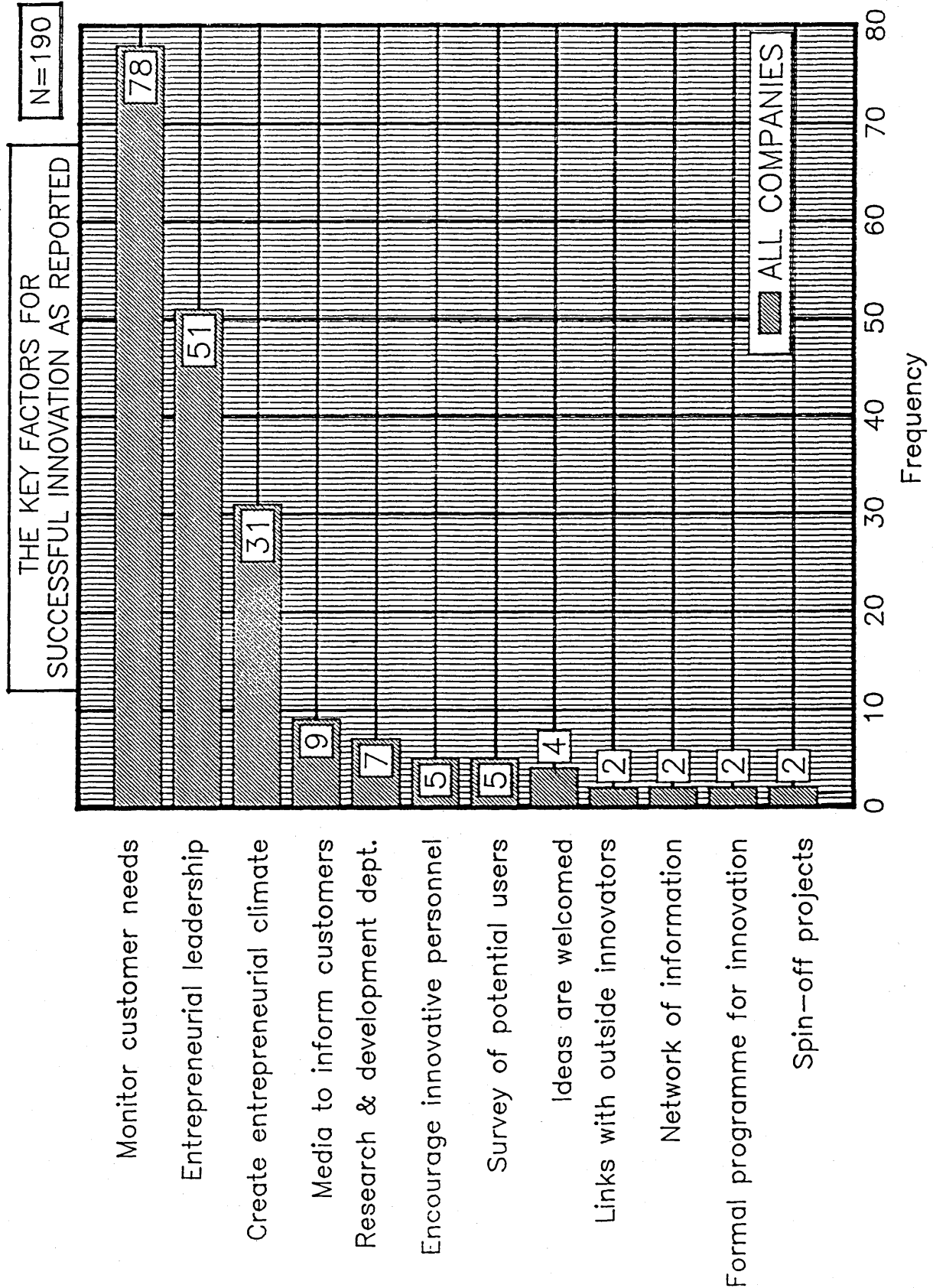
We observe the close relationship between leadership and culture when a firm was creating an entrepreneurial culture. The major difference being that entrepreneurial leadership reflects current operating methods and culture is generally established by the history of the firm over some period of time as explained in Chapter Six. The bonding of these two elements together could be viewed as the sovereign element to which Drucker (1961), who states that it is a combination of a firm's current leadership and its history that will determine how a firm views and plans for innovation. Together, they create a firm's strategic framework for future action.

8.5.7 Major Organisational Methods for Innovation

There were nine components developed to explain how firms generally operate. They were listed in the questionnaire as shown in question no. 31 in Exhibit No. 1. When the responses to this question was summarized in Exhibit No. 12 (based on a range of responses given 1 through 5), it is clear that most users and

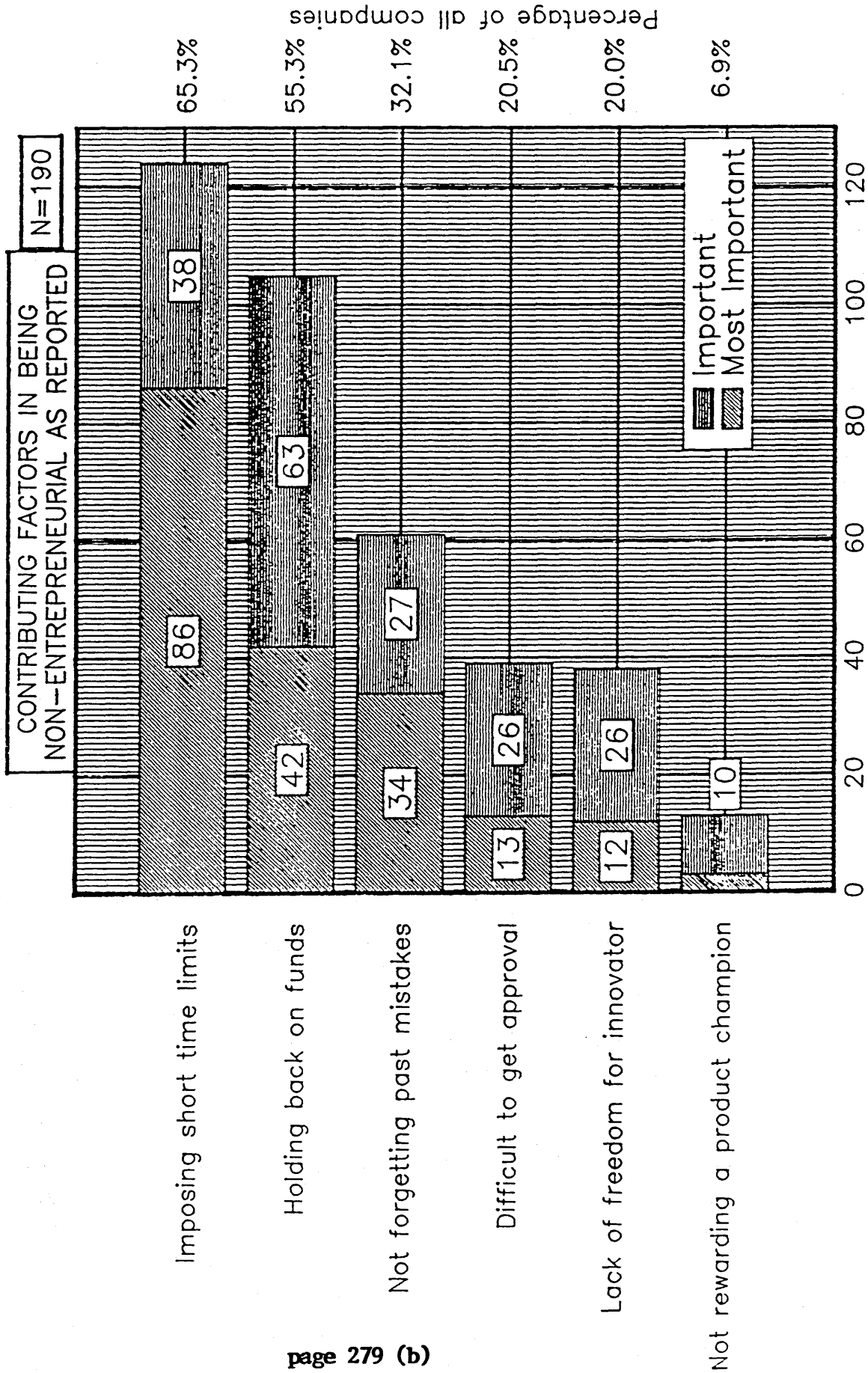
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EXHIBIT No. 11



Observations and Findings -Chapter Eight

EXHIBIT No. 12



non-users formally practice the use of operating targets. These elements indicate how decisions are made; teams are trained; marketing is done; and how results are achieved. Exhibit No. 2:65 even makes it clearer that there are certain strategic elements (clear goals, team being trained, and market opportunities are identified which register zero's) that some firms never expect to use.

8.5.8 Organisational Conflicts About Issues of Innovation

There were three organisational issues related to innovation that created the most conflict amongst the respondents and further confirmed in the post interviews as shown in Exhibit No. 13. They can be separated out in several ways.

The first is whether a firm should attempt high risk projects; be first to try new lines; or how bold a strategy should be. Secondly whether any of these strategies are used informally from time to time or formally used that created the other parts of the controversy. These elements (in Exhibit No.2:65;66) reflect a firm's strategic thrust to be more innovative may cause organisational conflicts. We observe that the wide areas of differences graphically displayed indicate whether a firm would formally or informally use them.

8.6 MANAGEMENT AND ORGANISATION PREFERENCES

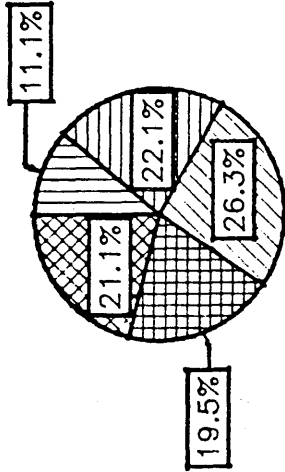
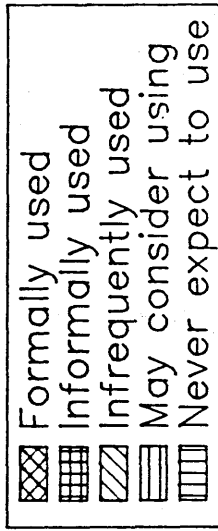
Respondents were asked to indicate how they mostly-managed their tasks, and whether their tasks were centralised or decentralised. We observe in Exhibit No.2:58-59 that a significant percentage of non-users (about 16 %) used a traditional method. The overall responses indicated that whether or not tasks were centralised or decentralised to stimulate innovation depended on if a R & D department was used, as shown in Table No. 12.

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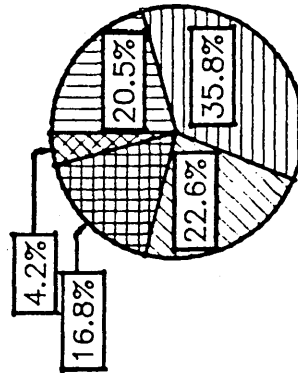
EXHIBIT No. 13

ORGANISATIONAL CONFLICTS
ABOUT ISSUES OF INNOVATION

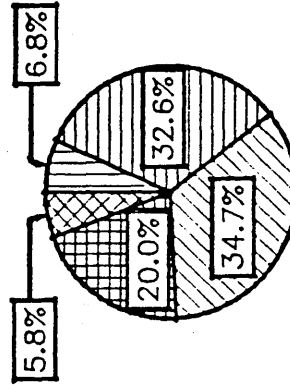
N=190



FIRST TO TRY NEW LINES



HIGH RISK PROJECTS TRIED



BOLD STRATEGIES USED

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Table No.12: The Types of Organisation and Management Used By Respondents

Parent:	Discipline Technical	Project Management	Traditional Managed	Venture Directed	Matrix Used	Row Total
Scottish:	22	17	33	3	12	87
Row %	25.3	19.5	37.9	3.4	13.8	45.8
Col %	45.8	38.6	56.9	60.0	34.3	
N. American:	15	9	8	2	16	50
Row %	30.0	18.0	16.0	4.0	32.0	26.3
Col %	31.3	20.5	13.8	40.0	45.7	
Oth. Overseas:	6	3	3	-0-	2	14
Row %	42.9	21.4	21.4	-0-	14.3	7.4
Col %	12.5	38.5	35.9	-0-	5.7	
Other UK:	5	15	14	-0-	5	39
Row %	12.8	38.5	35.9	-0-	12.8	20.5
Col %	10.4	34.1	24.1	-0-	14.3	
Column:	48	44	58	5	35	190
% of Total:	25.3	23.2	30.5	2.6	18.4	100.0

Table no. 12 deals with five different types of organisations that respondents indicated they used. As determined by a cross-tabulation method, it is noteworthy that none of the Other Overseas firms or Other UK firms used a venture-directed structure. We observe that one of every three companies preferred the traditional way of management (regardless of nationalities).

To see the impact that structure has on the use of formal programs, three firms with a formal programme for combatting obsolescence within an innovation strategy were interviewed. It was revealed that one was generally managed by a venture style in which each employee had a voice and a financial stake in what idea/project may be funded. However, two of other respondents interviewed indicated they used a matrix style organisation where projects and functional disciplines had dual controls.

8.7 THE IMPORTANCE OF TRAINING ACROSS NATIONALITY BY OWNERSHIP

Based on interviews it became apparent that there are major differences in how training to stimulate innovation amongst the respondents was viewed. In Exhibit No. 1, they were elements listed in questions No. 13 (f) and 28 (f).

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We observe that only 4.2 percent of the sample indicated that it was the most important factor and the question arising as to whether employees really could be motivated by training, since only four firms ranked it as one of the most important of all factors listed. Secondly there is little difference as to how users and non-users ranked training in Exhibit 2:45. However, interviews with three users indicate that training was most important to their overall strategies.

In an effort to understand the degree of differences between sample responses and views expressed in the interviews on training, a cross-tabulation was done using nationality and training elements in questions No. 31 (f); 13(f); and 28(c) as shown below in Table No. 13.

Table No. 13: If a Firm used Formal Training to Stimulate Innovation and How Ranked in Importance To Motivate

Parent:	<u>Did not Use or Expect To</u>	<u>Most Important Used in Strategy</u>	<u>Very Important Used Informally</u>	<u>Important May Use</u>	<u>Row Total</u>
Scottish:	74	1	4	8	87
Row %	85.1	1.1	4.6	9.1	45.3
Col %	50.7	12.5	22.2	44.4	
<hr/>					
N. American:	37	3	9	1	50
Row %	74.0	6.0	18.0	2.0	26.3
Col %	25.3	37.5	50.0	9.1	
<hr/>					
Overseas:	11	-0-	-0-	3	14
Row %	78.6	-0-	-0-	21.4	7.4
Col %	7.5	-0-	-0-	16.6	
<hr/>					
Other UK:	24	4	5	6	39
Row %	61.5	10.3	12.8	15.3	20.5
Col %	16.4	50.0	27.8	33.3	
<hr/>					
Column:	146	8	18	18	190
% of Total:	76.8	4.2	9.2	9.2	100.0

Table No. 13 attempts to indicate whether there was a positive association between certain types of Parent firms (being N. American, Other Overseas, UK and Scottish), the training given to employees, and a firm's receptivity to innovation. The table indicates that eight firms used training as a part of their strategy, but 76.8 percent did not. We observed that the second vertical column reveals that none of the overseas firms thought training should be used in strategy. Equally revealing is the highest percentage in the first

column where a dominant percentage of the sample indicates they did not use training as part of their business strategy or expect to at any time in the future. This is why another survey was launched.

8.8 ATTITUDINAL SURVEY TO TEST TRAINING ISSUE

To probe further the issue of training and a relationship between the orientation of the firm toward being innovative, a second questionnaire was developed as shown in Exhibit No. 3. From 130 mailed, there were 105 returned: 74 users and 31 non-users. However before we could accept the responses of this sample as to how they viewed training related to the stimulation of innovation regardless of whether they were a user or non-user, it was necessary to assess their orientation toward being innovative. The Varimax rotation procedure was selected as a method to assess their orientation toward innovation using the statements as described in Exhibit No. 3.

Using a statistical research method to measure innovativeness (Pavitt, 1982), we believe that there are three different factors to measure a firm's receptiveness toward innovation. The first factor would be a firm's attitude to change in general. This factor would be exhibited by the way things are done in a firm; whether policies are changed to match a new situation; the degree that new ideas are tried out; and how quickly decisions are made.

The second factor is a firm's orientation to the future as measured by one of the following: (1) people are encouraged to talk about the future; (2) the firm tries to incorporate the latest discoveries in the way that the firm is run.

The third factor indicates the overall importance a firm attaches to new product development; and the development of new methods in general. We believe that an assessment of these three factors would determine a firm's receptivity toward innovation. This was the purpose of Table No. 14 below:

Table No. 14 : Attitudinal Survey on Orientation of the Firm
 Respondents (n=105)

<u>Statement</u>	<u>Factor 1 Attitude To Change</u>	<u>Factor 2 Future Orientation</u>	<u>Factor 3 New Product Development</u>
There are conventional ways of doing things in our firm which rarely change.	-0.735		
In our firm, policy changes occur slowly.	-0.594		
Quick decisions and actions are not characteristic of our firm.	-0.616	.544	
News ideas are always being tried out here.	.616		
The setting up of unusual plans is encouraged here	.566		
The latest discoveries make few changes in the way this firm is run.		-0.486	
Most people in our firm talk about the future.		-0.571	
Our employees are encouraged to adopt a long-term outlook.		.629	
For our firm the development of new products is of secondary importance.			-0.771
New product development ranks high in our firm's priorities.			.709

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In Table No. 14, we observe that the three highly interpretable factors were extracted, together explaining 49.6% of the total variance.

Factor 1 (a firm's attitude to change) accounts for 23.7% of the variance and describes the firm's overall attitude to change: virtually all the variables associated with this factor described the different aspects of the receptiveness of the firm to change.

Factor 2 (a firm's future orientation toward being innovative) explains 14.6% of total variance, which loads heavily on variables relating to the orientation of the firm towards the future. We observe that factor 2 determines whether a firm, probably, has a formal strategy for innovation or a mission statement to be innovative, a characteristic of a user.

The positive loading of the (negative) statements relating to the speed of decision and the action are consistent with the firm taking bold steps toward being innovative. We observe that this loading indicates the preoccupation with the future over the current and that the firm was more likely to consider the long-term decision using a trade-off of the quality of the decision with the speed of the decision-making process. This would be a characteristic of an innovative firm whether it was a user or non-user of a formal strategy for innovation. This is important since all firms earlier indicated they have achieved some form of innovation.

Finally, Factor 3 (whether a firm viewed new product development as being important) indicates the emphasis placed on a firm toward new product development. This factor accounts for 11.4 percent of the variance.

This method of factor analysis was used because its R-factor technique links groups by variables rather than by meanings. Thus, factors could be determined (objectively using the hidden relationship revealed by the Varimax rotation procedure) whether or not the users and non-users which received the 2nd questionnaires were indeed innovative. Based on the responses, the sample could then be evaluated as being dominated by innovative firms or not.

8.8.1 Motivation for Training Differences Between Users and Non-users

The issues of whether the training needs of innovative firms were different from those of non-innovative firms was first brought to our attention by a respondent firm. The respondent (Director of Employment, Manpower and Training for a large American electronic firm) indicated that "they noticed that when training individuals from other divisions that the motives of those from an innovative unit were different from a "dead -end" unit". In order to observe whether users tend to have a formal programme for innovation and skills updating in contrast to non-users, who used only formal courses to combat obsolescence, Table No. 15 was constructed from the question no. 11 of the 2nd questionnaire in Exhibit No. 3.

**Table No. 15 : Contrast between Users and Non-users
On Motives for Taking Training**

Question: " How important was each of the following motives (five were listed) for taking a course?" Mean score of a five -point Likert type scale from 5= always to 1= being not important at all.

*** indicates a T-test with a probability p <0.01

Element Code	Motives Listed	Mean		t-test
		Users (n=74)	Non-users (n=31)	
Alupdate	To update existing skills	4.10	4.07	***
Aladd	To add new skills	3.98	4.58	***
Alchance	To improve chance of promotion	2.02	2.70	****
Alassign	To receive better assignments	2.35	3.08	****
Alacourse	Because it was assigned by firm	3.17	1.30	****
Alsponsor	Firm does not sponsor courses	-0-	-0-	n/a

Table No. 15 indicates that the mean values from the respondents in how courses were assigned in the users' case (3.17) can be contrasted with the mean value for the non-users (1.30).

We observe that the significant differences seem to be due to whether the training course was assigned in the users' case versus the view in the non-users' case that one takes a course as the only way to get better assignments. These reasons for taking a training course contrast the users from the non-users. This contrast may indicate that training does have some importance on innovation whether it is in a user or non-user's firm. This table confirms this view since all respondents (n=105) indicate that their firms did sponsor courses.

8.9 THE COMBINATION OF MOTIVATING ELEMENTS FOR INNOVATION

The literature indicates that there is a combination of elements which could be used to motivate an employee to be more entrepreneurial (innovative). There were over 14 of them which ranged from using a bonus system to sending employees away to off-site training sites.

We observe in Exhibit No. 2:63 that the ranking of these elements as the best way to motivate was determined by a scale of (1 -5); 1 being the highest. Certain elements (Mochamp, Motime, and Moself job) provided the greatest degree of contrast between users and non-users.

The differences based on the nationality of ownership were not clear. It raised a series of questions: Does one way seem to be preferred by one group of firms with the same nationality; or are there some elements (i.e. Opstrato, Moopen and Orginfo) would appear to be endorsed equally by both the users and non-users based on nationality?.

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We thought it would be helpful to link certain strategic elements and elements which stimulate innovation and to see how they contributed toward the motivation of a workforce. For example, if the element (Opstrato) reflecting a firm's strategy with a known mission to innovate is known at levels and the way information is processed (Orginfo) and other elements were correlated. Further, would the combining of the elements for updating one's skills by formal training; training supervisors to welcome innovation; open communication; goal-setting; and small group work would indicate a pattern as how firms would motivate their workforce.

In order to determine the impact of those elements and whether the nationality of a parent company affects the way that a firm motivated its employees, Table No. 16 was constructed as shown below:

Table No. 16: Most Important Factors Given for Motivation of Innovation .

Parents:	<u>Bosses Welcome Ideas</u>	<u>Goal Setting & Updating Employees</u>	<u>Communications Open and Group Work</u>	<u>Reward For Innovation</u>	<u>Knowledge Updated Formally</u>	<u>Strategy Known at All Level</u>	<u>Row Total</u>
Scottish:	32	7	12	1	12	23	87
Row %	36.8	8.0	13.8	1.1	13.8	26.4	45.8
Col %	38.6	43.8	35.3	33.3	35.3	63.8	
N. American:	24	3	9	1	6	7	50
Row %	48.0	6.0	18.0	2.0	12.0	14.0	26.3
Col %	28.9	18.8	26.5	33.3	22.2	19.4	
Overseas:	5	4	2	-0-	-0-	3	14
Row %	35.7	28.6	14.3	-0-	-0-	26.1	7.4
Col %	6.0	25.0	5.9	-0-	-0-	8.3	
Other UK:	22	2	2	1	9	3	39
Row %	56.4	5.1	14.3	2.6	23.1	7.6	20.5
Col %	26.5	12.5	5.9	33.3	33.3	8.3	
Column:	83	16	25	3	27	36	190
% of Tot:	43.7	8.4	13.2	1.6	14.2	18.9	

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Table No. 16 is a key chart. It deals with the top motivating and contributing elements for innovation and how they relate across the nationalities of the parent companies. We observe that the way Scottish-owned firms indicate that their strategies are known at all levels contrasted significantly with the other groups. A discussion with four of the Scottish firms indicated that they have clear policies (rules) on the ways certain things are done and what the goals for their firms were.

The lack of a reward for innovation and a need to formally update an employee's knowledge (columns 3 & 4) for Overseas firms was a revealing difference between nationalities and parent company. Discussion with two of the Other Overseas firms (they were Japanese and Scandinavian) indicated that it was more a matter of culture and conformity than training that stimulates change or innovation, thus, accounting for their zero responses in these columns.

In contrast, the executives of N. American firms- Digital, 3M, and Hewlett Packard- expressed different views as to why a training was part of their formal strategy for innovation, but all stated that it was their company policies for each employee to develop a personal career plan. Key and common components between them were that each of their employee's plans had to project the amount of training scheduled for an employee. They varied only whether it was one year to five years ahead.

Table No. 16 , also, indicates how the characteristics of an innovative firm are more pronounced among those multinational firms which use HRM strategies to combat obsolescence among technical and managerial employees. It is noteworthy that none of the Other Overseas firms felt that an extra reward was expected by an employee when they engaged in developing an innovation.

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Further discussion with the two Others Overseas firms indicated that in group work the peer pressure to have answers and to contribute were greater incentives than a personal financial reward. This shows that recognition is often just as potent as financial rewards in certain cultures (Scandinavian and Japanese).

8.10 POST INTERVIEWS—MOST INNOVATIVE FIRMS

These interviews were held with those firms which were ranked as the most innovative of the 190 firms surveyed.

We used the "Leadership Rules as developed in Appendix C as a guide. These rules and how the index were formulated are discussed in Chapter Seven.

Table No. 17, below, links those elements that were ranked by the top 26 respondents as to which were the most important elements to be incorporated into a strategy for innovation.

Table No. 17: What Elements were Used In A Strategy To Stimulate Innovation
As Components In a Firm's Overall Corporate Strategy

<u>Ranked Most Important By Top 26 Firms</u>						
Parent:	<u>Corporate Culture</u>	<u>Time Away</u>	<u>Allowed Mistakes</u>	<u>Formal Programme For Innovation</u>	<u>Visionary Leadership</u>	<u>% & Totals</u>
Scottish:	6	8	5	4	10	10
Row %	60.0	30.8	50.0	15.3	100.0	(11.4/ 87)
Col %	31.5	53.3	20.8	36.4	50.0	
<hr/>						
N. American:	8	1	8	5	8	8
Row %	100.0	11.1	100.0	10.0	100.0	(16.0/50)
Col %	42.1	6.6	37.5	45.4	40.0	
<hr/>						
Overseas:	2	3	3	-0-	-0-	3
Row %	66.6	100.0	100.0	-0-	-0-	(21.4/14)
Col %	10.5	20.0	12.5	-0-	-0-	
<hr/>						
Other UK:	3	3	3	2	2	5
Row %	60.0	60.0	60.0	40.0	40.0	(12.8/39)
Col %	15.7	20.0	29.1	18.8	10.0	
<hr/>						
Column:	19	15	24	11	20	
% of tot.	73.0	57.6	92.4	42.3	76.9	

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Table No. 17 reflects the responses of the 26 firms ranked as the "most highly innovative firms" of the 190 sample. The highest element of those selected by Overseas and N. American firms was to allow mistakes (100 %). Visionary leadership and culture were also key responses at 76.9 and 73 percent respectively.

The row to the far right provides a count per parent company by nationality. Of these firms, 7 were Pioneers; 6 were Dependents; 5 were Followers; 3 were Imitators; 2 each were Fatalists and Opportunists; and 1 was a Traditionalist

Twenty-four of these firms used a formal strategy and the remaining two used an informal strategy. All of the users firms, who used a formal strategy with an updating anti-obsolescence programme, had more than 501 employees. The two firms with an informal strategy were Overseas (Japanese and Danish) and employed less than 300 employees.

8.10.1 Responses of the Top 26 Firms On Key Elements

In an effort to assess the leadership rules as to why some of the top firms were innovative, a cross-tabulation table was developed to show the how users of a formal strategy (n=24) responded to certain questions on the questionnaire.

The questions were: if they engaged in manpower planning; if it was easy to get feedback from their supervisors; if product champions were rewarded; if their employees were trained to be innovative or recruited because of their innovativeness; and is it easy to get information from their supervisors ?

Table No. 18, below, indicates how those 24 firms responded to those six questions.

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Table No.18: To Assess The Leadership Rules The Following Questions were Asked:

Does Your Firm Engage in Manpower Planning ?; Is it Easy To Gain Data, Approval or Feedback from Your Supervisor?; Are Innovation Champions Rewarded, Promoted or Recognized ?; Are Your Employees Recruited For Their Entrepreneurial Traits Or Trained to be So? - N= 24 of the 26 Firms have a formal programme to stimulate innovation

	<u>Manpower Planning-Yes</u>	<u>Easy To Get Feedback</u>	<u>Champions Rewarded</u>	<u>Employees Recruited / Trained</u>	<u>Info Spread</u>
Parents:					
Scottish:	75	8	3	5	2
Col %	46.6	33.3	16.6	23.8	13.3
N. American:	42	13	12	13	11
Col %	26.1	54.6	66.6	61.9	73.3
Overseas:	10	2	-0-	1	-0-
Col %	6.2	8.3	-0-	4.7	-0-
Other UK:	34	1	3	2	2
Col %	21.1	4.2	16.6	9.5	13.3
Column:	161	24	18	21	15
% of 190:	84.7	12.6	9.4	11.1	7.9

Based in respect as to how all 24 firms responded, a series of interviews were with five users of a formal strategy to innovate, who were ranked as most innovative. All interviews were held at the offices of these companies.

During the interviews it became apparent that all interviewees agreed that two of the chief determinants for stimulating employees to be more innovative were the reaction of their immediate supervisor and the ease in which they received approval and feedback on a innovative idea. Basically, these factors were determined to be management style and tightness of control.

For example, North American firms allowed little time away to develop an innovation whilst some Other Overseas firms used this as a major element. Equally significant was how few overseas firms have a formal programme and visionary leadership compared to the other parent firm 's clusters. This is more or less shown in Tables No. 14 through 17.

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We observed during our visits that these were common features in the Other Overseas and North American companies. They included the informal corporate culture exhibited and the fact that many of the key managers interviewed were less than forty years of age. All conducted weekly meeting on quality complaints and had a companywide information system

The interviews also revealed that all of them stressed a common strategy consisting of a search for the self-motivated employee. All indicated that they used a generic human resource policy to attract and hire employees with some type of experience gained from working with small groups and used to working with little or no supervision. The phrase used by Apple Computer in its advertisement (June, 1989) for new employees is indicative of this philosophy ---'the individual is at the centre of everything we do and the employee must be able to demonstrate how they can create opportunity for themselves and others around them'.

We observe in Exhibit No. 2:50 that a fair amount of time as indicated by the users on the first questionnaire was expended in developing, reviewing, and writing proposals on innovative projects . Many of the managers interviewed indicated that being directed to write a proposal or review a proposal on the development of an innovation made them do much late night reading (38 %); while others indicated that problem-solving with colleagues was the most rewarding part of their job (64 %) Others (18 %) indicated that courses stimulated them to assess their knowledge and fill in the gaps.

We observe in Exhibit 2:8 the high number of users that reported that their programmes for innovation reported to the (Managing Director/Chairmen/CEO). This supports a belief that most users view the development of an innovation as having strategic importance.

Furthermore, Table no. 18 indicates that the issue of manpower planning is homogeneously viewed by most of the respondents, regardless of a firm's nationality. However, there were marked differences internationally as to how other supporting elements were used.

8.11 SUMMARY OF THE DISCRIMINANT ANALYSIS

This analysis was performed on 83 elements identified in the survey which may or may not contribute to the development of a strategy for innovation. Its aim was to determine the linear relationship of independent elements which discriminate best between those who used a formal strategy and those who did not. It was selected other types of analyses because it maximises the separation between the two groups.

Our assumptions and research logic, here, were that "users" will have a more consistent pattern of innovativeness than "non-users". Whilst both groups will be innovative to a degree, the non-users will retreat from time to time into a pattern of management of innovation based on their past experiences.

For example, Traditionalists will readily consider innovating around matters which will assist their beliefs in the economies of size, but will, generally, shy away a bold and radical innovation. We have labelled this belief when practiced as "the power of the sovereign element", a firm's experience. It forms the implied strategic framework in which a firm will objectively or emotionally determine the feasibility and benefits of an innovation.

We, also, observe in our review that certain elements seemed to have a greater discriminatory power than others in determining whether a firm is innovative or not.

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Table No. 19 shown below summarises the results of ranking those elements using Fisher's Coefficients and the Wilks' Lambda statistical techniques as explained in Chapter Seven

TABLE 19: SUMMARY TABLE OF DISCRIMINANT ANALYSIS

Order of Ranking	Element Computer Label	Fisher's Coefficients		Wilks Lambda Analysis	How each element is described as to its purpose and function in the assigned Code Labelling
		Yes	No		
1.	Opstrato	4.598	3.2158	.81344	Known strategic mission to innovate
2.	Keyneeds	0.552	1.075	.77795	Customers needs are surveyed regularly
3.	Motime	-0.629	-0.106	.75273	Motivated by time off to develop idea
4.	Buyin	1.347	0.841	.72962	Practice of firm in buying innovation
5.	Vision	0.843	0.337	.71491	Leadership exhibits visionary element
6.	Depts	5.749	6.769	.70257	Each department responsible for change
7.	KeyR.D	0.592	0.440	.68708	Research and Development Depart. used
8.	Mochamp	1.051	0.644	.67036	Others motivated by innovation champions
9.	Trained	0.944	0.534	.65452	Staff formally trained to be innovative
10.	Orgfirst	1.767	1.415	.63949	Usually first to try new ideas/products
11.	Mogoals	-0.218	-0.380	.62716	Motivated by goal-setting of employees
12.	Keyprog	0.526	0.773	.61574	Formal programme for innovation is used
13.	Ezsystem	0.426	0.702	.60478	Easy to gain approval for a new ideas
14.	Pholdup	1.201	1.534	.59519	Funding is available without holdup
15.	Keystaff	0.974	0.786	.58703	Staff recruited and trained to innovate
16.	Moseljob	0.327	0.739	.57547	Staff is motivated by self-design of job
17.	Strategy	1.446	1.267	.56978	Marketing-technological strategy used
18.	Ageloc	0.488	0.414	.56346	Age and location of an innovative firm
19.	Typeorg	1.405	1.173	.55839	How a firm manages its tasks, foremost
20.	Keycult	0.282	0.440	.55295	Firm's culture is very entrepreneurial
21.	Preward	-0.172	-0.758	.54909	Rewards given to enterprising employees
22.	Vision			.55191	Same description as above

Yes = 103 firms with formal strategy for innovation

No = 87 firms without a formal strategy for innovation

Canonical Discriminant Functions and Group Co-variance Matrices Data:

Box's M	F Degree	Freedom Pooled	Logthm	Score for Significance	Eigenvalue	Canonical Correlation	Chi-square
373.49	102018.2	15.216896		000.-.05	0.8911	0.6694	105.780

Table No. 19 indicates the results of the final ranking of 21 elements. In the Table's fourth column, the closer the

coefficient is to 1.0, the better it contributes to the use of formal strategy for innovation.

We observe in Table No. 19 that the number No. 1 ranked element was opstrato (firm's mission to innovate is known at all levels) at .813 and that only those elements which scored better than .549 were ranked from the 83 different elements captured by this survey. Thus, the magnitude of the coefficients reflected their importance by their rank.

We observe that this ranking order as shown in the Table No. 19 means that the element coded as (keyneeds) is about 30 percent more important than element (freward), and about five percent less importance than having a strategic mission to innovate (Opstrato).

Further analysing the discriminate results in detail shows that the most significant element is presented in ranking order of importance was the element (Opstrato). This indicates whether the company has a organisation-wide strategic mission to innovate.

Other elements such as a formal programme being used (Keyprog); staff is trained to be an innovators (trained) and employee being motivated by time away (Motime) were ranked as major determinants that determined whether or not a firm is innovative. The lesser important ones are those starting down from element (Ezsystem) at .6047 and than in a descending order.

8.11.1 Classifying Functions of Discriminant Analysis

The second function, we thought critical to this investigation, was the ability of a discriminant analysis to reclassify groups statistically. By this function (called a classification rate), it can determine if the data received is useful or too badly

skewed to be of value based on a proportional chance criterion (see definition in Appendix B).

Our overall classification rate was 83.2 percent because 32 firms (16.8 %) could not be re-classified as being either users or non-users.

We observe that this classification rate indicates the data was very useful. A better picture of the data's usefulness was obtained by using a proportional chance criterion (Azcel, 1989) and a Tau measure indicated that this is about 35 percent higher than a proportional chance hit ratio (190-103/190-87) and 65 percent fewer errors than expected by a random chance.

This analysis, also, directs our attention to the fact that 32 firms had problems defining their firms as having either a formal or informal strategy for innovation. As described earlier (pp. 14-6) we had established an arbitrary criterion rather than a research based one which predicted that true users can be classified according to a firm embracing five or more of the following nine elements:

1. Mission statement;
2. Three levels of strategies;
3. Formal programme with a name;
4. Budget allocated;
5. Training programme;
6. Technological strategy;
7. Structure openness;
8. Scanning system;
9. Strategic focus;

and a record of innovative accomplishments.

A further review on the responses of the respondents selected out by the computer as being improperly classified revealed that 15 users and 17 non-users did not meet our

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criteria. The results of our tabulation of these 32 non-conforming responses are as follows:

<u>Missing In User's Response</u>	<u>Areas Missing In the Nine Strategic Elements</u>	<u>Shown In Non-user's Response</u>
—	Record of Achievement	2
5	Formal Programme	2
5	Mission Statement	5
3	Training Programme	1
2	Budget Allocated	5
<u>17</u>		<u>15</u>

We observe that two of the users have less than five elements (both have 4), and three non-users have exactly five or more elements (5,5,6 respectively). Since there was no similar empirically-tested and published data readily available, we now question our earlier prediction that a firm had to possess five of the nine elements to be classified as a user and if this was too narrow a standard. And since we did not clearly inform or imply to the respondents that these criteria were to be used, we wondered whether or not our acceptance of less than five elements would violate the purpose of the investigation and if they should be extracted and re-classified accordingly.

We decided against changing the data, at this point. Our reasons were two-fold: (1) the logic of the investigation required us, at a later point, to reclassify the respondents based on their technological strategy, nationality and size; and (2) an effort to manipulate field-based data, unnecessarily, would distort the integrity of the responses and contaminate the quality of the statistical techniques.

Further, a review of the territorial maps indicated a better than expected separation of users and non-users. Group

centroids were dispersed proportionately with a close pattern of function-scores.

The subsequent re-classification of respondents by firm sizes, nationality, and strategy indicates that those in firms under 301 employees were more likely to mis-classify themselves (80.2/19.2 chance) than by nationality (84.6/15.4) or by technological strategy (96.4/3.6). Incidentally, published data (Aczel 1989:939) indicates these are "very high scores" for a broadly-based social study based on people perceptions.

8.12 RE-CLASSIFICATION OF FIRMS INTO A STRATEGIC FOCUS

The re-classification of firms to test their overall strategic focus, by the logic of our investigation, was designed to be a key indicator of the enabling elements needed to create a strategy for innovation.

This re-classification was to be done based on using seven technological strategies which were provided to the respondents in question no. 12 of our first questionnaire.

These categories were provided because the literature (Ansoff, 1964; Freeman 1974) states that the technological strategy was the unifying element for all innovation-investigating and developing activities within a firm.

We surmised that this element (strategy) combined with others would create the "sovereign element" of a firm. They reflect the linkage of a firm's management style of control, the flexibility of its organisational structure and the technological strategy that it prefers to use. In essence, the strategic focus is a "triggering" element by which a firm intuitively or formally creates a strategic framework for a strategy for innovation.

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We further observe that the element for a technological strategy (strategy) was ranked 17th out of the 21 elements in Table No. 19. It was also ranked some six places below the element (Dept) representing a firm's innovation-investigating activities; and ranked one place above how a firm manages its tasks structurally (Typeorg).

Our hypotheses (a focal point in this investigation and evolved from the hypotheses stated elsewhere) was that a firm could be located within a "strategic focussing" matrix with horizon and vertical axes depending on how these key elements were linked to each other. This matrix would indicate how a firm, generally, would welcome or resist any type of activities for the investigation and development of an innovation.

Restated our hypotheses is that:

A firm's position in this strategic focus matrix, would indicate a firm's receptivity to innovate, the more flexible its structure and the more formal its technological strategy is implemented the greater a firm's receptivity to innovate.

The testing of our hypotheses was to be done in three ways: (1) to re-classify firms around their self-selected technological strategies and to create new groups around those elements which measure a firm's innovativeness; (2) to create a horizontal axis (sliding index of flexibility) to measure the resistance of a firm's structure to assist a firm's innovation-investigating activities; and (3) to place users and non-users in a vertical axis to indicating whether they formally or informally used a strategy to coordinate those activities.

Our construction methods and results are as follows:

8.12.1 Re-classification into New Groups

The first step of the three steps needed to construct a strategic focus was to confirm that respondents had classified themselves as either a user or non-user properly.

For example, Exhibit No. 2: 43 indicates that when respondents were allowed to choose themselves, we noticed that over 38 percent (average of users and non-users rates) of them thought they were Pioneers, and few viewed themselves as Fatalists, Opportunists or Traditionalist. Our purpose, here, is to confirm their selection or to re-classify them accordingly.

Using the "Select" and Compute " controls of the SSPSS command, we added all firms by their responses to question No. 12 on the survey instrument in Exhibit No. 1 by frequency and count.

Then to complete the first step of a strategic focus measuring matrix, we selected some innovativeness measures (the same nine elements we arbitrarily established earlier) and clustered the respondents according to their self-selected technological strategy. The purpose, here, was to determine whether those enabling elements for the stimulation of innovation could be identified, separated, linked, and grouped into new groups. And if this technique could add or subtract respondents from one group into other groups.

By the using the various element codes, the formula (strategic element) is as follows:

```
Compute newgroups = Strategy + (opgoals-  
opstratgo) + (Orgtop-Orgadapt) / Emission +  
Eopplan + Eprogram + Goodfac1 + Typeorg +  
Dept + Simvoll-2 + Budgets + Keyinfo, then  
"sort" accordingly.
```

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Based on this calculation (given solely as an example to illustrate the logic of this analysis) we were able to accomplish two findings by devising a "sovereign element formula". First by using such a formula, we are now able to reclassify the respondents using nine elements rather than just one element. This procedure, also, would determine whether or not the firms' self-nominating method matches our computer developed profile for each strategic group.

Secondly, the computer could create a new group of respondents if any of the 190 firms failed to match an existing group profile. By this procedure, 31 firms failed and were placed into a new group to be called as "Un-Focused". The results below indicate as to how eight groups were created from the previous seven groups and in which of the groups they were redistributed:

<u>Strategic Groups</u>	<u>% of Before Group</u>	<u>Numbers in old Groups</u>	<u>Numbers in new Groups</u>	<u>% of new Group</u>
Pioneers	38.4	73	57	30.0
Un-Focused	—	—	31	16.3
Dependents	20.5	39	30	15.8
Imitators	14.3	27	14	7.3
Followers	10.0	19	21	11.1
Traditionalists	4.7	9	11	5.8
Opportunists	7.4	14	14	7.4
Fatalists	4.7	9	12	6.3

First, we noticed that the new group of 31 firms was surprisingly similar to the number of respondents that those we were unable to classify in the previous Discriminant Analysis. Second, we observed the severe reductions of about 78 percent in the Pioneer group; 51 percent in the Imitators group; about 24

percent in the Dependents group; and noticeable changes in the other three groups, except the Opportunists group.

The classification function of the Discriminant Analysis for the strategic focus indicated a 96.4 percent classification rate. There were seven firms marked as not being classified by the computer. Based on a personal review of the respondents' questionnaires: three were placed in Pioneer, one each into Dependent, Follower, Traditionalist and Fatalists. Respondents' answers to Budgets, Orgadapt and Orgfirst were responsible for mis-classification.

8.12.2 Index of Flexibility

The second step toward creating a horizon axis for the strategic focussing matrix consisted of ranking all respondents based on their overall innovativeness. This was the same index used to rank firms as described in Appendix G.

The scores ranged from .3119 as the lowest rate of innovativeness to .94716 for the highest. In an effort to determine the central tendency of the data and to protect against the influence of extreme observations, the median, mode, and means for each group were used. The median for all 190 observations (respondents) was .63008. Then scores were placed into five categories of flexibility based on boundaries of 12 within each boundary. These were called score classes.

The index of flexibility was created on the computer as follows:

Index of Flexibility= Newgroup / (Stimvoll-2)
(Typeorg) (Orgadapt) (Busenvi) (Moseljob)
(Eschedule) (Orgfirst) (Orginfo) (Orgtop) (Key
R.D) (Keystaff) (Andepart) (Depts.) (Ageloc)
(Depts.) "Sort" by Frequency.

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These sets of elements directly and indirectly reflect the type of managerial controls and structure used by each respondent. An example is the element (Typeorg) as reflected in question no. 25 of the first questionnaire.

Next, we used a mode based on frequent and count for each of the new groups which placed them into a modal class, accordingly:

<u>Score Class</u>	<u>Description</u>	<u>Index Mean</u>	<u>Modal Class</u>
Over .89	Top Quarter	.9234	Pioneers
.77 - .83	Very Flexible	.8708	Opportunists
<hr/>			
.71 - .76	Top Half	.6554	Followers
.64 - .70	Flexible	.6493	Fatalists
<hr/>			
Median	Normal Control	.6301	
<hr/>			
.58 - .63	Bottom Half	.6287	Imitators
.51 - .57	Tight Structure	.5584	Dependents
<hr/>			
.44- .50	Bottom Quarter	.4867	Traditionalists
.38 & under	Tightly Structured	.3419	Un-Focused.
<hr/>			

We observe, at the worst, this will give us a continuum and a sliding index in which each strategic group could be placed horizontally and linearly from Un-focused through Pioneers. Other than for this use, it has limited value because of centrality and symmetrical issues.

8.12.3 Formality of Groups' Strategy

The third and final step in designing a strategic focussing matrix is the vertical axis construction. This step is relatively

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straightforward based on whether a respondent was a users or non-users.

We ask the computer to "Sort" by frequency all of the new strategic groups by users and non-users categories. Any count of users within a strategic group with a frequency rate of more than 51 percent of users would be placed above the line vertically. Any group with a rate of less than 50 percent of users would be placed beneath the line. Based on this technique, the following placements were made:

New Strategic Groups	Users Frequency Rate-%	Vertical Placement	
		<u>Above</u>	<u>Below</u>
Pioneers	100		X
Followers	65		X
Imitators	61		X
Traditionalists	55		X
Opportunities	43	X	
Fatalists	33	X	
Dependents	28	X	
Un-focused	0	X	

Based on the construction of both the vertical and horizon axes, Figure 8.4 on the next page reflects the groups' positions within a four dimensional, two-tiered Strategic Focus Matrix.

Note: To test the conceptual abilities of this matrix, a class of 17 International MBA students at the University of Glasgow in April, 1990 used it. Empirically, it tested what strategic options that a firm had based on its dominant strategy associated with each group, its current position, its mode of innovativeness, and its firm's structure. The options range from using a capacity production-based strategy of a Traditionalist to

a pioneering strategy using innovation. Further implications of this strategic focus matrix will be discussed in Chapter Nine.

Figure No. 8.4: STRATEGIC FOCUS CLASSIFICATION
Mode of Innovativeness/ Technological Strategy / Structure Matrix
(N=190)

	Tightly Structured	Tight Controls	Very Flexible
Informal	Un-Focused Mostly Mesclent erratic pattern no scanning system Recipe Strategies* n= 31 Users= 0.0	Dependents Stimulated more by customers Product led* n= 30 Users=.028	Fatalists Driven more by competition Large R & D* n= 12 Users = .033
	Traditionalists Motivated by economy of scale and lowest costs Deliberate Strategy* n= 11 Users = .055	Imitators Motivated by Demand of Industry Scanning Mode* n= 14 Users= .061	Followers Stimulated by actions of Pioneers Delay Strategy* n= 21 Users= .065
Formal			Opportunists Stimulated by market opportunity Design-led* n= 14 Users = .043
			Pioneers Stimulated by formal programmes To Lead* n= 57 Users = .100

* denoted most dominant strategic focus Source:EDA/1990

Figure 8.4 is a key indicator as to how each firm will, by their own unique history and experiences, view the value of innovation. The term nescience is further defined in Appendix B as this applies to a firm which decides to be totally ignorant of what is happening in its environment.

8.13 THE SECOND SYMPOSIUM RESULTS

The results reflects the second symposium of two symposia required by the investigation. Its purpose was to contrast, collectively, the views of managers to others, whom who may hold different ones on strategy and innovation. These areas of potential differences were posed in a series of questions.

For example, some of the issues were: if managers and others held the same view that the practice of innovation can be taught; can innovation be planned upon demand; and questions about whether a deliberately-formed strategy was better than an informal one. Other details of this symposium are discussed in Chapter Seven (p.240-2) and in Exhibit No. 4.

Although there were 22 statements to probe the attitudes and opinions of the 36 participants, only eleven statements received a rating after discussion. The results are shown in Table No. 20 on the next page:

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DELPHI 2ND SYMPOSIUM QUESTIONNAIRE: UNIVERSITY OF GLASGOW

Table No. 20 : SIGNIFICANT DIFFERENCES OF OPINIONS BETWEEN MANAGERS AND OTHERS

Note: Mean scores on a 5-point Likert scale ranged from 5 = strongly agree to 1 = strongly disagree. Statements were paraphrased from those questions in Exhibit No. 4; * 2-tailed probability

Selected Statements Paraphrased	Means		M-W-U*	T-Test*
	Managers (n=22)	Others (n=14)		
Ref: Section I				
1. There is a definite way to practice innovation and it can be taught, whether science or knowledge based.	3.7	3.1		0.041
2. The principles of accountancy penalise a decision to innovate	3.3	2.8		0.069
3. Accountancy ignores that a firm has other goals than profit.	3.5	2.9		0.014
5. Big firms are better at innovating by being efficient; and smaller firms are better at innovating by being flexible.	4.9%	2.6%	0.051	
8. A Deliberate long term strategy is a formula for failure since it locks managers into a narrow way of thinking	2.6	4.1		0.038
9. Business strategy is best when is simplest, and long detailed plans should be avoided.	4.0	2.6		0.038
10. A strategy which plans for innovation requires a systematic implementation, but innovation can not be made to occur upon demand.	3.3	2.7		0.092
15. In planning five years, you should plan 1 year further than competitor.	53%	31%	0.055	
Ref: Section II				
B. Innovation is either a skill-enhancing or skill-destroying process.	4.3	4.8		—
C. Established firms are in a better position to explore an opportunity than a new entries within an industry.	53%	31%	0.055	
D. Firms in a UK survey (1983) to bring about change used the following strategies: Which method would you use first, second and so on ?				
	UK Survey	Ranking by Mode		
		Managers	Others	
Marketing and sales approach	1	3	2	
New product development	2	2	1	
Re-organisation of firm	3	1	3	
Financial Controls	4	4	4	

We observe that in Table No. 20, there were marked disagreements on several of the statements posed. They are denoted by either the M-W-U, t-test or X-square techniques. The widest difference were in statements no. 5, 8, 14, and 15 in Section I and in Section II, para. B & C in the Exhibit No. 4 of the Appendices.

8.14 TESTING OF THE HYPOTHESES

The literature indicates that there is a wide range of hypotheses developed (pp.286-92) which could be tested. We prefer to test just seven of them in a condensed version.

We observe from the implications of Exhibits No. 2 and the findings in Exhibits No. 6 through 13; and the summary of 21 elements as developed by the Wilks' Lambda in Table No. 19 that the following hypotheses can be tested:

It is confirmed affirmatively that more loosely- controlled a firm's structure and the more a firm's innovation investigating and developing tasks are decentrally-managed and the more flexible its method of management and the more formal its strategic thrust to innovate the greater a firm's receptivity to innovate. Specifically:

(a) It is confirmed affirmatively that the more formal and better known a firm's strategic mission is known for innovation within its environment consisting of buyers, prospective employees and suppliers the greater a firm's receptivity to innovation;

(b) It is confirmed affirmatively that an employee's receptivity to innovate increased when time is given off to innovate, and the more an employee's bosses welcome suggestions and supply feedback, and the more group work of an employee is reinforced by a firm's experience and the more defined a firm's goals are to innovate by a formal strategy the greater a firm's receptivity to be innovative.

(c) It is confirmed affirmatively that the more innovative the firm is perceived by its environment, and the greater the

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attention and importance attached to planned manpower development, and the more a firm recruits certain types of individuals from its environment the greater its strategic thrust the greater a firm's receptivity to be innovative;

(d) It is confirmed affirmatively that the greater the importance the firm attached to the collection of new information and its dissemination to employees of all level for application, the greater a firm's receptivity to innovation;

(e) It is confirmed affirmatively that the more time spent on training of employees in innovation and the greater attention spent in initially hiring an employee who is entrepreneurial and the more resources allocated for rewarding product champions within a formal programme for innovation, the greater a firm's receptivity for innovation;

(f) It is negatively infirmed that the greater effort needed by an employee to gain project funding, time away, feedback or approval to innovate, the less innovative a firm will become; and

(g) It is confirmed affirmatively that the greater the firm's willingness to cooperate in field trials and training with the customers, and the more a firm participates in joint ventures with other firms, and the more a firm motivates its employees to be more entrepreneurial, the greater a firm's receptivity for innovation.

CHAPTER NINE

CONCLUSIONS AND IMPLICATIONS

9.0 AIMS

Let us conclude this investigation by asking three questions

1. What did the literature tell us about how strategy-making should be developed ?
2. What did the managers tell us about how they stimulated innovation?
3. What conclusions did we reach about both?

We will proceed to answer these questions in the same sequence.

9.1 THE LITERATURE

First of all our analysis of strategic techniques on each level of strategy-making has proved to be a fruitful undertaking. After the enquiry phase of this investigation, we were better able to understand the arguments of Ansoff (1965) and Andrews (1971) about why there is a need to have different levels of goals and business strategies within a firm, how each was developed, when implemented, and how they were related to the each other. The following comprise the three reasons for our enquiry.

First, the meanings of the term strategy in both a descriptive and normative sense were misleading. This created a

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confusion because the term was being used by many different disciplines within the field of management. This confusion created an equally perplexing map within the literature as to which was the clearest research path for us to follow. This implied a need for us to define and describe each of the terms as precisely as possible.

Second, in order to see more clearly the link between strategy-making and innovation, it was necessary to look at the evolution of strategy in some detail. This was prompted when our literature search indicated that there was a relative lack of research on the origin of and the history of strategy as a business concept. This was a surprising finding. Our review of nineteen different textbooks here and in the USA (Dartmouth's Amos Tuck Business School, Harvard's Baker Library and MIT's Sloane Business School) found only three that devoted any space at all to this . Two of these sources were published in the past five years.

Third, in analysing the impact and use of strategy, we found it necessary to develop our own concepts and definitions. This helped us to better understand the impact, the variety, and range of approaches being fostered by others, both academically and empirically. For these reasons we developed a glossary in Appendix B explaining some of the terms we discovered and how we have used them.

From this enquiry we have concluded that there are four main arguments within the field of strategic management.

(a) That there is a debate raging in the field of strategic management. It is a debate questioning whether a strategy is best executed deliberately- formed by a plan or informally- developed by a pattern of action. However, we believe that our investigation supplements rather than supplants the controversy

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as to whether strategies for innovation are best nurtured by a formal process or an informal one. To avoid entering this circular debate, we used, as a theoretical starting point, the definition of Baker.

"a formal process [strategy] being where there is a distinct hierarchy similar to that found in a military organisation. Limits of authority and responsibility to being set forth in a programme which are very clearly laid down. There is an exhaustive set of written standards [covering most eventualities from hiring of personnel to funding employee's ventures]. An informal method [strategy] being when there is no clear hierarchy (as to how innovation will be stimulated). Authority/ responsibilities being based more on ability than on a formal structure [to innovate]. There are few, if any, written rules, programmes or procedures."(1975:147)

This was theoretically stretched into a conceptual framework by the works of Quinn, Mintzberg and James, who state,

"Strategies may be looked at as either a priori statements [formal] to guide actions or a posteriori resulting from actual behaviour [informal]... One, therefore, must look at the actual emerging patterns of the enterprise's operant goals, policies and programs to see what its true strategy is... whether consciously set forth a understanding resulting from a stream of decisions "(1988:4,14-20).

then, after we refined this contextually and reviewing the words of Terborg, Van de Ven, Pettigrew, Porter, and et al, it was determined that there was a need to develop an empirical study.

Their counsel formed almost a unifying view (which is unusual since this view is coming from many different schools of management ranging from organisational development theorists to structural strategists) which has been underscored and argued elsewhere when appropriate throughout the investigation that:

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"choice and decision process models being done by strategic management scholars lack the context of how a firm is structured and the insights as to what individual and purposeful actions were designed to do by the actual makers of strategy and change, the practising manager".(Pettigrew 1987:5-12)

(b) That there are three main arguments within the field of strategic management that are compelling. One argument related to this investigation is how strategy-making is directly linked to management effectiveness and its competitiveness. The second argues how the field of strategic management does not fill a specific and defined purpose in management in the formulation of a firm's goals. The third is the issue of using informal methods to run one's firm.

The first argument outlines how there is a divided body of opinion among those concerned with improving the theory and practice of management. Here, there is one side which believes that the formulation of a goal of a firm's corporate strategy does not give a much sharper focus to management thinking. The other side represents the formulation strategists. They argue that the discipline of strategy-making requires a carefully devised analysis of a firm's strengths and weaknesses in relation to the risks and opportunities existing in a firm's environment. Generally, they believe this can only occur by the formulation of a strategic goal, first. Then, the best choice is selected as an output by a strategic model which evaluates all the alternatives available to a firm. These theorists can be classified as resting squarely in the rational school of management. At the other end of the continuum we place the intuitive incrementalists.

The second argument deals with the variety of strategic options available to a firm. The pluralistic school of management argues that, at first sight, one might infer from the manner in

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which companies operate that there is an infinite variety of strategic models available to a firm. On the other hand, the universalist school of management argues that upon closer inspection there are only a limited number of alternatives which are useful for strategy. They claim that the few alternatives available to the formulation of corporate and business strategy owe many of their principles to military thinking. They argue it is how these few strategies are implemented that is the key to their success.

The third argument is whether innovation can be stimulated upon demand. One side argues that innovation occurs through "serendipity", a term coined by Walpole in the 1754. This is a place where nothing is planned and all accidents turn out to be pleasant discoveries. There are several dimensions within this school of thought that informality is best. The danger in believing in such an informal strategy is argued against by the Rationalist on the grounds that it disguises a firm's ability to fully understand the potential of innovation from a strategic standpoint.

With such a wide range of views about innovation and strategy, it was important to study, and codify the basic principles of ancient military and business strategy. From our review, we were able to determine and suggest which effective elements of strategy were essentially structural and which ones were peripheral to the topic of innovation.

9.1.1 STRATEGY

We embraced conclusively Ansoff's definition and modified it to be:

" strategy is the unifying thread of all activities within a firmand the pattern of major objectives, purposes or goals and essential policies and plans for achieving those goals, stated in such a way as to

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define what business the company is in or is to be in " (1965).

We conclude that that all companies have some type of a strategy albeit that only a relatively small proportion of them have ever developed an explicit plan or a statement of exactly what the goal for their strategies might be. It is one of the premises of our investigation that whether it is formal or informal is not the question, but whether a firm consciously decides to accept one method over the other. For that reason, we expanded Ansoff's definition away from his concept of narrow goals into the broader ones of Andrews that goal-setting is part of the strategic process. A view not held by Ansoff.

Our attempts to explore a full variety of strategy from military concepts to generic strategic models in Chapters Two through Four were deemed essential to this research. They provided us with a fundamental understanding of the strategic process and its applicability to the stimulation of innovation. We started off our investigation with an exploratory review of the ancient concepts of strategy.

Unfortunately, this is a step which too many researchers fail to do before launching a newer version of a strategic model. Anthony supports this:

'.. the absence of any military-diplomatic principles of strategy constitutes a significant gap in the management field for planning and the lack of relating these "conjugate principles" to set the limits and common aspects of strategy to other fields is a major flaw'.(1965:27)

The seven major conclusions of strategic elements as developed from the review of ancient and military strategy were: (1) by a clear mission statement of the grand strategy being employed, a leader is able to attract and mobilise those around

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him/her into action; (2) the flow of information is vital; (3) surprise is a major ingredient for success; (4) the simpler the strategy the more effective it is; (5) the behaviour of men on the field of battle will be no better than how they have been trained off the field; (6) the acts of innovation were the deciding factors for how war was fought; (7) and the leader must recognise that there are varying reasons for going to battle and should appeal to as many of them as possible.

The analogy between the military and commerce can be boiled down into five basic patterns: to attack, flank, defence, raid or develop new warfare.

First, in a military sense, one may decide to attack the enemy head-on. In a business context, the frontal assault could be compared to a pricing competition or by innovating with a new product to directly compete with an existing one.

Second, when a military strategy uses a flanking tactics, it is generally because a competitor's weaknesses or strengths are noticeable and an army compensates by using a manoeuvre to exploit or avoid them respectively.

In a commercial context, a flanking strategy may be similar to a policy of indirect competition based upon the creation and promotion of product differences. Clearly such a policy places considerable emphasis upon new product development carrying the elements of surprise. In the words of Bruce Henderson (1990), the creator of the Boston Box Strategic Model and the founder of Boston Consulting Group... 'one must induce your competitors not to invest in those products, markets and services where you expect to invest the most... this is the fundamental rule of strategy'.

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Third, when the military seeks to defend its territory or troops against attack, it gains a superior position (higher ground, friendly lands, or greater resources) which would discourage any advancing armies from attacking it without heavy losses. In business when a firm seeks to defend its product or markets against others, it differentiates its products. It does this in such a way that there is not any sizeable segment of its market profitable enough to warrant the development of a differentiated good or service by a larger competitor.

Fourth, for a military leader to consider a raiding action, it is tantamount to a negative decision accepting that the enemy is superior. Therefore, the effort is to have the enemy pay a price while accepting the inevitability that the enemy can not be defeated by direct action. In the context of commerce, such action would be to offer a product at such a low profit margin in the hope that other more profitable products related to it could be sold to recover some of the loss, but not to compete head-on. The selling of camera film at a below market price to induce customers to use a firm's film processing services set at a higher profit margin would be an example.

The final strategy is the one which most frequently leads to a decisive outcome, in both the military and business contexts, is the strategy of innovation. In simple terms, the results of an innovation can change a competitive situation so completely that one party previously vested with one type of weaponry superiority is replaced by a newer type of superiority. History indicates how warfare went from the long bow to gun powder and the current day concept of nuclear war heads. Then as each new invention created a new way of fighting, so it is with business.

In a business context, the advance of a technological innovation can result in the creation of a product so different from anything which has preceded it that a firm automatically

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gains a superior position. Classic examples of this are the polaroid camera and the process of xerography.

We end this section by stating that the direct transfer of military concepts to business has three major flaws:

(1). The idea of having a direct and identified adversary is a misguided one. With the exception of PepsiCo and Coke Cola Company, there is usually no way a firm can identify a single and direct competitor. Even though, a large majority of firms do practice this tendency. This is not the case in the military, generally, one knows the real enemies and can prepare accordingly.

(2). There is not necessarily a direct win/lose scenario in business as there is in military. A firm can be profitable and grow without there being a direct loss registered by another. This is particularly true in innovation, as new markets and old customers will consume innovation differently.

(3) In business one can be a partner in one market and a competing force in another. This seldom happens in warfare, the line is drawn and co-operation is seldom achieved without the complete submission of one to another.

9.1.2 The FIELD OF STRATEGIC MANAGEMENT

Let us begin by stressing once again that the field of strategic management is an entirely modern phenomenon. The first managerial ranks did not even appear until the 1900's and business strategy as the term of business policy did not even get a name until 1910.

Our review on the development of strategy over the past ninety years has only touched upon the major factors that helped

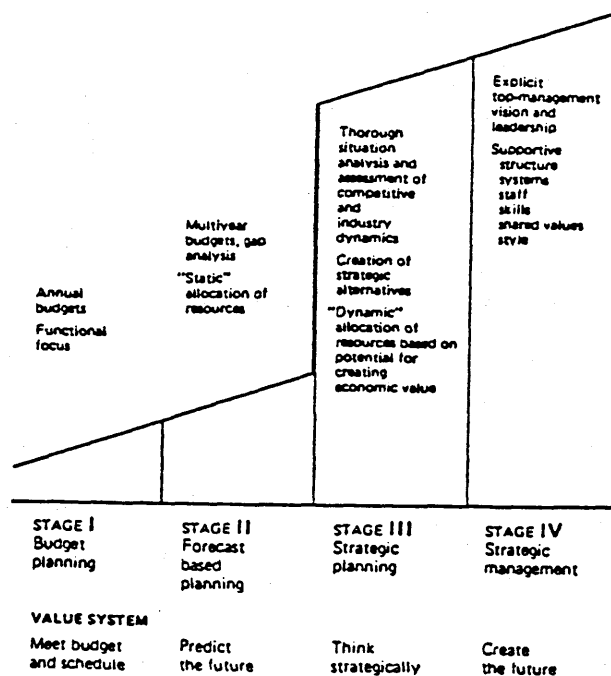
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to shape the field of strategic management. Since most of them came into being in the late nineteenth century, the field of strategic management has changed many times. Table No. 1 and Appendix A have only hinted at the variations and the subtleties of this constantly changing pattern.

Another one of our premises which was concluded as being true is that the rate of development for the field of strategic management overall was led not by the academic community but in the way that the leading business firms developed their strategic focus.

In spite of these many changes, firms still go through a ritual of change. From a one-person firm to a huge international conglomerate, the stages are clear and distinct. Some do it in months (e.g. Apple Computer Company), but most do it in years, even decades. It is also the same with strategic management as the evolutionary strategic focus within a firm can be divided into four different stages as depicted below:

Diagram 9.1: Evolution of Strategic Focus Within A Firm



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This diagram reflects some of the concepts as Gluck (1980) maintains in his article, "Strategic Management for Competitive Advantage". Briefly, the four phases of managements are: Stage I- in this stage, the strategy of meeting a payroll and the training of staff to be functional dominates the mind of a managing director/owner; Stage II- is the gap-filling stage where the decision-making unit (DMU) is expanded from a closely-held team of a few to a multi-layered one of many which starts to think strategically; Stage III- is where the more complicated market/product mix forces the DMU to assess opportunities and threats in the environment on a two to three years time frame; and Stage IV- is where a firm seeks to shape the environment in which it competes and innovation is one of the options that are considered.

Our investigation concludes that these first stages of development also reflect the views of management as being in a "sovereign strategic element" of comfort. This is when a firm by its history decides to remain internally-focused, it prefers to plan erratically based on current problems and opportunities and seeks to be very action-oriented, best classified here as an informal strategy. Only in Stage II through III, does the likelihood of a formal strategy encompassing a strategic focus emerging. A firm starts to develop this strategic focus, generally, about half way from being a firm that is totally internally-focused to one of becoming aware externally of the opportunities available to it.

We further argue that a firm can become so forecast and planning driven to the point that it becomes nescient when a DMU starts to practice a belief that it has discovered the recipes as to how to compete, "the one best way".

It is in Stage IV that a firm learns the difference between accumulating data and useful information. It may revert back to

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managing as previously in Stage II with the outward look of Stage IV, it is that point that a strategy for innovation is more likely to be made formally.

We believe that the use of innovation as a strategic tool will become the debate of the 1990's. It will be similar to the past debates about why and how a firm develops a "strategic focus". This is a focal point of a long running argument between consultants and academics beginning with 1950.

Our review, from 1950 through the 1980's, indicates that the debate was about whether a firm should use strategies of low costs, market, or product differentiations. Seldom was the third strategy of being a technological leader or being one of the more innovative firms ever mentioned as a viable alternative. When it was discussed, it was generally recommended for certain industries such as electronics and chemicals.

The strategy of being a low-cost producer is a relatively easy goal to achieve, but there is a finite limit to how much costs can be reduced. Once this limit was reached, companies learned to differentiate themselves from other low-cost producers.

By the late 1970's, arising from this need to compete differently, differentiation by market share or by innovation were some of the other strategies investigated. However, innovation requires a firm to create a different type of "strategic mission" and communicate it with equal force to a triad of customers, suppliers and employees in order for it to work. These types of strategies can be distinguished by how they embrace a new concept of strategic value which is the capstone of the book, by Peters and Waterman, "In Search of Excellence". We call this the trinity of values approach of strategic management.

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This is an integrated system based on a firm creating values beyond price for its customers; a shared value of profit, common interest and accomplishment from its suppliers; and a shared value with its workforce to the extent that each individual within a firm feels that they can create a future for their firms. Unfortunately, this trinity of values is best understood by firms in Stage IV and was emulated without success by firms in a lower stage.

The debate, now, is how innovation and new product development should be actively promoted. It is difficult to recall a time when innovation being stimulated by one's workforce was of greater interest to managers, consultants and academics than it currently seems to be. Competitive pressures on all fronts have driven many organisations to expect more and more from their workers.

We concluded that firms and others studying their strategic behaviour fall into one or more fundamental traps: (1) they use or recommend unrealistic criteria to assess a company strengths or weaknesses; (2) they are either not aware of or forgot the lessons from ancient strategy that an act of innovation can change the balance and competitive position of a firm overnight; and (3) they rationalise industrial changes based on government policies, and interest rate fluctuations, etc. using sophisticated strategy-making models.

We further conclude that firms are now seeking new ways of managing their future and the stimulation of innovation amongst their workforces is now being viewed as one of the most desirable and most profitable ways to do it.

9.1.3 INNOVATION

The need for this investigation has been justified by the observation that there is an extensive body of literature, both theoretical and normative, pointing to the process of innovation within the firm as being important.

The literature review in the field of strategic management suggested that there are serious problems in using existing management theories to explain how the elements of strategy can be linked to the stimulation of innovation, primarily because of the wide variety of definitions given to innovation.

Therefore, we conclude that the best definition of innovation is:

"the ability of a firm to replace existing product, processes, services and ideas with new ones to gain a competitive advantage and over time a firm will learn to use what works best for it".

Our definition is similar to the one voiced by others such as Downs and Mohr (1979) that the study of innovation rejects a universal innovation theory. They support a conclusion that we reached that a definition of the process for innovation should be applied as broadly as possible. Our investigation linking the nine essential elements of strategy-making (Table No.9) to the following internal elements needed to stimulate innovation can be summarised as follows:

1. Innovation must be welcomed and encouraged by a firm;
2. Leadership and vision by top management is critical;
3. All, if not the bulk, of a firm's employees should be committed to innovate and motivated accordingly;
4. Circumstances will lead an actor to innovate a solution when existing methods, products or ideas become

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obsolete; and

5. The realization that the benefits and potential of an innovation can be determined.

We were able to identify seven intertwining reasons why a strategy for innovation pose a special strategic challenge. They are:

1. collapsing of the product life cycle;
2. environmental turbulence which prevents accurate forecasting;
3. rapid change caused by the advancement of technology;
4. occupational obsolescence within a firm's workforce;
5. uncertainty about where the next competitor will come from;
6. greater uncertainty about key customer needs and wants; and
7. no guarantee that an innovation can be developed profitably.

This challenge by itself is enough to stimulate many of today's managers as many in the 1940's turned to the concepts of strategy as a way to cope. Documented by the high responses to our survey, managers are showing above average interest in the topic of innovation.

Similarly, there are a number of writers in the literature sketching out innovation indelibly as a topic worthy of study and treating strategy not as a discipline branching out from a narrow field of management, but as a broad one. But it is because the gap is widening between the actual practice of innovation and the theoretical process of innovation that it is of interest here. Exploring the linkage between the two has been neglected in the overall field of strategic management.

9.2 IMPLICATIONS FROM LITERATURE

In our review of the literature, we could not ignore the tensions of a great debate. The desire for an informed debate on the

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causes and promotion of innovation has spawned several very penetrating and influential studies, including those already mentioned in the literature sections of this study. This is made all the more so by the telling insights of writers such as Kanter (1985) and Waterman (1990).

Their comments seem to stand out among the mass of literature, and commentary reviewed here. Their messages are disturbingly the same, and may be paraphrased as follows: "

'In today's increasingly uncertain, competitive and fast-moving world, companies must rely more and more on individuals within their firms to come up with new ideas, to develop creative responses and to push for change before opportunities disappear or minor irritants turn into catastrophes. Innovation whether it is in products, markets, strategies, technological processes or work practices must be stimulated' (Kanter, 1985).

The implications from the literature can be reduced down into five major conclusions:

1. The basic message seems to be that strategy and motivational elements to stimulate innovation and organisational development are inextricably linked. The impetus for change and competitiveness through the 1990's will rely more and more on an innovative and entrepreneurial workforce. The broad arguments for and against a formal strategy being used for innovation are open to various interpretations. No matter how they are viewed, they fortell wide implications as to how organisations will develop their strategies in the future.

When we finished cataloguing the processes by which organisations make their strategies, it turned out to be far more more complicated than imagined in our research design phase. In fact, at one point, we started to believe that the term, strategic planning is a misnomer, that there was not a systematic

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way to create a strategy for innovation. In an attempt to make sense of the research on structure and innovation, we found it necessary to use charts and configurations of others as well as developing a fair share of our own.

2. The importance of an organisational structure as it relates to the stimulation of innovation became evident. We re-discovered the importance of structure, and made a finding consistent with the research of Burgelman, who stated " structure and strategy exist in a reciprocal relationship to each other. Depending on which part of the strategic process is observed, both structure follows strategy and strategy follows structure can be correct propositions"

We found ourselves coming back to the impact of structure on a firm's ability to innovate as documented by Burns and Stalker over and over again in seeking insights as to how strategy-making evolves. Given the range of organisational issues posed in the literature, it should not be surprising that the most striking finding about the respondents in this investigation was that they all managed innovation and strategy in their own unique ways, but we argue they still seemed to cluster around a limited amount of variations as to the types of structure that the managers deemed useful.

3. We have concluded that while strategic planning is difficult to implement, its concepts are fundamentally very simple. They are simple because they, in the final analysis, are nothing more than a series of decisions and action to be taken over time. They turn difficult when managers seek to make sound and executable decisions requiring a vision to see things as they are and take a risk about what they may be in the future.

4. We, also, found that it was not devising a strategic planning technique which was the challenge, but the developing of

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a strategic focus within a strategic framework. This is the strategic focus in which all options are evaluated by a firm. The formulation of doing it requires much forethought and some energy.

5. We found no evidence that present and popular strategic models can address the stimulation of innovation, completely. In fact, our review supports this conclusion and the statement of Hofer and Schendel (1971:137) which states " In general we still know very little about technological innovations and its effects on competitive strategy, except that it can have a profound impact on a business's chances for long run survival"

We conclude this section and start the next by offering the conclusions from the field study.

9.3 WHAT OUR FIELD-BASED SURVEY TOLD US

The fundamental perspective of this study is more Schumpeterian (1934, 1942) than neo-classical. Thus, all of our conclusions to follow are based on Schumpeter's principles; distinguishing the time sequence between the technological transfer and its application constitute the competitive edge.

In first six chapters, we developed a set of concepts and findings (pp.168-70) about how strategy works and the impact of innovation. The supporting data cited throughout those chapters provided us with a theoretical description of how strategy should work, but more significantly the field-based data discussed in Chapter Eight which showed us how strategic planning is actually used in practice.

We subscribe to the belief that innovation and entrepreneurship have proven central to a firm's advantage. Why firms and individuals innovate and why they are more effective

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in certain firms and not in others will be the focus of much of what follows.

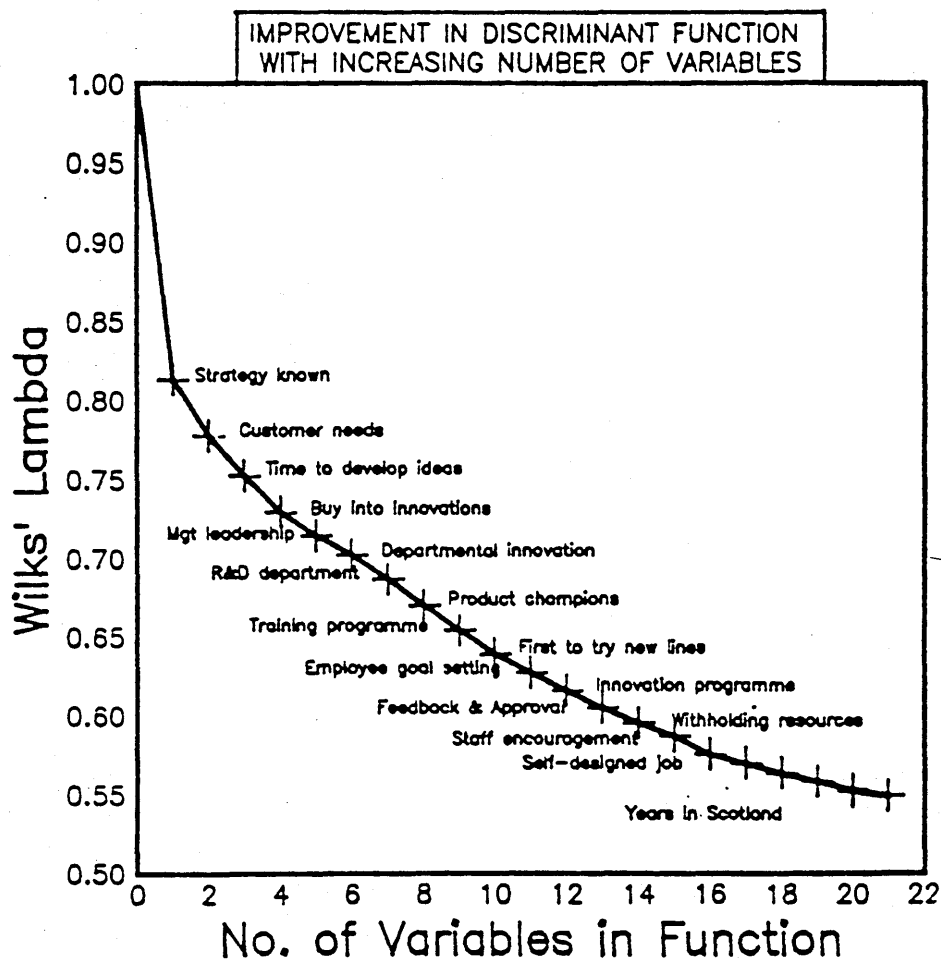
First, we will outline those conclusions affirmatively determined by the investigation. Then we will present two précis indicating the body of data in Exhibit No.2 , corroborated by some of our interviews with 26 managers, and our enquiry into the field of management. These created the empirical framework in which the following twelve conclusions were formulated about innovation in Scottish-based companies.

1. We were able to identify, isolate, and establish links between those enabling elements in strategic management and those that stimulate innovation within a strategy for innovation.

While there are endless lists of strategic elements (over 137 being offered in the literature that shape strategic decisions), we discovered in this investigation that there were only four general categories of elements which are critical and inherent to the study of innovation: environmental elements; distinctive elements (such as structure, technological strategy, etc.); contingent elements; and motivational elements as to how the behaviour of the individual is motivated. These four general categories are made up by 21 elements identified and isolated by a discriminant analysis.

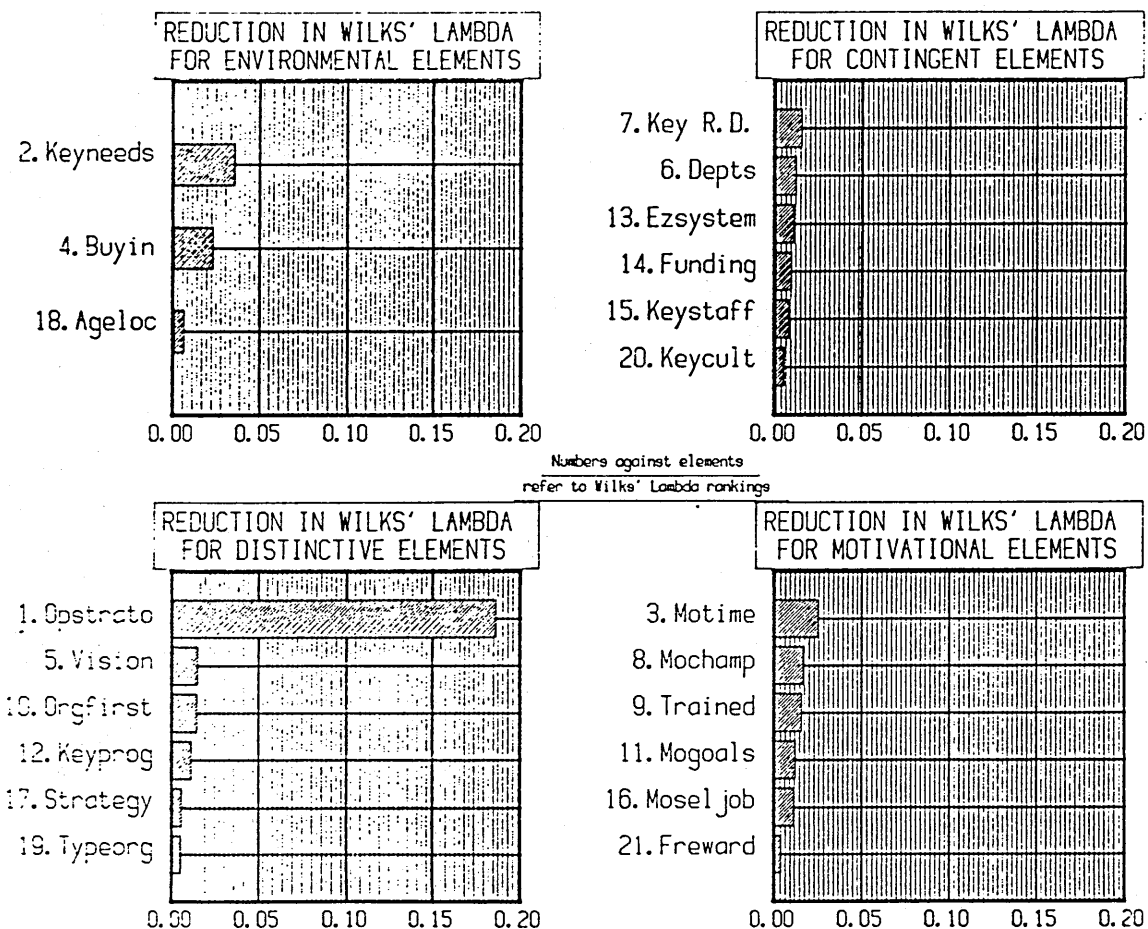
Using the summary of 21 elements as shown in Table No. 19 , we were able to prove that there is a positive association between those elements in formulating a strategy for innovation and a firm's innovativeness. We were able to show that there is a definite ranking as to how a specific element or a series of elements would stimulate innovation. This was confirmed affirmatively by the progressive improvements in the discriminant function as shown below in Diagram 9.2:

DIAGRAM 9.2: Discriminant Improvement Chart



This diagram indicates that there is a positive reduction between certain elements ranging from the ranking element (Opstrato which reflects the fact that a firm's strategic mission to innovate is known at all levels) by the first reduction of .0339 to the second highest ranking element (Keyneeds) and thereafter. The reduction for all of the elements are shown in the Wilks' Lambda Display chart below. There, all of the 21 elements were grouped as being a member within one of the four general categories stated above, are explained further. These groupings of elements are shown in Diagram 9.3:

DIAGRAM 9.3: Reduction in Wilks' Lambda Chart-21 Elements



The Environmental Elements reflect the overall strategic focus of a firm to scan and make strategic sense of its environment. They indicate how a firm gains an understanding of its customers needs, whether it engages in a pattern of buying innovation from other innovators as modified by its age and geographic location to support a strategy to innovation.

The Distinctive Elements are those elements which a firm's DMU uses to create, promote, and structure innovation - investigating and developing activities. They are the major stimulants of a firm's overall mission to innovate. They are

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called distinctive because as individual elements they distinctly give a firm the competitive advantage which separates it from other firms. They can be used in isolation by either users or non-users with equal effectiveness or can be used in combination with other elements.

The Motivational Elements are those internal elements used by a firm to create, reward, and stimulate a desired behaviour of innovativeness amongst its workforce. They are propelled forward by a series of behavioural and human relations management strategies. These elements range from giving an employee time off to innovate to a financial reward for being innovative.

The Contingent Elements are elements which are more short term and are used specifically, at one point in time, to meet a current and long term mission to innovate. These elements are directly affected by the amount of resources allocated to them and the style of leadership being exhibited at any one time within a firm. It is for these reasons that they are labelled as being contingent. They range from whether a firm uses a centralised department to develop an innovation to the type of corporate culture exhibited by a firm's values and its past history of being innovative.

It was also further confirmed affirmatively that users and non-users have distinct and different ways in how and which elements that they will use. The users were more likely to have a mission statement; grant employees time -off to innovate; use a separate department for research and development and engage in the formal training schemes for their employees in an effort for them to be more innovative. In contrast, the non-users seem to exert more efforts in getting to know the key needs of their customers; relied more on an entrepreneurial type of leadership; and use culture as a stimulant for innovation. These area few of the 21 elements identified above and they can be separated

accordingly. This was confirmed by using the mode of users and non-users to see which group was more likely to use one element over another. Below is Diagram 9.4 as to how the users used 13 of the 21 elements.

Diagram 9.4: Reduction in Wilks' Lambda-Users' Elements

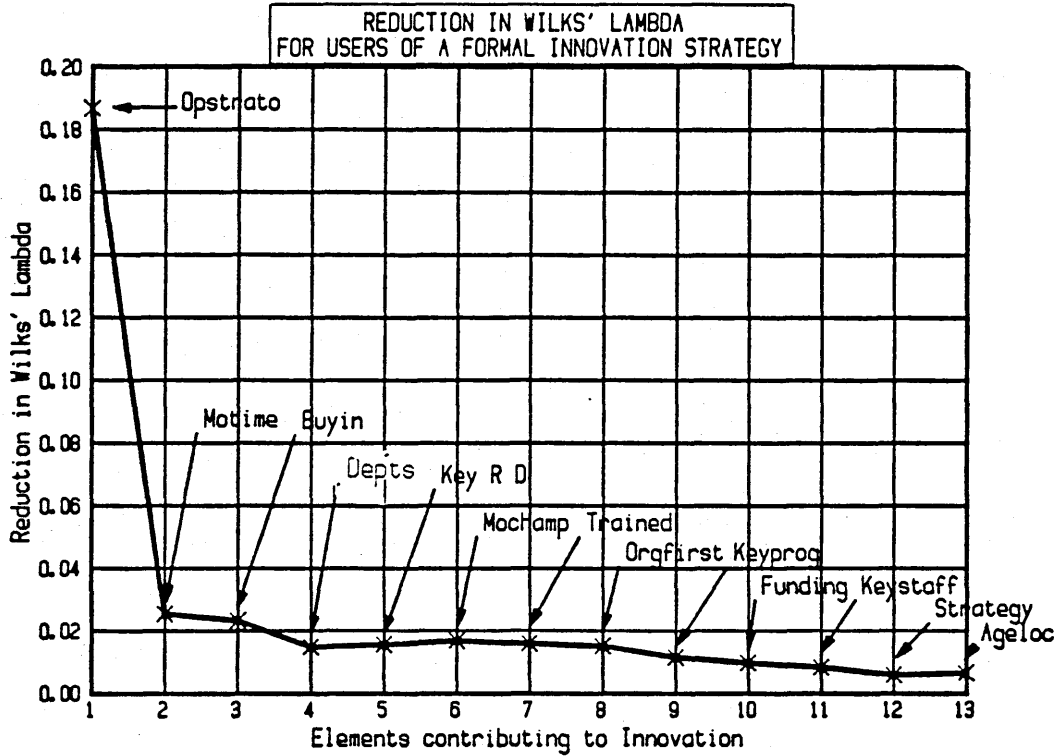


Diagram 9.4 shows that users by mode (51 percent or higher) within a group preferred thirteen of the elements versus eight by non-users. After the Opstrato element, the next two elements in the chain were Motime and Buyin were the elements that are noticeable above the .02 reduction axis. It is important to state that while an element could be picked by both groups, it is the mode that determines its placement, e.g. Opstrato was selected by 68 percent of the users, but only 31

percent of the non-users. Thus it was classified as a user's element.

DIAGRAM 9.5: Reduction in Wilks' Lambda- Non-users' Elements

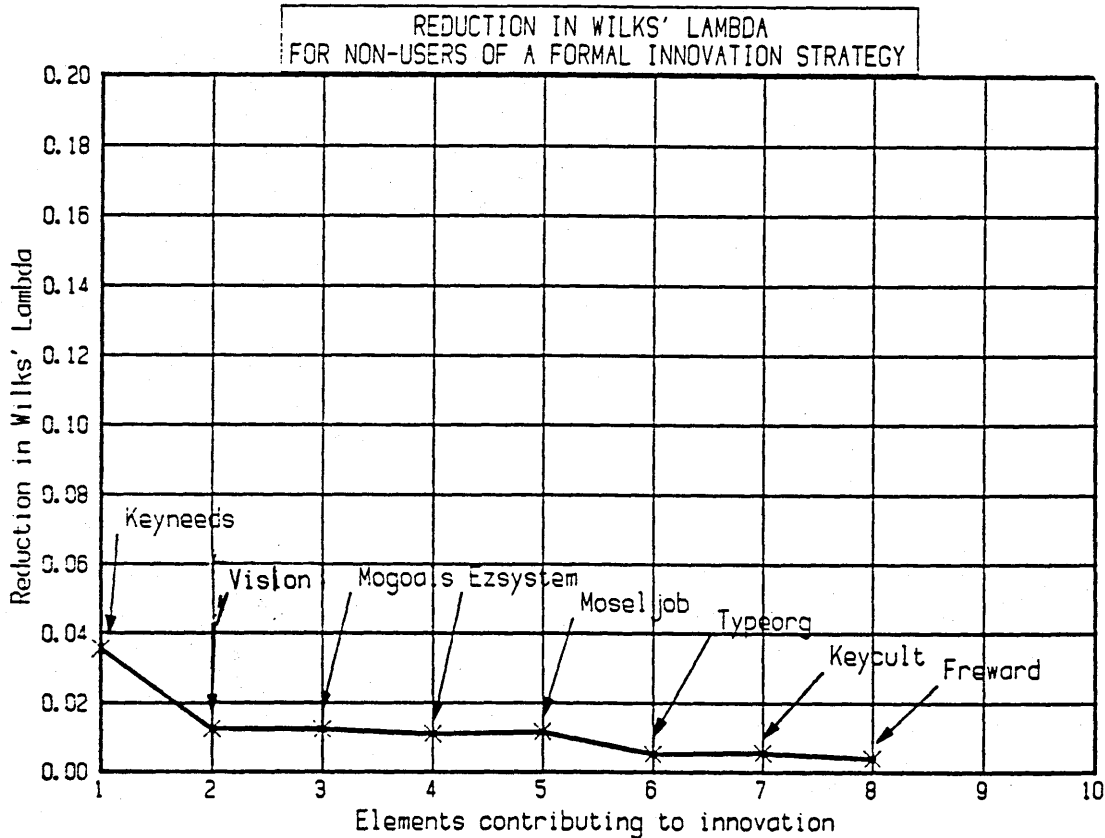


Diagram 9.5 shows that the pattern of non-users were more likely to cluster under the reduction axis value of less than .02 with the exception of Keyneeds. This could be interpreted to mean that there was a greater spread of responses around an element. This finding was correlated by the data in Exhibit 2 that respectively most non-users have less formal methods to conduct their business. Further, they are less likely to exhibit a set of developed patterns as to how they think strategically.

2. Based on the above ranking of elements, we agree with a majority of academics and managers that a common problem is the

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sustained development of an innovative effort (Taylor, Tushman and Naylor). We conclude that the four major groups of elements into which all other elements can be grouped accordingly provide this substantially. It is by their linkage that an innovative strategy by a firm is sustained. The differences between users and non-users in Diagrams 9.4 & 9.5 are noted accordingly.

3. It is confirmed affirmatively that a firm's grand strategy (opstrato) is the paramount element for a firm having an effective strategy for innovation. We hypothesise that elements 2 through 21, in concert, reflect a firm's sovereign element and forms the strategic framework in which all management decisions are made.

4. It is confirmed that a firm's technological strategy (strategy) can exert a major influence on a firm's mission to innovate. However, the fact that it was ranked 17th out of 21 elements indicates that a combination of other elements may be more important. We hypothesise that the technological strategy reflects a firm's position when compared to other elements as to how a firm will evaluate strategic options available to it and how it prefers to compete. It forms a pattern of management which is incrementally- used to give a firm a sense of strategic direction. It is best used as a lower ranked strategy, similar to a military manoeuvre.

5. Whether users of a formal strategy will exhibit a higher degree of innovativeness was deemed initially as being inconclusive by the investigation. There are two reasons for this. The first being the fact that three of the 26 firms ranked as being the most innovative of the sample were non-users. They represented about 11 percent of that group. Second, the criteria for evaluating users was too broad. This was further confirmed by the fact that having a formal programme for innovation (keyprog)

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was ranked as only 12th of the 21 elements, although 68 percent of the users indicated they used one.

However, after reviewing the initial self classification by the firms and by a subsequent re-classification, it was confirmed affirmatively that these three non-users were indeed users by the criterion of them having five or more of the nine essential features which were used to classify users of a formal strategy.

6. It was confirmed affirmatively that the older the firm and the more its strategic mission is externally focused, the more innovative was its strategy. We further hypothesised that all successful firms are innovative and a firm's efforts to combat obsolescence are key contributing factors. These were confirmed over and over again in the post interviews, by our Tables no. 13-15, and in Exhibit No.2.

7. We conclude in Chapter Two that the first core of strategic management should deal with all aspects of strategy formulation (p.60) and the second phase of implementation should address the organisational design and behaviour patterns of a firm's managers. It is owing to a poor implementation of motivational and contingent elements in a firm's second phase of strategy-making that most firms fail.

8. We accept the importance of the experience of a firm as a sovereign strategic element for a strategy for innovation (Andrews, 1975 and Stephen, 1976) as stated in Chapter Three.

9. We accept the beliefs that the four generic strategies of business are directly based on the military. Further, we hypothesised that by using their principles, a typological ranking of eight or more strategies could be developed (Appendix B and Figure 8.4. on p.305).

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10. Furthermore, we agree with Newman, Katz, Hofer and Schendel, and others cited elsewhere that a master (grand in military terms) strategy requires a mission statement and a goal-setting process within its strategic formulation process. This forms the common and unifying thread of strategy that Ansoff refers to. This is confirmed by Cyert and March who state that the negotiating of goals within a firm creates this thread of a common goal which all stakeholders can agree to.

11. We also agree that a theory of competitive advantage and synergy (Ansoff's) should be blended with the components of sequencing, timing factors, and a technological strategy (Newman). These in turn should be modified by the development and updating of a firm's competences-skills, and core technology-as critical success factors (Andrews), and the use of a resource allocation system (Hofer & Schendel).

For the creation of a strategy for innovation versus other generic strategies, one must add a series of behavioural-rewarding strategies (Adams, Forster). We suggest that the punctuated strategic concepts are needed to reinforce and update the workforce from time to time (Forster). And the use of a formal programme for innovation-investigating (Pinchot, Drucker and Kanter). We hypothesise that most innovations developed in-house by a firm arising from a programme will come from less than five percent of its workforce, (Type II).

These features, in total, constitute the nine elements as set out in paragraph 8.11.1 which classify a user of a formal strategy. These were the theoretical sources of the criteria used earlier to determine if a user had at least five of these elements in their responses.

12. In the assessment of the Leadership Rules as shown in Table No. 18, only a small percentage of the sample (less than 11

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%) indicated that they used them explicitly. It was confirmed conclusively that there is "not a one best way to innovative", except over 84 percent of the sample indicated that financial and manpower planning was a vital component of a strategy for innovation. We hypothesised that this supported the need for an organisational development plan to be placed parallel to a strategy to innovate. It is needed to balance and fund a long term strategy.

Further, in an effort to support the objective of how innovation can be stimulated, and to validate this investigation, the following statements of Paul Cook, founder and Chief Executive Officer of Raytheon, (the Harvard Business Review, March-April, 1990, pp.97-103) are submitted:

' To be an innovative company, you have to ask for innovation. You assemble a group of talented people and put them in an environment [culture] where innovation is expected. We get innovation because our corporate strategy is premised on it. You won't get innovation without pressure and you learn to spend as much selling it as developing it. Most people want to be creative and they all respond to recognition for being so. You must make sure that people are talking to each other and this is done regularly.. Also by innovating, we avoid competition, in fact we use partnerships with others competing firmsit's that simple- and that hard...Every company is innovative or it just isn't successful. It is just a question of degree how innovative.'

9.3.1 PRECIS -FORMAL USERS OF STRATEGY

The précis for users of a formal strategy for innovation as taken from Exhibit No. 2 is as follows:

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(a) The users as a group were more likely have a combination of innovation accomplishments versus the responses of the non-users (Exhibit 2:10).

(b) Users exhibited more of a proactive type of management than non-users. They were more likely to innovate in order to exploit new opportunities and to gain a competitive advantage than non-users. (Exhibit 2:11).

(c) Users were almost evenly divided about using outside experts to stimulate innovation amongst their workforce (Exhibit 2:12).

(d) Users were twice more likely than non-users to view their workers as being innovative and trained and ranked them as one of their greatest strengths (Exhibit 2:24)

(e) By one and a third margin, the users were more likely to project their future needs for promotional and marketing activities than non-users (Exhibit 2:31).

(f) Users were one and a half times more likely to incorporate technological advances as an element of their planning than the non-users (Exhibit 2:33).

(g) Users indicated by mode of responses that most of them would plan from 3 to 5 years ahead versus non-users, who indicated a mode of responses clustered around 1 to 2 years ahead (Exhibit No. 2:34).

(h) Over two-thirds more users indicated they used a mission statement for being in business than non-users (Exhibit 2:36).

(i) In the use of manuals as an element of their business plan, one out every two users indicated they used them as in

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comparison about two-thirds of non-users indicated they did not use them at all (Exhibit 2:37).

(j) Over two-third of users had a programme for innovation which was about six and a half times greater than non-users (Exhibit 2:42).

(k) A greater percent of users viewed themselves as Pioneers than non-users (Exhibit 2:43).

(l) Users by a three to one margin seemed aware that innovation requires greater investment and risk than non-users (Exhibit 2:48).

(m) Users as a group expressed a greater belief in using innovation purchased from the research results of universities and from making licensing arrangements as options in being innovative than non-users. However, four out every ten users expressed a preference for developing innovation "in-house" rather than purchasing it and noted the questionnaire accordingly (Exhibit 2:50)

(n) Users by a two to one margin believe in performing a pilot project first in developing an innovation when compared to what non-users suggested (Exhibit 2:50).

(o) Users indicated a greater number of responses for allocating time for employees to develop a proposal for innovation than non-users (Exhibit 2:50).

(p) Users indicated the hiring of entrepreneurial personnel as one of the key factors for one to be successful in developing innovation. This was not equally represented in the responses of non-users (Exhibit 2:52).

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(q) Over 68 percent of the users had an innovation-investigating department (Exhibit 2:55).

(r) The differences between users and non-users when innovation-investigating were noticeable by how they ranked the importance of R & D and the use of employee suggestion programmes (Exhibit 2:57).

(s) Users used a greater variety of organisational structures than non-users (Exhibit 2:59).

(t) Users indicated significant differences by means and standard deviations when compared to non-users as to how a strategy is developed for innovation and how management articulates its mission (Exhibit 2:65).

(u) Users indicated major differences in the means and standard deviations when compared to non-users as to what extent management makes bold, wide-ranging strategies and is the first to introduce a product or service (Exhibit 2:66)

The most representative interview of the users' group was from Respondent YY, Opportunist- User, Deputy Director of a Japanese Electronic Firm,

"... We practice that a strategy for innovation lies within each employee. When they are exposed to all aspects of the business, their abilities are stimulated to be more innovative which we do by re-assigning them every two to three years... We do not believe in the product life cycle. They are no more than logarithmic projections after the fact. They are false to a degree because of two rate factors. The rate that the market will absorb an innovation and the rate that an employee will absorb the complexities of an innovation... You, theorists forget that distributors do not always accept a new product because it is new, they have financial commitments to existing stock. They will only want what their customers are demanding. And customers do not like to replace one product with another unless there are significant costs reduction techniques in it

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being purchased or a huge profit generator for them. WHEN ASKED ABOUT HOW THEY GENERALLY MANAGED.. Each supervisor is allowed to manage anyway he feels fit, the number of hours, type of employee he hires, and so on. But don't forget once a person become a supervisor, we generally know how they are going to manage. HOW DO YOU SEE YOUR FIRM OVERALL AS AN INNOVATOR... Being one step ahead of production, walking side by side with the marketing department and customers, and one step behind our competitors. WHY ONE STEP BEHIND? ... We make profits and customers off their mistakes, we improve where their products are the weaknesses. IS YOUR FIRM'S MISSION TO INNOVATE CLEARLY UNDERSTOOD.. It seems like it is repeated everyday WHAT IS THE BIGGEST MISCONCEPTION WE (researchers) HAVE ON STRATEGY? Your business school models are too simple, I personally like them more detailed outlining exactly the big picture...

9.3.2 PRECIS-INFORMAL USERS OF STRATEGY

The precis for the non-users of a formal strategy is as follows:

(a) Non-users were more likely than the users to say that they would explore the need to innovate, foremostly as a mean to protect their markets. This could be interpreted to mean they are more reactive to their competitor than users (question No. 14-Exhibit 2:11).

(b) Non-users were one and a half times less likely to use an expert to stimulate innovation amongst their workforce (Exhibit 2:12).

(c) Non-users were three times less likely to view their facilities and location as their greatest strengths (Exhibit 2:26).

(d) Non-users indicated that a lesser amount of them than users felt their strategy was best for them (Exhibit 2:44).

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(e) Non-users expressed a greater tendency to use small work groups and goal-setting sessions as one of the ways to motivate their workforce than users did (Exhibit 2: 45).

(f) Non-users by a three to one margin indicated that one of the negative results which would happen if they innovate is that a competitor would copy it before long (Exhibit 2:48).

(g) One of every four non-users believe the best way to purchase innovation is to acquire the firm that perfected it (Exhibit 2:50).

(h) Non-users indicated overwhelmingly that they would be more successful at innovation if they had a clearer vision on what is possible (Exhibit 2: 52).

(i) Non-users' responses on the way their firms were organised correlated closely with the fact that they were non-users of a formal strategy. Over 56 percent of them did not have an innovation-investigating department of any type (Exhibit 2: 55).

(j) Non-users' responses clustered around knowing customers needs and having a visionary leadership at the top as the key factors for a firm being innovative. None indicated that they would establish links with innovator (Exhibit 2:56).

(k) Non-users were more likely to use a traditional method of managing by delegating downwardly compared to users (Exhibit 2:59).

(l) Non-users were more likely by a one to four margin to operate by using profit centres than users (Exhibit 2:62).

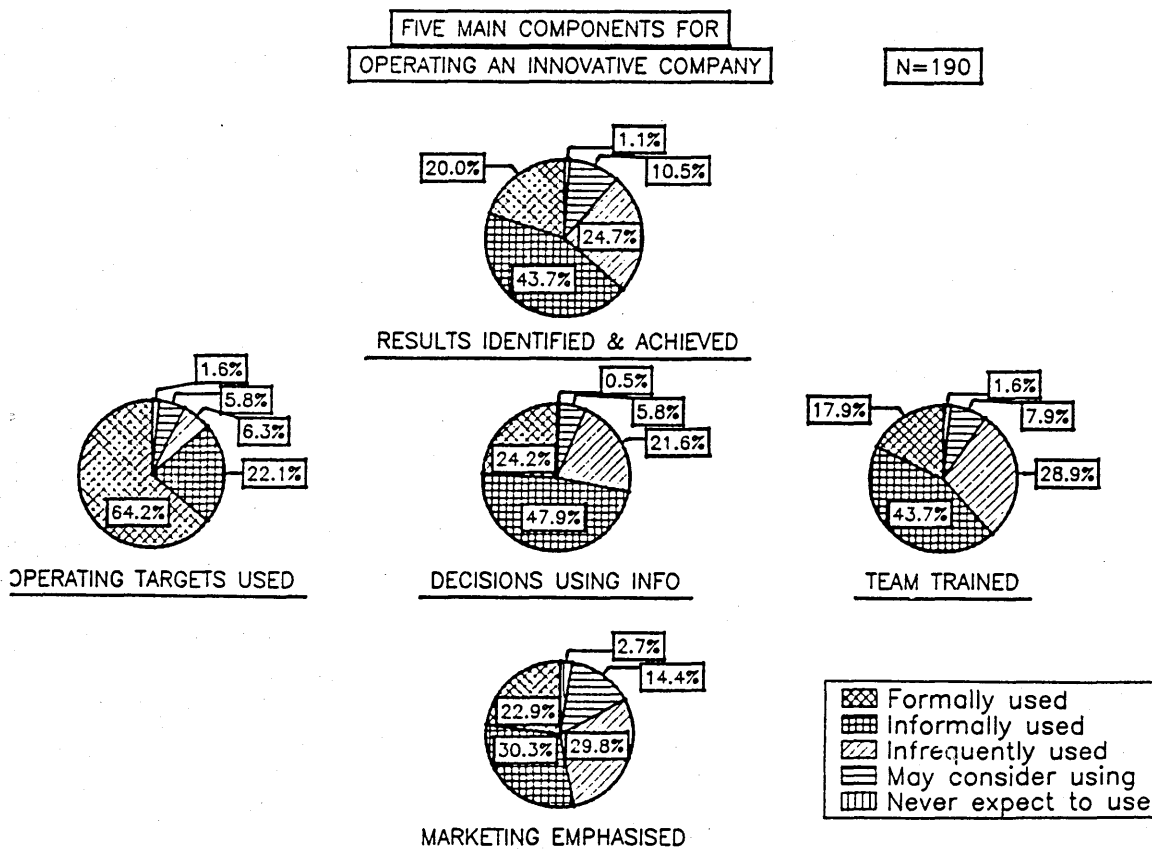
(m) Non-users ranked that the number one way to motivate personnel in being more entrepreneurial was the nurturing of product champions (Exhibit 2: 63).

9.3.3 SETS OF COLLECTIVE CONCLUSIONS FROM USERS AND NON-USERS

Although the sample exhibited a wide range of responses as to how innovation can be stimulated, there were three sets of conclusions which users and non-users, collectively, have to offer. They should not be considered as supporting a belief that there is one best way, but a ranking of what empirically was found best for the respondents.

The first set of conclusions was the five main components for operating an innovative company. They ranged from a firm setting precise operating profit targets at 86.3 percent to how marketing opportunities are emphasised at 60.3 percent. How respondents differ as whether they informally or formally used them is displayed in Diagram 9.6 below:

DIAGRAM 9.6: Five Main Operating Components Chart

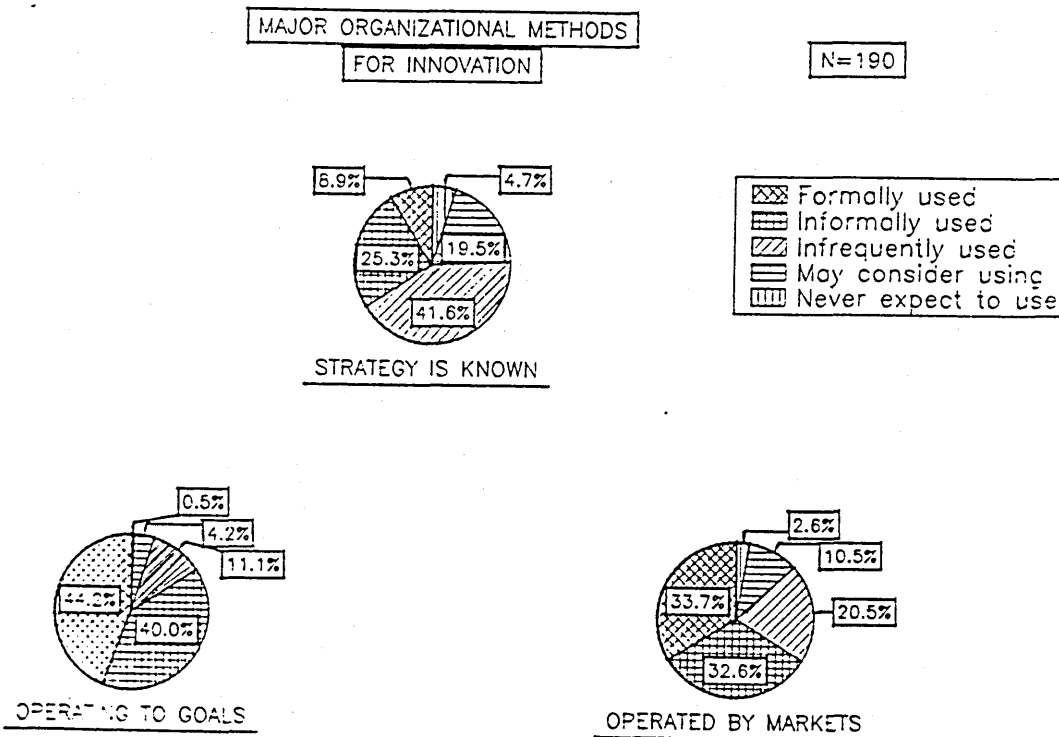


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The second set of conclusions to which they, collectively, substantiated were that there were three major types of organisational methods which both the users and non-users found effective.

The major organisational methods (informally and formally used) range from a firm using precise operating goals as business objectives at 84.8 percent; operating by a known strategy at 66.9 percent; and operating by market segments at 66.3 percent. Some firms used all three, but the majority of them (2 out of every three) used at least two of the methods as shown below in Diagram 9.7:

DIAGRAM 9.7: Major Organisational Methods

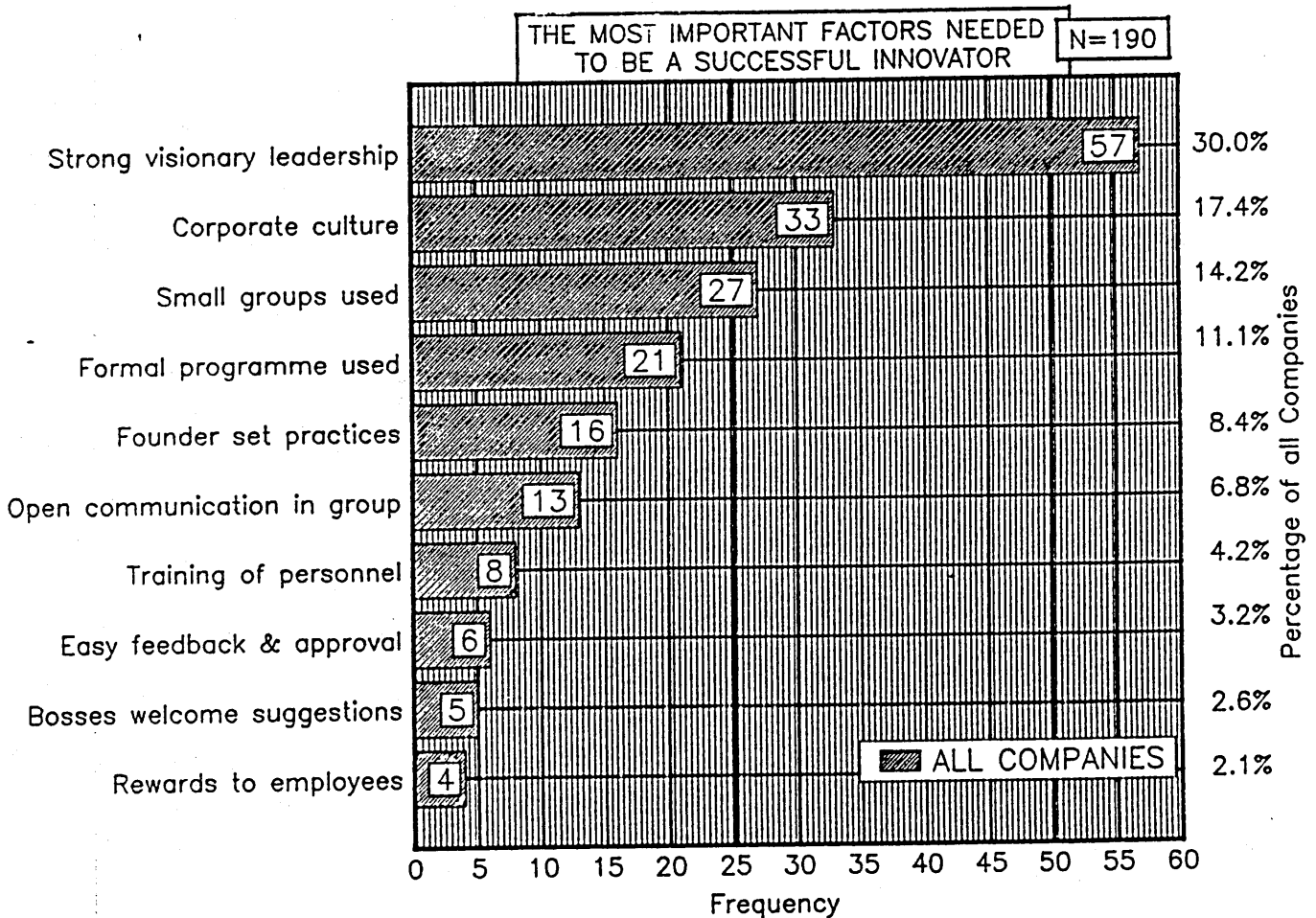


These indicators are separated as whether they were formally used, informally used, infrequently used, may consider using or never expected to be used. They are excerpted from Exhibit No. 2,

the percentage of each group's responses as to whether they were from either users or non-users are tabulated, accordingly.

The third set of conclusions reached, collectively, by both users and non-users were the ranking of factors they determined were needed to be a successful innovator They are presented in Diagram 9.8 below:

DIAGRAM 9.8:
Most Important Factors for An Innovative Firm



9.3.4 HYPOTHESISED IMPLICATIONS ARISING FROM THE INVESTIGATION

There are seven implications arising from the investigation. The first is the implication that managers must constantly fight

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first is the implication that managers must constantly fight against managerial ignorance as a psychological factor. This is based on whether or not they have been successful in stimulating innovation. This we refer to as the "nescience factor". It is the chief ingredient in which a gap-filling analysis of a DMU's strategic focus is formed against.

The second implication is that a fair number of firms used to have a more formal system of planning, but choose to discontinue using it. The third implication is that a technological strategy either locks in or opens up the variety of strategic options that a firm may reasonably pursue. Depending on whether a firm is a Follower, or Pioneer, etc., this forms the strategic options and constraints available to a firm.

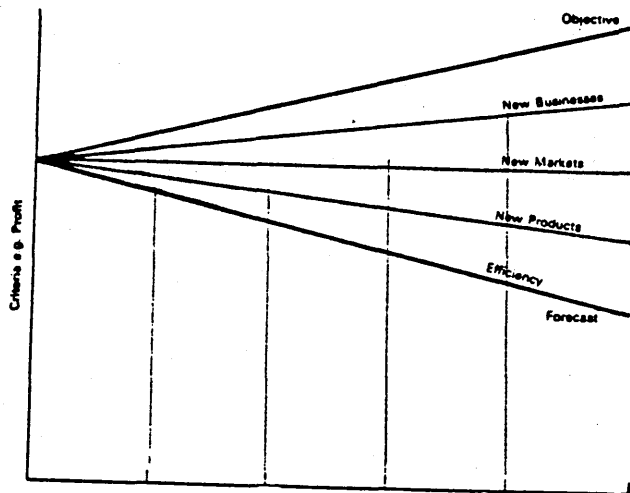
The fourth implication is the importance of the organisational development plan to fuel and balance a strategy for innovation. This infers the fifth implication as to how a strategy for innovation should be placed in parallel to a firm's organisational development plan in order to describe what we call as the "polyvalent firm". This is the type of firm which is able to deal effectively with current operational problems, whilst developing an innovation for the future.

The sixth implication is how the product life cycle concept can be used in the stimulation and management of innovation. The seventh and final implication is a model to verify the updating of a firm's core competences and the importance of a human resource model to combat obsolescence as part of a strategy for innovation. All of these implications were sources of interest from the interviews held with respondents as outlined elsewhere.

9.3.4.1 NESCIENT GAP-FILLING MODE

The first premise on which this investigation was based is that all firms have a strategy of some type. It is the degree of knowledge to which the DMU seeks that is the key. It may range from being very aware of environmental changes or not aware at all that makes the difference. This factor represents the nescience approach of management. It may be why some firms prefer an informal (unwritten) strategy as a method of directing their businesses. Diagram 9.9 below indicates the type of strategic options a gap-filling analysis may consider.

DIAGRAM 9.9: Direction-Growth Gap Analysis



This diagram as developed by Stanford Business School (Taylor 1977 :164) indicates that there are four basic options available to a firm as strategies to greater growth and profits. The analysis is calibrated by a series of five hash marks (representing one year each) will indicate how long it would take as an average to reach the objective. The easiest way (one

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year or less) is to raise the efficiency in a firm's present business proceeding through the most difficult (over five years) which would be the acquiring of new businesses in un-related fields away from a firm's core competences.

We believe that a DMU in the throes of ignorance and skills obsolescence generally will opt for using innovation to improve its firm's efficiency and seldom considers new product development. This raises issues for future research

9.3.4.2 EMPIRICAL VIEW OF PLANNING

The second implication we explore is that a typical non-user respondent was more likely to avoid the process of formally planning for the stimulation of innovation unless there is some assurance that the process will work. Several non-user firms expressed this view and one in particular, Respondent VV at the 2nd symposium. His following statements may be representative as to how other non-users think:

" the irreversibility of starting such a strategy has wide implications in the event we fail, and no one has spelled out the exact consequences of our firm not forming a strategy for innovation. We had a bottom line about 14 percent greater this year than ever, why should we change?....If we believe what we read and hear about how fast the world is changing, and if the business world is suppose to change so rapidly what if we do jump on the bandwagon and find it going in a different direction than we planned."

This view has currency, even though firms such 3M corporation, Digital Equipment Company and others are showing the way. Many are eschewing the opportunity to take on innovation regardless of what their examination of the strategic models reveal. They just do not see the trade-offs being offered by innovation as large enough to compensate for the way they are presently operated.

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Instead many firms are succumbing to a tremendous pressure to superficially attack their problems. This could be traced to how the future is being portrayed as increasingly more hostile in a rapidly changing environment. When a theorist writes that the environment is turbulent we think he/she probably means that something is going to happen or happened that they did not anticipate. Yet in theory an organisation can control its future to a certain degree by the use of planning.

In fact, if one reads the same authors starting in the 1950's, 1970's and straight through, (Drucker is a good example) they are constantly predicting that the environment is in a turmoil and going through turbulent period. They were probably right, but that is the way the world always has been and planning can not cure a changing world. But it can provide a strategic view as to how fast the environment is changing.

The other observation on this implication was that a fair amount of firms in the sample (we hypothesised that about 10 percent of the non-users in the 301 to 1,000 employees band) returned back to an informal system after abandoning a more formal process. This is more or less confirmed by the words of a non-user Respondent LL, below:

" One of the strategic things that we tried here was a long range planning system. It was dynamite when we first put it in place, it made our thinking fresh, the form and process was painless.... Then, some eight years later the meetings got longer, the covers of the reports got harder, the diagrams became more and more sophisticated. The process kept getting longer and longer. Last year, we cut back and start meeting into group of seven or less and we became idea-oriented again. The freshness is back."

The implications of this respondent and others are the foundations for further research whether firms are

deliberately selecting an informal way of planning after using a formal method.

9.3.4.3 HYPOTHESISED STRATEGIC FOCUS MATRIX

The third implication arising from this investigation was how the strategic focus embodied in a firm's technological strategy determines which strategic option a firm can pursue.

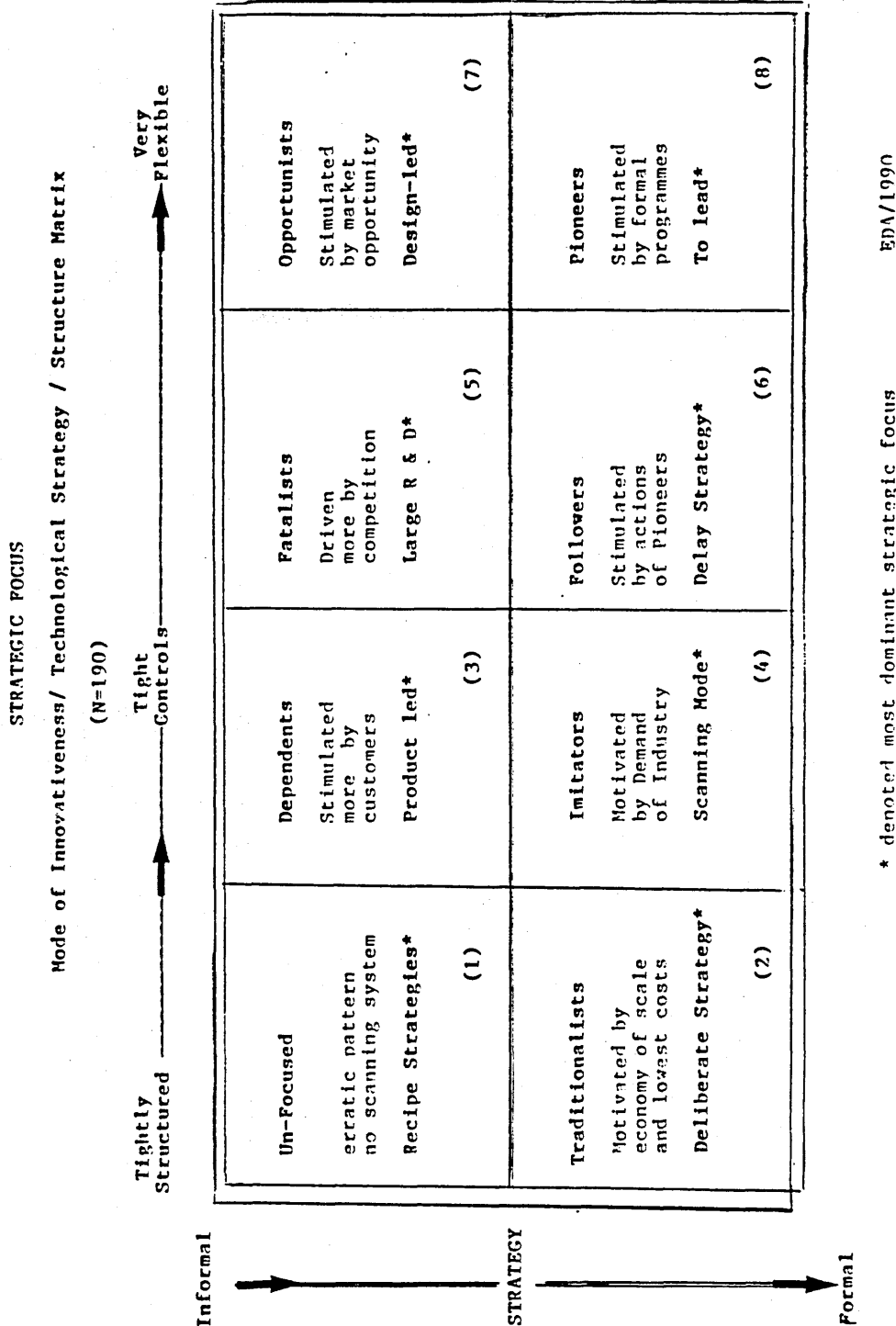
We hypothesised that a key component of a technological strategy is the ability of or the inability of a firm to scan its environment and make sense of what it sees. It was designed around these elements.

Based on its construction, using a firm's organisational structure, its formality of using a strategy, and its degree of innovativeness, we propose the following model in Diagram 9.10. as indicated on the next page.

This strategic focussing matrix implies how it can be used to formulate a firm's grand strategy. One of the few axioms in the literature is that a firm will go through several sequential stages in use of strategic principles.

However, one of the misconceptions that most researchers in the field of strategic management fail to realise is that a firm will go through the strategic changes (internally) depending to a large degree on its history of being successful with one type of a technological strategy. We believe that a firm using a Traditionalist's strategic focus will probably only consider strategic options that are compatible to its initial strategy. The stages of development that a firm will go through have very little to

DIAGRAM 9.10: Strategic Focus Matrix



do with its age or size, we believe it will generally only consider to do more or less of a on-going strategy and from this, a new strategy evolves. A firm seldom strays from its basic strategy except in a hostile environment which

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generally forces a firm because of external changes. But, even under external and hostile pressures to change (debtors, new competitors, etc.), a firm (unless it has consciously decided to be innovative) will consider most of its options around its previous technological strategy.

For example, take a firm in position no. 1 in the upper-left corner of the matrix using Diagram 9.10. This position implies that the firm is tightly-structured, using recipe solutions for problem-solving, and using an informal planning system or an un-focused management style in general. These are traits which are symptomatic of a closely-held firm. The management in a scan of a benign environment determines that a growth strategy is feasible at this time. It has several strategic options available to it immediately.

From position No. 1, a firm can become more specialised and develop into a key prime sub-contractor in a niche-filling strategy. If that is the case, over time, the firm become a Dependent, position No. 3 where the firm is stimulated by the needs of key customers. There, a firm's tight controls and centralised decision-making are at an advantage.

Or, over time, the firm can become known for making a few standardised products. When a firm starts to manufacture these few products in larger batches, then it can move to position No. 2. This is the position of the Traditionalist. There, the technological strategy is to evaluate methods and innovations which will improve on costs and higher volume production. In the final analysis, it is actually more of an existing technological strategy that it previously used in position no. 1.

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The main strategic feature of the matrix indicates that a firm is more likely to move up and down and sideways by one position at a time unless it innovates. Then, the firm can proceed to positions 4 or 5. Position No. 5 should be avoided because generally it is controlled by large capital-intensive firms in a rapidly moving business environment.

A major innovation with a breakthrough could even move a firm to positions no.7 and 8. However, the firm has to have a sharply-focused strategy to do this and a well trained workforce.

The option for a Pioneer firm in position no.8 is to engage in a series of programmes and punctuated HRM strategies in order to sustain its position and profits. This firm's strategies should be directed to "downsizing manoeuvres" which is a series of methods to reduce staff and overhead or a retrenchment strategy. We hypothesised that large hi-tech firms will be considering these types of strategies with some frequency over the next decade. For example, IBM, in the first time in its history had a reduction in its workforce of some 150,000 employees and plans to do more of the same in 1991.

9.3.4.3.1 PURPOSES OF THE FOCUSING MODEL

We hypothesise that once a firm becomes locked into a recipe strategy regardless of its size and industrial position, it takes on the recipe strategy of firms in position no. 1. The difference being that a larger and older industrial leader can prolong its existence by acquisitions, spin-offs and mergers with more innovative firms.

The implication of how a firm implements its technological strategy by using this focussing matrix

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supports the view, here, that successful innovation depends upon a firm's scanning abilities. It is from a scanning activity that a firm gains an awareness that determines how it will act in the future and what type of strategic options are pursued.

Another feature of the matrix is that it can indicate to a firm how it should adjust its organisational structure and management style from an informal mode of strategy into a formal one, and when.

This strategic focussing matrix provides a factual basis for future strategy-making and has implications for further research.

9.3.4.4-5 HYPOTHESISED IMPLICATIONS FOR A NEW STRATEGIC FRAMEWORK

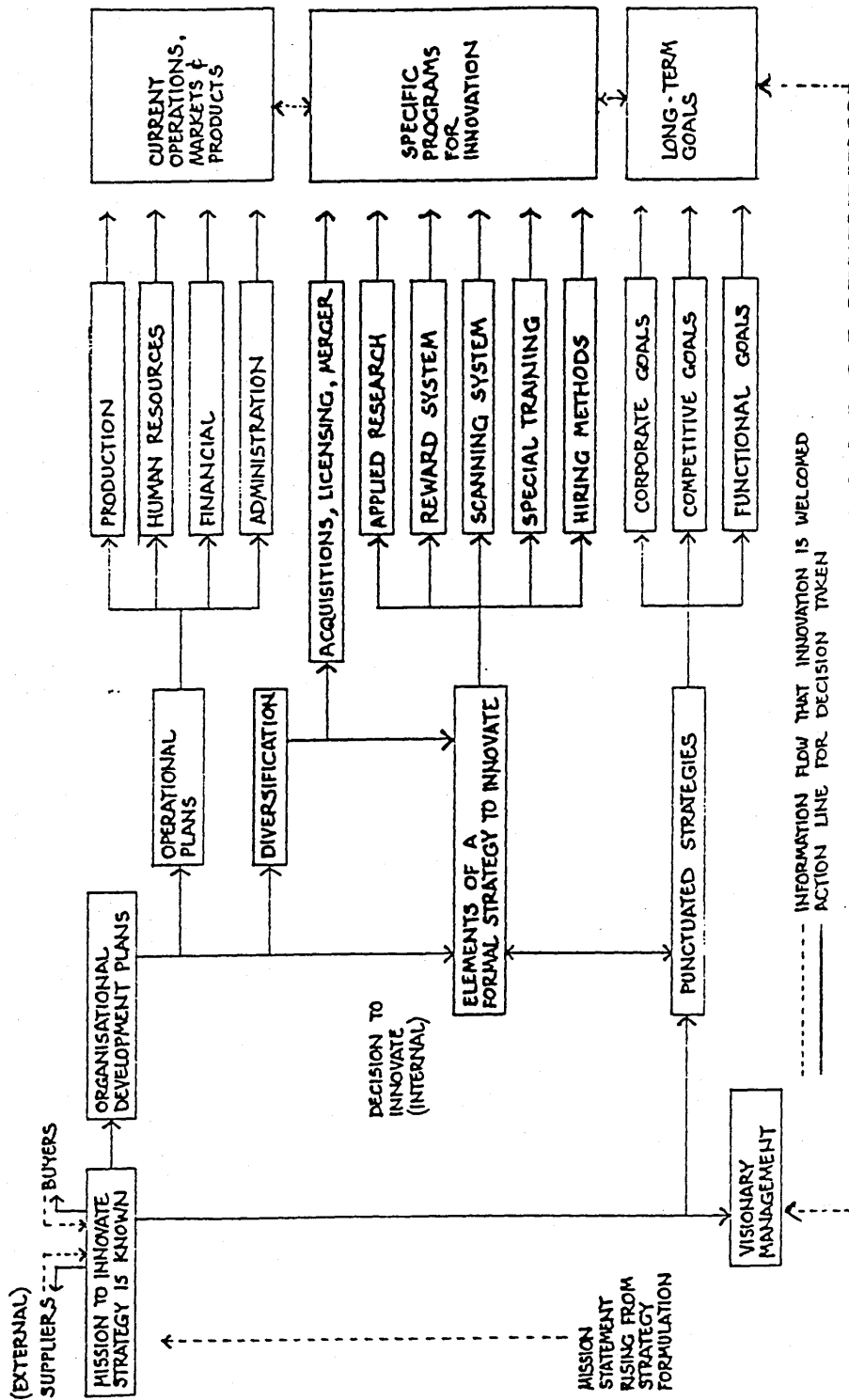
These fourth and fifth implications were first prompted by a direct question from a respondent as to how a strategic framework for innovation should be designed and how it would differ from a normal strategic plan. Research, into how other innovative firms have done it, produced the following:

- "It should be simple, complex strategies are an exercise in self-delusion" Waterman (1989:48) and from Kanter (1985:204) ..
- . "it [her (Chestnut Ridge Experience) must be parallel to an existing organisational structure; be linked by core skills and competences; has specific and formal programmes to stimulate innovation; needs a hierarchy with specialised tasks and functional groupings which cut across the entire sponsoring firm"

Based on the field work and on the re-analysis of landmark studies in the field of strategic management, we propose the model, as shown in Diagram 9.11 on the next page.

DIAGRAM 9.11: HYPOTHESISED BUSINESS PLAN FOR INNOVATION

STRATEGIC FRAMEWORK FOR STIMULATING INNOVATION



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This schematic of a strategic framework for innovation has several features. First, its most unique feature is that it shows three fundamentally different strategic processes going on simultaneously in a medium to large complex firm.

The top layer (operational plans) reflects the organisational development plans of a firm as it corresponds to a production-driven method of efficiency and meeting current operations, markets and products. From there, the funds are generated and loyalties (delivery, price and quality) to existing customers are kept. These are three elements which all future strategic concepts must build from.

The middle layer (elements of a formal strategy to innovate) indicate the six strategic options available to a firm in setting forth its strategy to innovate. They range from diversification by acquisitions, and licensing of an innovation to special hiring and training methods which are needed sometime in the future. The specific programmes for innovation may include a funding of employee suggestions to launching a fully developed innovation in a pilot study.

The bottom layer (punctuated strategies) reflects the strategic focus of management as modified by a firm's sovereign element. This is the element triggered by a DMU's concept of risk, history of successful innovating and behaviour of employees to accept change. This focus is directly transferred as to how a firm's corporate, competitive and functional strategies are implemented.

The relationship between the punctuated strategies of management, the elements of a formal strategy to innovate and the organisational development plan are critical links. It considers all the options which a firm may pursue from diversification, a

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decision to innovate internally and what the feedback from suppliers and buyers provides.

It should be clear by now that the strategic model presented here (Diagram 9.11) is more complete than some of the strategic models in the past as discussed in Chapter Four.

The dovetailing of a formal plan to innovate juxtaposed and between a firm's conventional strategies and its organizational development plan is one central feature; a clear mission statement is the other; but it, also, addresses most of the limitations of the earlier paradigms.

For instance, this strategic management paradigm combines Ansoff's narrow view of goal-setting and Andrew's broad view of it. This observation does not imply, however, that in some cases, strategies and objectives are not formulated simultaneously. Nor does it imply that strategy formulation and mission formulation processes do not overlap substantially. The key point is that the stimulation of innovation which is placed parallel to these two layers, should be and is distinct as to purpose and focus. Many of the other generic models do not recognize that possibility.

The other distinguishing elements, internally affecting the paradigm are:

(1) the elevation and importance of the mission statement being supported by a compatible reward system, culture-orientation assessment, and human resource strategic plan;

(2) the explicit identification of a firm's control for guiding the desired human reaction toward innovation were missing altogether from most of the models reviewed;

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(3) the recognition that the macro-organisation process is directly influenced by a firm's existing structure, and its culture is a key feature. By recognising this the personal choices of its managers to modify a strategy based on their own experiences is blocked. Thus, each of these elements has a dynamic feature and life of its own; and

(4) the model outlines how an organisation's strategy is reflected in its structure as to how it would handle the issue of culture, tell supervisors how to react to attempts at innovation and the results of group work satisfaction to innovate. The combination of these factors, in reality, determines whether a firm will reach its stated strategic objective and are implications for future research.

9.3.4.6 A STRATEGIC PRODUCT LIFE CYCLE CONCEPT

The advantages of the product life cycle in stimulating innovation has been cited elsewhere (p. 139). However, the gap between the literature and the responses from the interviews led us to hypothesise that a blend of the experience curve and the product life cycle features for the purpose of stimulating and controlling efforts of a firm to innovate.

From a competitive and strategic viewpoint, there are major implications arising from their use. These range from how prices will fall once a certain volume is reached to predicting how to price an innovation in order to reach break-even point.

However the literature (Abernathy and Wayne, 1974) often argues that excessive use of the experience curve and the product life cycle concepts can impede a firm's efforts to innovate.

We hypothesise that the combination, using the concepts of Utterback (1983), and the rate of product life deterioration

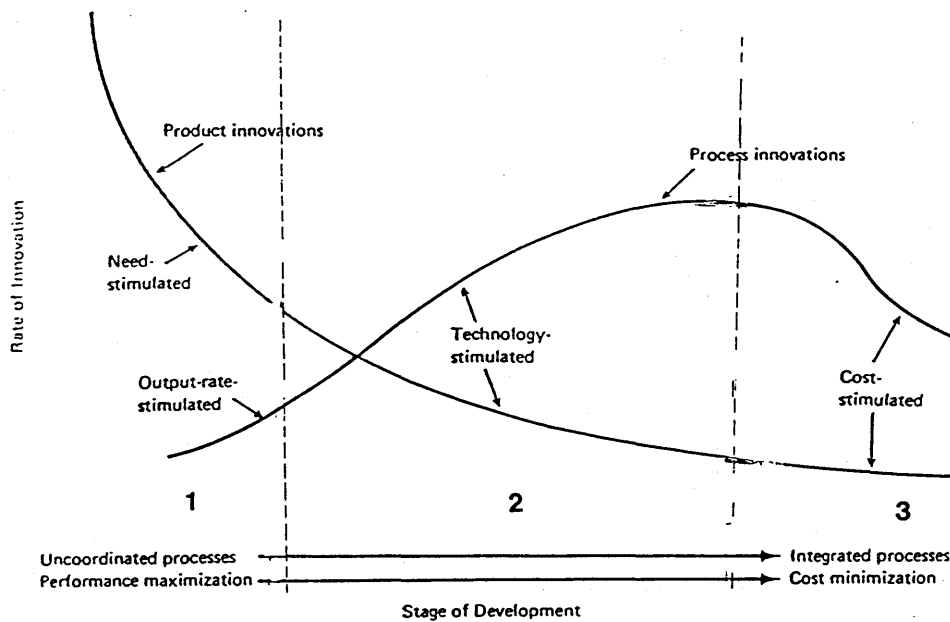
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will determine at what point that an innovation can be devised. His research indicates that there are four types of stimulants during a product life that stimulate an innovation.

For example, in the first stage, a firm should realise that most successful innovations are best directed to meet the needs of the market for an improved product or service that maximises performance; and the other stages are best stimulated by technology, costs and output rate improvement equipment.

These three stages are depicted below in Diagram 9.12 below:

DIAGRAM 9.12: Hypothesised Three Stages Innovation Cycle Chart



This chart outlines how a firm should innovate a product or process depending on what stage the product is in and how each stage is stimulated differently by a customer's wants

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representing either cost reduction efforts, output rate improvement, technology, or market need.

At each of the three stages, the formality of the innovative activities moves from an un-coordinated process into a more formal integrated process as the firm has greater experience with the product and as its useful life matures. This model does establish these relationships and the innovative process over a period of time in a strategic sense. It provides a view to an innovating firm on, generally, at what stage that a market-buyer would probably be seeking performance maximisation or costs minimisation from an innovation.

One of the problems with the experience curve and product life cycle analyses is that they do not consider a product having components with different levels of obsolescence. Thus, a firm has to develop an experience curve chart or product life cycle for each one. Secondly, their concepts are more internally-directed on how a firm will modify a product rather than externally directing a firm's strategy as to what a buyer may need. One of the prime features of this model is overcome this strategic shortfall from happening. Thus, there is an implication for future research here.

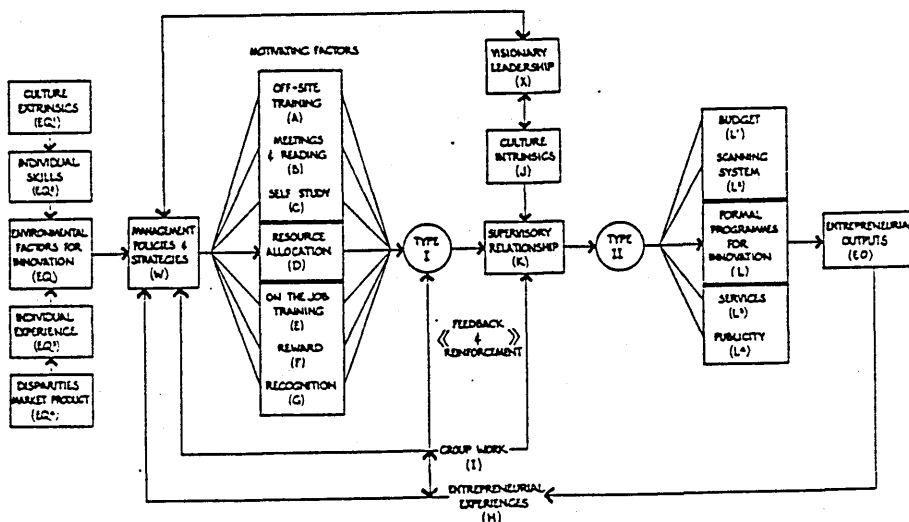
9.3.4.7 DIAGNOSTIC MODEL FOR COMBATTING OBSOLESCENCE

The seventh implication came from the interviews with the respondents in respect of their efforts to prevent the erosion of their core skills and competences. The importance of occupational obsolescence and its strategic effect was discovered at the first symposium held with firms in June, 1988.

It was ranked as the number one concern of the respondents as outlined in Table No.5 (p.229) as it was the obstacle most likely to prevent their firm from achieving its goals as an innovator. A

review of the overall conceptual model (p.230-3) as developed from meetings with some of the respondent firms, it was suggested that it could be used to develop a human resource assessment strategic tool to motivate learning and self-achievement by employees. Below is a reduced version of the conceptual model (Figure 8.2: p. 230) as a reference:

DIAGRAM 9.13: Diagnostic Use of The Conceptual Model



Diagnostic and Research Model

Within this model there are five main variables which could be used to combat occupational obsolescence: Entrepreneurial Output (EO); Management Strategies (W); Group Work (I); Environmental Factor (EQ); and a Firm Work's Experience (H).

We hypothesise that the combination of these variables could be linked into a human resource management (HRM) strategy in several different ways:

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1. Entrepreneurial Output (EO) equals Updating practices (A+B+ C+ D + E) times Management Strategies (W) times Environmental Factors in an individual (EQ) as directly reflected in a firm's Management Practices (X.J.K)

Or, it may be stated that Updating Practices (A+B+C+D+E) less Reward (F) and Recognition (G) plus Group work (I) and Firm Experience (H) equals Entrepreneurial Output (EO)

These combinations imply that the updated, innovative employee is the result of many factors: past formal education, the extent of self-achievement and task orientation, the effects of supervisory behaviour, actuation of management policies which stimulate learning, peer group reaction, on-the-job learning, and strategies to innovate. The linkage of these variables could be used to test a firm's strategy to combat obsolescence needed in an effort to be innovative.

2. The model, in turn, could test a firm's strategy to innovate against its existing corporate culture (Box J) and what new supervisory skills (Box K) are needed to make changes internally which are compatible with the environment.

3. The model could be used to make a review of the firm's current experience (Box H) and the achievement of its group work in meeting past tasks (Box I).

In stimulating innovation and combatting obsolescence, these measures are needed in the first strategic stages as to how a firm should assess the level of core skills updating needed to meet a strategic objective. Within each group, each employee is tested to see whether he/she shows evidence of being fully-motivated or not (Boxes A through G). It could be called the strategic point for future updating in the model. It can be said

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that (EQ + X.J.K) is multiplied by (I + H) = W + (A.B.C.D.E.F.G.).

These variables, operationally defined, could be used as a device for assessing an individual's level of obsolescence as well as his/her work group level of obsolescence.

Used as such, it could become a diagnostic tool for determining where training and updating of employee should be used to correct approaching obsolescence which will affect a firm strategically. In such an approach, there would be two main types of employees:

9.3.4.8 TO ASSESS EMPLOYEES CLASSIFIED AS TYPE I

For a Type I person, (the younger employee) there is a need to test which of his/her skills will be made obsolete by a new innovation.

Since this employee is generally the last to be hired, he/she should be the easiest to update if a radical innovation is revealed in the environment or a new strategy is being considered by a firm. Using the model, a firm should be able to assess what changes are occurring in a firm's business environment (EQ) and what new business strategy (Box W) should be developed by a firm's leadership (Box X) to accommodate them.

9.3.4.9 TO ASSESS EMPLOYEES CLASSIFIED AS TYPE II

For a Type II person (the older employee, who is entrepreneurial) there maybe a need to evaluate the future success of a project that he or she is proposing for funding from a firm's formal programme of innovation. Or to determine which of the older employees in several different groups should be selected to manage a new project.

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A look at the cumulative experience ($[(EQ.W + EO).K]$) of the group in being innovative in which the employee worked; the overall experience of the firm ($X.J + EO (I +H)$) in being innovative and entrepreneurial; and the factors exhibited by the individual ($[A+B+C D+E] + [(F + G). L]$) should project a firm's future innovative outputs (EO) of a project with this Type II person in charge. The equation would be: $[(EQ.W + EO)K + X.J] + EO (I +H)$ which is multiplied by $[A+B+C D+E] + [(F + G). L]$. This quantity is equal to future EO (entrepreneurial outputs).

The implication as to the value of such a diagnostic tool is a subject for future research. Since the role of human resource management is to be increased as part of the strategy-making team, the value for this type of strategic model should be measured.

9.4 SUMMARY OF CONCLUSIONS AND IMPLICATIONS FOR FURTHER RESEARCH

The results of this investigation demonstrate the complexity of innovation as well as the difficulty in causing it to happen. Yet, the facility and capability to develop successful innovation activities within a firm are crucial to the well-being and long-term survival of all businesses. The competitive pressures to generate greater productiveness and success are forcing firms to recognise that there is a need to enhance their ability to develop, and launch new products and processes in ever-decreasing time-frames.

This need to innovate is accelerating exponentially by the high level of new product failure, of small firms failing to make the transition to more mature organisations and conversely, the market share losses of many well-established multinationals who bring about their own demise by stifling their ability to innovate.

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These observed business phenomena indicate that there is a vital temporal dimension linking strategy and innovation which is missing and must be understood:

(a) why are some organisations more innovative than others at some point in time; and

(b) why do some organisations continue to be innovative over a long period of time whilst others experience significant difficulties after initial successes?

In examining and evaluating these patterns of development, we have come to the view that the problem of innovation, or challenge if you wish, does not usually arise from a lack of usable technology. It is, however, commonly connected to a set of strategic and organisational pathologies. They, in turn, are directly stimulated by four groups of elements linked to a technological strategy within a firm's overall corporate strategy: (1) contingent elements; (2) motivational elements; (3) distinctive elements; and (4) environmental elements (see pp. 330-8). It is clear that the firms which use most of these elements in a strategy are more successful than non-users. And the more of these elements are used, the greater a firm's receptivity to innovate is registered.

Furthermore, this investigation supports the conclusion that there is no one best way to incorporate these elements into a strategy for innovation. This conclusion holds true whether or not a firm's strategy-making is implemented in a formal or informal manner, an issue which is still open to further debate and research.

Whilst the literature on strategy-making containing a wide range of diversity, it is crystal clear that a firm with an integrated human resource component, a flexible organisational

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structure and the presence of a evolving strategic focus will improve its ability to innovate. This proposition is supported by the fact that this investigation established that 34 of the 36 responding firms in Appendix G which exhibited an above average receptivity for innovation were users of a formal strategy that encompasses these three factors. This is further supported by the sample in which 92 percent of the users indicated some type of innovative accomplishment when only about 18 percent of non-users indicate the same. This finding in Exhibit No. 2:9 makes this a clear conclusion.

At first glance, it may appear that there is a bias skewed to the cluster of 36 "most innovative" firms because of the industry they are in, such as the electronic sector of Scottish industry. However, the spread is representative of all industries surveyed: electronic firms being the biggest group with a total of 11 represents about 30 percent of this group. Others were 10 manufacturing firms; 8 service firms; and 7 pharmaceutical firms. Our investigation indicates that it is more important whether the firm used a corporate strategy consistent to its technological strategy rather than what type of industry it was in (i.e. Fatalist, Followers, Pioneers, etc). North American firms within this ranking were all electronic firms. This is because over 67 percent of population of the 93 North American firms residing in Scotland are electronic. Overall, the number of firms owned by Scottish Nationals dominated the ranking of being the most innovative within the sample. Since over 50 percent of the total sample were Scottish, this finding is consistent as shown in Table No. 6.

One of the confusions arising from this investigation is the term of innovation versus innovative accomplishment. Innovation is treated here as a process, whilst any innovative accomplishment resulting from this process is viewed as an investment into the future. However, the innovative

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accomplishment must give a firm a competitive edge by replacing the existing with an improved facilities, manufacturing process, operating structure, new product, etc.

9.4.1 RESULTS OF THIS INVESTIGATION

The investigation has set out to consider those elements linking strategy to innovation which is taking place, empirically, in firms located in Scotland. More specifically, the study was intended to investigate the primary objective as follows:

Whether those enabling elements which stimulate innovation within a firm and whether those strategic elements which create a formal strategy for innovation can be identified, isolated, linked, and measured

This investigation was able to isolate 21 out of 83 elements which could be used to stimulate innovation. The most sovereign element of them was a firm history combined with a strategic element as to whether it was known by the employees that their companies had a strategic mission to innovate. This element of having a strategic mission to innovate linked the association of the other elements and the flexibility of a firm's organisational structure to organise innovation -investigating and developing activities.

Equally, this investigation confirmed that the strategic framework to transform a firm into an innovative company was linked by some of the following elements: (1) a feedback system from the supervisory ranks to encourage an employee to innovate; (2) the use of a formal entrepreneurship programme with supporting services; (3) a budget for innovation investigating and developing activities; and (4) a scanning system which was responsible for the surveillance of those environmental elements most critical to a firm's success.

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The strategic focussing matrix developed within the investigation provides a strategic choice of being reactive (waiting for events to take shape clearly before responding) or proactive (anticipating the shape of events and acting quickly).

This investigation demonstrated affirmatively that a group of firms could be classified into different types of technological strategies. This has major import on how certain types of companies would handle future technology. These strategies indicated whether they would welcome innovation boldly or conservatively. This typology was based on a combination of the vision exhibited by the management of a firm, its organisational structure and degree of innovativeness which formed these strategies.

The investigation, therefore, adds to the growing body of empirical evidence that points to a relationship between nine essential strategic elements established in the literature and management practices to stimulate innovation. It also revealed a link, empirically and internationally, between the practices of innovation and the updating of skills training and how some international companies stimulated their employees to be innovative differently from Scottish firms.

It has to be underlined, however, that there is no suggestion in this investigation that the stimulating of innovation can guarantee a firm's future success in being innovative. Other factors such as whether or not its research and development is being done within a formal department as well as the type of management structure and leadership quality of the management team are important considerations. The impact of these factors has been demonstrated in numerous other studies.

The investigation was able to determine that the abilities of a firm to create an entrepreneurial organisational climate

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are critical to the rise and stimulation of innovation. In such a climate whether a formal strategy is used or not, strong visionary leadership and small group work can cause innovative accomplishments within a firm. But in a formal strategy to innovate, the amount of freedom given to an employee to take time away from operational tasks was viewed as crucial.

9.5. IMPLICATIONS FOR FUTURE RESEARCH

As discussed earlier, in paragraph 9.3.4 (pp. 346-64), there are seven implications arising from this investigation that warrant further research. They are:

1. that most firms are innovative to some degree, but it is the degree of ignorance which a Decision Making- Unit (DMU) operates in that determines whether a gap-filling strategy will embrace innovation. This raises an opportunity for more research. Specifically, this should begin to address issues related to whether or not a DMU 's managerial ignorance toward innovation is a psychological factor or formed by the type of technological strategy that a firm selects to use.

2. that firms which, in the past, used a formal strategy-making mode are reverting back to an informal method of planning. This is an issue for further research. Analysis should focus on those firms which abandon the practice of making strategy-making after using it for a period of time. The experience of these firms and their reasons for this change may indicate an emerging trend developing within the field of strategic management.

3. that the strategic focus of a firm is directly reflected in its technological strategy. The use of the Strategic Focus Matrix as shown in Diagram 9:10 for future strategy-making within a firm has implications for further research. Additional research should determine whether or not a firm's strategic focus

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will change over time. And if so, does it only consider future strategic options that are compatible to its original technological strategy in two basic directions: either to become more formal in its strategy-making or to become more flexible in its organisational structure.

4. that innovation requires a different type of strategic framework to which a hypothesised business structure was proposed (p. 356) and the merit of its use requires more research. Specifically, whether there are any advantages in using a three-tiered strategic framework to stimulate innovation rather than a single tiered or matrix type of strategic structure.

5. that the culture and structure of a firm combined with a mission statement to innovate in which employees are rewarded according to their ability requires additional research. Current research is already addressing these aspects, but there is a need to focus attention on the specific effects as to how a new innovative culture can be established in an existing structure by the training of a firm's supervisors. Thus, further research measuring the effects of a firm's mission to innovate using supervisors trained in how to handle innovative attempts by their employees is needed.

6. that a strategic product life cycle chart is needed in which a firm can project at what stage that a customer would seek innovation in an existing product or process. This is shown in Diagram 9.12 in which there are three distinct stages. Research should be directed as to how each stage will stimulate a different type of innovation.

7. that a human resource strategic model is needed to combat occupational obsolescence occurring in two distinct different types of employees is a subject for further research. This should be set out to look at the effects of updating the

core skills of Type I and Type II employees as a triggering force to combat obsolescence and stimulate innovation at the same time.

9.5.1 FURTHER RESEARCH ISSUES

The issue of innovation within multinational corporations (MNCs) is one topic which has received relatively little attention within the field of strategic management (see p. 22). Research on MNCs' strategy and structure largely examines how the head office and its foreign subsidiary interact. The consequences from the perspectives of how MNCs manage innovation across physical, cultural and organisational boundaries is a topic worthy of further research (Tushman and Moore, 1988:499-517).

With respect to future research directly related to this investigation, there seem to be three directions available:

First, the replication of this investigation in other areas of the world which would establish whether the relationships between these elements could be uncovered elsewhere.

Second, a longitudinal and more detailed study of the link between strategy and innovation with the most innovative firms in this sample would offer another opportunity for future research. This could also address the issue of size and age of a firm by incorporating firms with less than 51 employees and have been operating less than seven years into the sample.

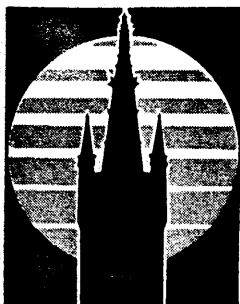
Third, there is an opportunity for further research into the testing of the seven hypothesised implications as outlined earlier.

In conclusion, it is important to mention that current and past research seem to indicate that all possible types of organisational innovation (formal or informal) cannot be

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bracketed together. This tends to reject a unitary innovation theory as the one best way to innovate. However, there is a linkage in which several elements will dominate in producing a more sophisticated method of strategy-making in which a firm can innovate. This investigation clearly indicates that innovation does occur when a synergy is created between employees, customers, and suppliers in some type of strategy.

Thus, any future research as to the linkage between forms of strategy-making and the stimulation of innovation is a topic that will be welcomed by all quarters of the academic and the business communities and would definitely advance the field of strategic management.



Glasgow Business School

page 1 of 8
SURVEY ON INNOVATION & STRATEGIES FORMULATION

Please return by SAE to:

Errol D. Alexander-1989
Glasgow Business School
University of Glasgow
57 Southpark Avenue
Glasgow G12 8LF

Should be returned **within two weeks** of receiving

PART ONE: RESPONDENT AND FIRM PROFILE

1. I am completing this survey because: (tick one below)

- a). it was addressed to me 1.
- b). delegated to me by addressee 2.
- c). forwarded from addressee to me 3.

2. My Name is: _____

Title of Position held: _____

The Company: _____

No. of Employees in this location _____ Parent Company size _____

Description of Business: estimate your years in business at this location _____

(tick one below for your core business purpose)

- Mfg. 6. Service 7. Jobbing 8. Research 9.

Instructions and Notes for completing this survey:

For the purpose of this survey, an **innovation accomplishment** is any new management action/plan which gives your company a competitive edge. It could be either: a new operating structure, new product/market opportunity, new sales policy, new facilities, new mfg. process, new assy. method, new equipment, etc.

There are 32 questions and will take over a half hour of your time to complete them. Together they assess how strategies for innovation are formed. So it is important to answer every question.

Sometime a question will not accurately reflect what your organisation is doing now. Then you may give a response based on your opinion or what your company should do. All of these responses and your written comments will be combined anonymously in a research report.

THANK YOU for assisting us and contributing in this important undertaking.

3. At present, my company has a formal strategy, programme or policy that encourage innovation: (tick below)

- a. Yes 10. []
- b. No 11. []

3a.) If answered Yes, the name of our Programme _____

For how many years _____; Reports to whom _____

4. In the past three years, my organisation has developed or invested in several innovation accomplishments...see examples in mentioned on front page (tick accordingly)

- Yes 12. []
- No 13. [] (if no, go directly to question no. 5)

4a. Please state briefly which one, why and when in the spaces below:

<u>Type of Innovation</u>	<u>Purpose</u>	<u>Which Year?</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

(Please attach another sheet if more space or a greater explanation is needed)

5. An organisation, from time to time, should perform an analysis of its strengths and weaknesses. Our organisation does such an analysis by: (tick any below that applies)

- a.) Commissioning outside experts to do so 14. []
- b.) Conducting internal audits in each department 15. []
- c.) Completing an annual planning work sheet 16. []
- d.) Forming a committee of management personnel 17. []
- e.) Assigning it to a special department 18. []
- f.) Surveying our customers and their needs 19. []
- g.) Comparing outputs to a formal business plan 20. []
- h.) Reviewing trade and business publications 21. []
- I.) None of those stated above 22. []

6. An organisation should know its strengths and weaknesses. Our organisation believes its greatest strength is in: (tick three and rank your three choices either 1, 2 or 3)

- a.) its name and size-reputation 23. [] _____
- b.) marketing expertise and market position 24. [] _____
- c.) management systems and culture 25. [] _____
- d.) research and development activities 26. [] _____
- e.) an innovative and trained workforce 27. [] _____
- f.) distribution network and financial position 28. [] _____
- g.) operations-facilities and location 29. [] _____
- h.) leadership and vision of its management 30. [] _____

7. An organisation should understand its external environment, its competitors and new opportunities arising within the market in which its operates. In our organisation, we believes, it is most important to know: (tick one)

- a.) the market shares of our key competitors 31. []
- b.) why customers purchase our products or services 32. []
- c.) what is needed in the market place 33. []

8. An organisation should project its needs for the future. Our organisation does this in the following areas: (tick where it is done)

- a.) financial requirements 34. []
- b.) manpower needs 35. []
- c.) promotional and marketing activities 36. []
- d.) facilities and equipments needs 37. []
- e.) plans to conform to governmental regulations 38. []
- f.) how to incorporate technological advances 39. []

9. A plan should be long and short term in order for a firm to be competitive. To that purpose, we plan: (tick one)

- a.) less than 1 year in advance 40. []
- b.) 1 year to 2 years in advance 41. []
- c.) 3 years to 5 years in advance 42. []
- d.) 6 years and more in advance 43. []

10. An organisation should review its business plans formally because conditions can change. Our organisation reviews its plans (tick the smallest time interval you use between reviews):

- a.) not reviewed at all 44. []
- b.) quarterly 45. []
- c.) monthly 46. []
- d.) weekly 47. []
- e.) annually 48. []

11. An organisation should have a plan with several different elements to it. Our organisation believes its business plan should have(tick as many as apply below):

- a.) mission statement for being in business 49. []
- b.) policies -departmental manuals 50. []
- c.) operating plan 51. []
- d.) budgets 52. []
- e.) Standing operating procedures 53. []
- f.) schedule of activities 54. []
- g.) programmes for innovation 55. []
- h.) none of the above 56. []

PART TWO: QUESTIONS ABOUT STRATEGY AND INNOVATION

12. When it comes to stimulating innovation (ref to question no. 2 for examples) by a strategy, it is best to describe my organisation foremost as being: (tick one)

- a.) a pioneer- seeks to be first with the newest 57. []
- b.) a follower- enters the market late by plan 58. []
- c.) an imitator- improves on someone's innovation 59. []
- d.) a dependent- innovates only to customer's needs 60. []
- e.) a traditionalist- does not innovate by plan 61. []
- f.) an opportunist- innovates for very high return 62. []
- g.) a fatalist- innovates to survive against others 63. []

.... in my opinion why we are the type of organisation (as I ticked above) is because: _____

13. In my opinion, we are successful at being innovative (or what is needed for us to be more successful at innovation) by having: (tick five and rank them either 1,2,3,4,or 5)

- a.) formal programmes for developing innovation 64. [] _____
- b.) rewards for innovative suggestions by employees 65. [] _____
- c.) effective small groups for decision-making used 66. [] _____
- d.) strong visionary leadership 67. [] _____
- e.) corporate policy set by founder(s) 68. [] _____
- f.) personnel trained to be more entrepreneurial 69. [] _____
- g.) open communication within groups 70. [] _____
- h.) feedback and easy approval system to make change 71. [] _____
- I.) corporate culture which nurtures innovation 72. [] _____
- J.) Supervisors who welcome suggestions and changes 73. [] _____

14. In my opinion, I believe we should explore being more innovative in the future so it will help us to: (tick two)

- a.) reduce or stabilise our costs against competitor 74. []
- b.) protect our existing markets against others 75. []
- c.) exploit new opportunities for growth 76. []
- d.) gain a competitive advantage 77. []
- e.) meet new customer specifications 78. []

15. In my opinion, when an organisation starts to innovate, the following happen: (tick four in all- two bad factors and two good factors that may occur from the list below)

- a.) new type of contracts or customers are won 80. []
- b.) employees are taught to be more innovative 81. []
- c.) the relationship with our suppliers improves 82. []
- d.) some current operating problems are solved 83. []
- e.) image in being a progressive company improves 84. []
- f.) additional sales or profits are generated 85. []
- g.) greater investment risk and losses maybe incur 86. []
- h.) competitor will copy it before long 87. []
- I.) a fair amount of operational time is distracted 88. []
- J.) resources are stretched and less get done 89. []

16. In my opinion (or from our company experience), it is best to "buy" into an innovation rather than to develop it "in-house" from: (tick one from list below)

- a.) the acquisition of the firm which perfected it 90. []
- b.) a licensing arrangement to use it 91. []
- c.) research results of a university or institute 92. []
- d.) a patent purchased from inventor 93. []

17. From our company experience (or in my opinion), before a new product, innovation or process is developed, first one of the following things should happen: (tick one accordingly)

- a.) customer research is done 94. []
- b.) pilot project is launched 95. []
- c.) employees given time to develop a proposal 96. []
- d.) benefits for the innovation is determined 97. []
- e.) none of the above 98. []

18. From our company experience (or in my opinion), the maximum time for development and an investment period generally given for an innovation to prove itself is: (tick one)

- a.) less than 6 months 99. []
- b.) 7 months to 12 months 100. []
- c.) 13 months to 18 months 101. []
- d.) 19 months to 24 months 102. []
- e.) 25 months to 30 months 103. []
- f.) 31 months to 36 months 104. []
- g.) No maximum time limit established 105. []

19. In my opinion, we could be more successful at innovation when we: (tick one)

- a.) accept more risk 106. []
- b.) welcome change as being good 107. []
- c.) receive a clearer vision on what is possible 108. []
- d.) hire more entrepreneurial personnel 109. []

20. In my opinion, we will, generally, fail on a new project which may produce a worthwhile innovation if we: (tick two and rank them 1 & 2)

- a.) impose too short a time limit for it to work 110. [] _____
- b.) hold back on funds and personnel when asked 111. [] _____
- c.) make it difficult for it to be approved 112. [] _____
- d.) fail to reward the product champion properly 113. [] _____
- e.) do not allow mistakes and failures by innovator 114. [] _____
- f.) take away the time and freedom of the innovator 115. [] _____

21. In our experience (or my opinion) a proper return of an investment for an innovation to be commercially successful is when we: (tick one)

- a.) realise profits greater than normally received 116. []
- b.) reach break-even on investment as planned 117. []
- c.) able to recoup development costs plus interest 118. []
- d.) capture new customers and new markets 119. []

22. I believe (or by our experience) that the key factor for one to be successful in developing innovation is to: (tick five and rank them 1, 2, 3, 4, & 5)

- | | |
|---|----------------|
| a.) learn to monitor customer changing needs | 120. [] _____ |
| b.) encourage and reward innovative personnel | 121. [] _____ |
| c.) engage in more outside ventures with innovators | 122. [] _____ |
| d.) exhibit entrepreneurial leadership at the top | 123. [] _____ |
| e.) invest in ways to inform and educate customers | 124. [] _____ |
| f.) develop a network of information about changes | 125. [] _____ |
| g.) conduct a survey of potential users for demand | 126. [] _____ |
| h.) nurture budding "in-house" entrepreneurs | 127. [] _____ |
| I.) develop a formal programme for innovation | 128. [] _____ |
| J.) create an entrepreneurial corporate culture | 129. [] _____ |
| K.) launch more projects into spin-off enterprises | 130. [] _____ |
| L.) establish a research and development department | 131. [] _____ |

PART THREE: ORGANISATION FOR ENCOURAGING INNOVATION

23. In our organisation, we have a separate department for Research and Development (R & D), corporate venturing and new product development (tick yes or no accordingly):

- | | |
|--|----------|
| a.) yes-all three types-R&D, venturing, new products | 132. [] |
| b.) yes-but functionally combined in one or two depts. | 133. [] |
| c.) no- we do not have separate departments for any | 134. [] |

24. To stimulate innovation within an organisation, I believe it is best that: (tick two of the following)

- | | |
|--|----------|
| a.) efforts be centralised; one service others | 135. [] |
| b.) efforts be decentralised; each develop its own | 136. [] |
| c.) efforts be done by an innovation committee | 137. [] |
| d.) an employee suggestion system be developed | 138. [] |
| e.) corporate entrepreneurship programme be used | 139. [] |
| f.) research and development department be developed | 140. [] |

25. In my opinion, I believe it is best to describe the tasks being performed within our present organisation as mostly-managed from a perspective of being: (tick one of the list below)

- | | |
|---|----------|
| a.) Discipline-based; work based on technical skills | 141. [] |
| b.) Project-based; organised based on projects only | 142. [] |
| c.) Traditional-based; being delegated downward | 143. [] |
| d.) Venture-based; decided by consensus of committee | 144. [] |
| e.) Matrix-formed; projects and disciplines reporting | 145. [] |

26. The business environment in which my organisation operates is extremely competitive because we are constantly faced with: (tick one or leave unanswered if not competitive)

- | | |
|---|----------|
| a.) Supplier uncertainty; pricing or sources changing | 146. [] |
| b.) Technological uncertainty; tighten quality specs | 147. [] |
| c.) Market uncertainty; changing market shares | 148. [] |
| d.) Specific uncertainty; key customers are changing | 149. [] |
| e.) Production uncertainty; shortened delivery dates | 150. [] |
| f.) Product uncertainty; declining product life cycle | 151. [] |

27. In our organisation, we generally allocate our budgets for new product development, R & D, innovation or production by one of the following methods. (tick one)

- a.) using a percent of turnover; norm to industry 152. []
- b.) basing on a projected level of profits 153. []
- c.) increasing last year by a set percentage 154. []
- d.) allocating it by the needs of projects 155. []
- e.) on operating costs and profit centres 156. []
- f.) quality of proposals and plans being approved 157. []
- g.) ratio to cash generators; core business needs 158. []
- h.) percentage of profits earned 159. []
- I.) None of those above 160. []

28. In our organisation (or in my opinion), the best way to motivate each employee to be more entrepreneurial is for us to: (tick five and rank them 1, 2, 3, 4 & 5)

- a.) use a bonus reward system to promote enterprise 161. []
- b.) attract proven entrepreneurial types to workforce 162. []
- c.) conduct on-site training programmes on innovation 163. []
- d.) promote problem-solvers over other employees 164. []
- e.) give employees time away to develop ideas 165. []
- f.) train supervisors to encourage innovators 166. []
- g.) nurture product champions to be successful 167. []
- h.) recognise formally a worker's innovative efforts 168. []
- I.) create an open communication system of problems 169. []
- J.) use small groups and goal setting sessions 170. []
- K.) stimulate personnel by using outside experts 171. []
- L.) job rotation and self-job design schemes 172. []
- M.) fund employee's initiated project for development 173. []
- N.) send employees to off-site training and seminars 174. []

29. In our organisation; in an effort to stimulate innovation we allocate(or should allocate) a certain percent of our turnover each year for development of new product and other innovation accomplishment. The amount should be: (tick one)

- a.) less than 2 percent of turnover 175. []
- b.) ...2 to 5 percent of turnover 176. []
- c.) ...6 to 9 percent of turnover 177. []
- d.) ...10 to 13 percent of turnover 178. []
- e.) ...14 to 17 percent of turnover 179. []
- f.) ...18 to 21 percent of turnover 180. []

30. In this section, there is space below for any personal comments which you would like to express on the topic of innovation in Scottish-based companies or about this survey.

PART FOUR: ASSESSING YOUR ORGANISATION ABILITIES TO BE INNOVATIVE

In the next two areas, we are asking you to assess the innovation quotient currently in your organisation. You may assess the degree of each of the following statements or questions by circling the most accurate number from the answer scale as it applies to each.

Not at All	A Little	Some-What	Quite A Bit	Very Much
1	2	3	4	5

31. What Are Your Current Methods of Operating:

- a. Business objectives are clearly defined and the company operates to them. 1 2 3 4 5
- b. Market opportunities are identified and results achieved by co-ordination. 1 2 3 4 5
- c. Pricing policy matches prices to markets and not to production costs. 1 2 3 4 5
- d. The company has a clear understanding of money and its use as a resource. 1 2 3 4 5
- e. Decision making procedures are sound and supported by good information. 1 2 3 4 5
- f. Management team is well trained to meet changing business needs. 1 2 3 4 5
- g. Precise sales and profits targets are key elements in the business goals. 1 2 3 4 5
- h. Business opportunities are identified by product/market segmentation. 1 2 3 4 5
- I. Strategy is developed for innovation and management articulate it well. 1 2 3 4 5

32. How Well Do Employees and Management Work Together in Your Organisation?

- a. To what extent are employees receptive to each other ideas and problems? 1 2 3 4 5
- b. To what extent do employees keep each other informed about business? 1 2 3 4 5
- c. To what extent can an employee make a suggestion to top management? 1 2 3 4 5
- d. To what extent is the company quick to use a new improved work method? 1 2 3 4 5
- e. To what extent is there a strong emphasis on the marketing of new products 1 2 3 4 5
- f. To what extent has there been changes in new products or services lines? 1 2 3 4 5
- g. To what extent has there been a proclivity for high risk projects? 1 2 3 4 5
- h. To what extent does management make bold, wide-ranging strategies? 1 2 3 4 5
- I. To what extent is your company first to introduce a product or service? 1 2 3 4 5
- j. To what extent does management adjust and tries to understand uncertainty? 1 2 3 4 5

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EXHIBIT NO.2

SURVEY DATA: SELECTED RESPONSES OF 190 FIRMS OPERATING IN SCOTLAND

<u>Computer Element Label</u>	<u>Label-Value Description</u>	<u>% (n=103) Users of a Formal Strategy</u>	<u>% (n=87) Non-Users Informal Strategy</u>
1.Title	Title of respondent:		
	* CEO/Managing Director	65.0	49.4
	Managers	16.5	10.3
	Specialist	10.7	21.8
	Chairman	6.8	17.2
	Others	1.0	1.1
2.Parent	Nationality of firm's parent company:		
	Scottish	37.9	55.2
	N. American	30.1	21.8
	Other UK	25.2	14.9
	Other Overseas	6.8	8.0
3.Nonempty	Size of Reporting Unit in Scotland	< mean is 600 employees;	mean of age 35.7
	51 to 300	27.2	67.8
	301 to 1,000	56.3	22.8
	1,001 plus	16.5	10.4
4.Totsize	Size of Parent Company size	<mean is 2,750 employees;	largest was 700,000?
	51-1,000	35.9	34.5
	1,001-2,500	18.4	20.7
	2,501-5000	6.8	16.1
	5,001-10,000	5.8	10.3
	over 10,001	33.0	18.4
5.Corebusi	Core business purpose		
	Manufacturing	74.8	64.4
	Service	20.1	29.9
	Research	2.9	-0-
	Others	1.0	2.3
6.Formalst	If a formal strategy for innovation was being used?		
	Yes	100.0	000.0

* Note: All data is presented under the users' column with the largest response being first; non-users' placement reflecting the order of users.

Exhibit No.2 -Appendix

Users:

Non-users:

7.Howlong How long in years that the firm had a formal strategy?

less than 1 year	1.9
1 yr. to 3 yr.	39.8
4 yr to 6 yr	21.2
7 yr to 9 yr	6.7
10 yr to 12 yr	10.6
13 yr to 15yr	6.8
15 yr and over	13.0

8.Reports What is the level within the firm that formal programme for innovation reports to ?

CEO/ Managing Director	58.6
Specialist	12.6
Special Committee	11.7
At HQRS. of parent	9.7
Special department	3.9
Not disclosed	2.9
Others-consultant,etc.	1.0

9. Delvest Have you innovate the past three years?

yes,we have	92.2	18.2
no, we have not	7.8	81.8

10.Typeinvo The type of innovation accomplished

A combination of below:	48.5	29.9
just new equipment	1.0	5.7
just new product	16.5	12.6
just new sales policy	9.7	8.0
None at all	7.8	19.5
just new systems	6.8	12.6
just new manufacturing/process	6.8	3.4
just new assy method	1.0	2.3
none of the above	4.9	1.1

11.Purpose Why did your firm innovate, tick the primary purpose?

To gain new market	28.2	27.6
To reduce costs	17.5	10.3
To exploit a technology	16.5	21.8
To protect their market	15.5	8.0
Others reason- culture, founder	10.7	3.4
N/A	7.8	19.5
To meet competition	3.9	9.2

Users:

Non-users:

12. Anexpert Do you use outside experts to analysis your firm (SWOT)?

Yes	51.5	29.9
No	48.5	70.1

13. Anaudit If a special auditing team use to analysis your firm (SWOT)

Yes	56.3	41.4
NO	43.7	58.6

14. Anplan If a business plan include a SWOT?

Yes	51.5	34.5
No	48.5	66.4

15. ANgroup If an ad hoc group is formed to a SWOT?

Yes	53.4	34.5
No	46.6	65.5

16. Andepart If assigned to a department for a SWOT?

No	89.3	5.7
Yes	10.7	94.7

17. Anbuyer If buyers are surveyed by your firm in a SWOT?

Yes	68.9	51.7
No	31.1	48.3

18. Anoutput If outputs are compared to a business plan?

Yes	78.6	60.9
No	21.4	39.1

19. Ansource If trade and business publications in the SWOT

No	61.2	65.5
Yes	38.8	34.5

20. Namesize Does your firm believes its greatest strength is:
its reputation, name or size?

Most important	25.2	26.4
----------------	------	------

21. Marktpos Does your firm believes its greatest strength is its market position?

Most important	13.6	11.5
----------------	------	------

Exhibit No.2 -Appendix

Users:

Non-users:

22.Syculture Does your firm believes its greatest strength is its systems and culture?

Most important	4.9	8.0
-----------------------	------------	------------

23.R.D Does your firm believes its greatest strength is its research and development activities?

Most important	10.7	3.4
-----------------------	-------------	------------

24.Worker Does your firm believes its greatest strength is its innovative workers?

Most important	21.4	10.3
-----------------------	-------------	-------------

25.Network Does your firm believes its great strength is its financial or distribution network?

Most important	1.9	1.1
-----------------------	------------	------------

26. Facloc Does your firm believes its greatest strength is its facilities and location?

Most important	16.1	4.9
-----------------------	-------------	------------

27.Vision Does your firm believes its greatest strength is its visionary leadership?

Most important	17.5	23.0
-----------------------	-------------	-------------

28.Exenviro In understanding our environment, we believe it is most important to know:

What is needed in the market place;	70.8	70.1
Why customers buy our products;or	21.4	18.4
The market share of key competitors;	7.8	11.5

29. Fubudget If your firm uses financial systems to manage by?

Yes	96.1	92.0
No	3.9	8.0

30.Fuworker Does your firm projects its manpower needs?

Yes	86.4	82.8
No	13.6	17.2

31.Fumarket Does your firm projects its marketing activities?

Yes	80.6	60.9
No	19.4	39.1

Users:

Non-users:

31. **Futools** Does your firm projects its plant equipment needs?

Yes	96.1	82.8
No	3.9	17.2

32. **Fugovern** If your firms projects the impact of government regulations?

Yes	59.2	44.8
No	40.8	55.2

33. **Futech** If your firm projects how to incorporate technological advances?

Yes	76.7	47.1
No	23.3	52.9

34. **Timeplan** How far ahead in years does your firm plan?

3 to 5 yr ahead	58.3	27.6
1 to 2 yr ahead	31.1	48.3
less than 1 yr	7.8	19.5
6 yr or more	2.9	4.6

35. **Review** How often does your firm review its plans?

Monthly	41.7	36.8
quarterly	35.9	39.1
Annually	18.4	12.6
Weekly	3.9	6.9

36. **Emission** Does your firm's strategy have a mission statement for being in business?

Yes	66.0	41.4
No	34.0	58.6

37. **Emanuals** Does your firm use manuals to control your strategy?

Yes	50.5	36.8
No	49.5	63.2

38. **Eopplan** Does your firm use an operating organisational plan?

Yes	92.2	75.9
No	7.8	24.1

39. **Ebudgets** Does your firm's strategy uses budgets?

Yes	96.1	86.2
No	3.9	13.8

Exhibit No.2 -Appendix

Users: Non-users:

40. Esop Does your firm use standard operating procedures?

Yes	63.1	51.7
No	36.9	48.3

41. Eschedule Does your firm use a schedule of activities?

No	55.3	62.1
Yes	44.7	37.9

42. Eprogram Does your firm use a formal programme for innovation?

Yes	65.0	9.9
No	35.0	90.1

Note: 47 Users had a name for their programme
(e. g. pathfinders for 3M Corp.)

43. Strategy Will you select one of the following that foremostly describes your firm?

Pioneer-first with the newest	45.6	31.0
Dependent-innovates/customer's needs	14.6	27.3
Imitator-improves on other's products	13.6	14.9
Follower-enters market late by plan	9.7	10.3
Opportunist-innovates/very high returns	9.7	4.6
Traditionalist-does not innovate	4.9	4.6
Fatalist-innovates to survive industry	2.9	6.9

44. Why Why did you describe your firm that way? Because in my opinion we see:

This way for more opportunities/growth	48.5	43.7
Not disclosed	16.5	27.6
That this strategy works best for us	16.5	6.9
Constraints force us to be this way	15.5	16.1

45. Of the following (10 elements), the most important way to be innovative is to have:

Vislead	Strong visionary leadership	34.0	25.3
Culture	Culture nurtures innovation	18.4	16.1
Formal	Formal programme for innovation	13.6	8.0
S-group	Small work groups	10.7	18.4
Founder	Policies inherited from Founder	9.7	6.9
Trained	Personnel trained for innovation	4.9	3.4
Opencom	Open communication within group	4.9	9.2
Bosswelc	Boss welcome suggestions	2.9	2.3
Rewards	Rewards/innovative suggestions	1.0	3.4
Ezsystem	Feedback/easy approval for change	-0-	6.9

Users:

Non-users:

46. Explor I believe we should explore ways in being more innovative because:

They will exploit new growth	42.7	39.1
They will reduce our costs	33.0	26.4
They will protect markets	18.4	26.4
They will give us an edge	5.8	8.0

47. Goodfac I believe when a firm starts to innovate, the following good things happen:

New contracts and customers are won	54.4	50.6
Image as a progressive firm occurs	17.5	18.4
Employee are taught to be innovative	12.6	12.6
Relationships with suppliers improve	7.8	8.0
Some operating problems are solved	7.8	10.3

48. Badfac I believe when a firm starts to innovate, the following bad things happen:

Greater investment and risk occur	63.1	18.4
Fair amount of time is stretched	18.4	21.8
Competitors will copy before long	18.4	57.5

49. Buyin How a firm should buy its innovation rather than develop it

Firm should gets it from a University	40.8	10.3
Firm should liscense it from others	27.2	43.7
Disregard this method as an option	24.2	9.7
Acquire patents from inventors	6.8	5.7
Acquire firm which perfected it	1.0	27.6

50. First What is the first thing a firm should do before an innovation is developed

Conduct a customer survey	37.6	55.2
Do a benefit analysis	35.9	33.3
Allocate time for a proposal	15.8	4.6
Perform a pilot project first	10.7	5.7

51. Maxtime The maximum time to be given in the development of an innovation to prov

19 to 24 months given	22.3	27.6
7 to 12 months given	19.4	32.2
No maxium time established	18.4	17.2
13 to 18 months given	16.5	11.5
25 to 30 months given	11.7	2.3
30 to 36 months given	7.8	6.9
less than 6 months given	3.9	2.3

Exhibit No.2 -Appendix

Users:

Non-users:

52. Bemo I believe my firm could be more successfully at innovating if we:

Welcomed change as being good	35.0	29.9
Had a clear vision on what is possible	24.3	46.6
Hired more entrepreneurial personnel	23.3	13.8
Accepted more risk	17.5	10.3

53. Fimpose I believe we, generally, fail on innovation when we do one of the following:

Imposing too short a time limit	48.5	41.4
Not allowing mistakes and failures	18.4	17.2
Holding back on funds when requested	17.5	27.6
Making approval difficult to get	8.7	4.6
Not giving freedom to innovate	5.8	6.9
Failing to reward Product Champion	1.0	2.3

54. Return I believe that a proper return on an investment for an innovation is when:

New buyers and markets are captured	46.6	43.7
More profits than normally is received	34.0	33.3
Planned Breakeven point is reached	12.6	11.5
Able to recoup all costs & interest	6.8	11.5

55. Depts Does your firm have separate departments for venturing, R & D, and new products?

No, we combine them into one	44.7	33.3
Yes, we have separate depts	23.3	10.3
We have no depts at all	32.0	56.3

56. Keyfactor For successful innovation, the most important of the following key factors are:

Keyneeds Customers's needs are monitored	18.4	29.9
Keylead Leadership at the top	50.5	14.9
KeyCult A firm entrepreneurial culture	17.5	36.8
Keyusers A survey of potential users	2.9	2.3
Keylink Establish links with innovators	2.9	-0-
KeyRD R & D department is used	2.9	4.6
Keystaff Encourage and reward staff	1.9	3.4
Keyprog Formal programme of innovation	1.9	-0-
KeyInfo Network of information is used	1.9	2.3
Keyideas Nurture ideas from workforce	1.0	3.4
Keyspin Launch more spin-off projects	1.0	1.1
Keymedia Ways to inform customers	-0-	-0-

Users:

Non-users:

57. Siminov1 To stimulate innovation, centralised, it is best that:

R & D Dept be used	38.8	37.9
Corporate entrepreneurship be used	27.2	29.9
Employees' suggestion system be used	19.4	24.1
Innovation committee be used	13.6	14.9

58. Siminvo2 To stimulate innovation, decentralised, it is best that

Employees' suggestion system be used	39.8	43.7
Corporate entrepreneurship be used	32.0	35.6
R & D Dept be used	17.5	12.7
Innovation committee be used	10.7	8.0

59. Typeorg My firm is mostly-managed by one of the following ways:

Project-based:organised projects only	26.2	19.5
Matrix-managed: projects/disciplines	25.2	10.3
Traditional-based: delegated downward	23.3	39.1
Discipline-based: based on skills	22.3	28.7
Venture-based: consensus by committee	2.9	2.3

60. Busenvi My firm operates in one of the following environment:

Market uncertainty	44.7	47.1
Product uncertainty	14.4	9.2
Technological uncertainty	13.6	5.7
None of those listed in question	10.7	6.9
Supplier uncertainty	7.8	10.3
Production uncertainty	4.9	9.2
Specific uncertainty/ customers changing	3.9	9.2

61. Opinion If an opinion was expressed in question no. 30:

No Data expressed at all	72.4
Supporting data/insightful	18.4
Negative on innovation	6.9
Negative- questionnaire design	2.3

Exhibit No.2 -Appendix

Users:

Non-users:

62. Budgets In my firm, we allocate budgets for innovation by

The needs of the project; allocated	38.8	28.7
Quality of the proposal when approved	16.5	14.9
Norm to industry:percentage of turnover	11.7	9.2
None of those methods listed	10.7	21.8
Projected level of profits to be made	6.8	6.9
On operating costs/profit centres	5.8	13.8
Ratio to cash generators/core business	3.9	1.1
Increased by set amount each year	3.9	3.4
Percentage of profits earned	1.9	-0-

63. The best way (1st choice) to motivate employees to be entrepreneurial is to

Motypes attract more entrepreneurs	19.4	19.5
Moopen create open communication system	17.5	18.4
Mobonus use a bonus system to reward	15.5	11.5
Mogoals use small groups to set goals	11.7	15.3
Moboss train supervisors to stimulate	8.7	5.7
Moaward recognise employees' efforts	9.7	12.6
Mosolver promote problem-solvers	5.8	5.7
Mochamp nurture product champions	5.8	4.9
Moseljob use self job design scheme	1.9	6.4
Moexpert use expert to stimulate	1.0	-0-
Motime give them time off to innovate	3.9	-0-
Motrain train employees on-site	-0-	4.6
Mofund fund employees' projects	-0-	1.1
Moffsite train employee offsite	-0-	-0-

64. Allocate As a percentage of turnover for innovation, I suggest that:

The least amount to be: < question not framed properly, little value?

less than 5 percent	40.8	39.1
less than 2 percent	24.3	47.1
less than 9 percent	16.5	8.0
less than 13 percent	11.7	5.7
non-disclosed	3.9	-0-
less than 17 percent	1.9	-0-
over 20 percent	1.0	-0-

Con't of EXHIBIT NO. 2 .

65. Assessing how their firms currently operate (question 31):

Strategic Elements	<u>Users' Strategic Profile</u>				<u>Non-users' Strategic Profile</u>				
	Very (%)	Much used	Not used (%)	Mean	Std. Dev:	Very (%)	Much Used	Not Used	Mean
g.Targets used	71.8	1.0	4.06	1.003	55.2	2.3	1.03	.970	
d.Money used	61.2	1.0	4.51	.739	57.5	9.2	4.29	.978	
a.Clear goals	50.5	1.1	4.38	.744	36.8	-0-	4.06	.926	
h.Market segment	43.7	1.0	4.06	1.003	21.8	4.6	3.57	1.127	
c.Prices match	32.0	5.8	3.81	1.118	34.5	6.9	3.79	.986	
b.Results met	24.3	1.0	3.92	.848	14.9	-0-	3.46	.986	
e.Decision/info	24.3	6.8	3.92	.837	24.1	1.1	3.68	1.173	
f.Team trained	18.4	-0-	3.75	.857	17.2	3.4	3.59	.970	
I.Mission stated	13.6	1.0	3.53	.884	3.4	9.2	2.67	.909	

Con't OF EXHIBIT NO. 2 .

66. Assessing how well do employees and management work together (question 32):

Contingent Elements	Users' Strategic Profile			Non-users' Strategic Profile				
	Very (%)	Much used	Not used (%)	Very (%)	Much Used	Not Used (%)		
	Mean	Std. Dev.		Mean	Std. Dev.			
c.Top listens	50.5	1.0	4.24	.944	35.6	1.1	4.04	.914
f.New lines used	38.8	1.9	3.11	1.067	12.6	2.3	3.47	.986
e.Marketing used	32.0	1.9	3.78	1.063	11.5	2.3	3.21	1.135
i.First to try	27.2	10.7	3.43	1.319	13.8	11.5	2.86	1.202
d.New methods	25.2	-0-	3.89	.851	26.4	-0-	3.21	.999
a.Idea welcomed	17.5	1.9	3.74	.871	10.3	-0-	3.58	.899
j.Adapts easily	14.6	1.9	3.71	.857	12.6	1.1	3.49	.834
b.Info/spread	10.7	7.8	3.58	.786	10.3	1.1	3.44	.899
h.Bold strategy	7.8	4.9	3.01	.970	3.4	9.2	2.65	1.021
g.Risky projects	4.9	14.6	2.65	1.100	3.4	27.6	2.28	1.120

EXHIBIT NO. 3

Respondent Name: _____ Date: _____

Firm name: _____ Tel. No. _____

will be attending the symposium of being scheduled for the 5th of May, in the Senate Room in the University of Glasgow yes[] No [] see enclosed RSVP card

To assist us as you have done in the past, we are asking you to take ten minutes to assess the following statements by circling the most accurate number from the answer scale as it applies to our firm.

	Not		From time		
	At all	Seldom	To time	Generally	Always
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>

- . There are conventional ways of doing things in our firm which rarely change. 1 2 3 4 5
- . In our firm, policy changes occur slowly. 1 2 3 4 5
- . Quick decisions and actions are not characteristic of our firm. 1 2 3 4 5
- . News ideas are always being tried out here. 1 2 3 4 5
- . The setting up of unusual plans is encouraged here. 1 2 3 4 5
- . The latest discoveries make few changes in the way this firm is run. 1 2 3 4 5
- . Most people in our firm talk about the future. 1 2 3 4 5
- . Our employees are encouraged to adopt a long-term outlook. 1 2 3 4 5
- . For our firm the development of the new is of secondary importance. 1 2 3 4 5
- . New product development ranks high in our firm's list of priorities. 1 2 3 4 5
- . Please indicate the foremost reason for you taking a training course?

please circle below:	Not	Barely		Somewhat	Very
	Important	Important	Important	Importance	Important
	<u>1</u>	<u>3</u>	<u>3</u>	<u>4</u>	<u>5</u>

- | | | | |
|-----------------------------|-----------|----------------------------------|-----------|
| update existing skills | 1 2 3 4 5 | To gain new and needed skills | 1 2 3 4 5 |
| improve chance of promotion | 1 2 3 4 5 | To receive better assignment | 1 2 3 4 5 |
| cause it was assigned | 1 2 3 4 5 | My firm does not sponsor courses | 1 2 3 4 5 |

. Overall, how important are new ventures and/or new product development to your Firm?
Explain Please: use space below or the back.

D E L P H I

Please classify yourself:

- 1 As a business manager of
a) a Scottish-owned company []
b) a North American-owned company []
c) an overseas/European-owned company []
d) a UK-owned (but not Scottish) company []
- 2 As an academic []
My speciality is
- 3 As a specialist in []

I have been in this profession for years.

SECTION I

- 1 Innovation is based on learnable and repeatable skills. There is a definite way to practice innovation, whether science based or knowledge based.

Scale before discussion

Scale after discussion

- | | |
|----------------------------|----------------------------|
| a) I strongly agree [] | a) I strongly agree [] |
| b) I agree [] | b) I agree [] |
| c) No opinion [] | c) No opinion [] |
| d) I disagree [] | d) I disagree [] |
| e) I strongly disagree [] | e) I strongly disagree [] |

- 2 Accountancy "is based on the return of assets, and often penalises a decision to innovate, because it makes the new project share in overheads or other charges which don't measure the long term value of the decision."

Anthony/106/

Scale before discussion

Scale after discussion

- | | |
|----------------------------|----------------------------|
| a) I strongly agree [] | a) I strongly agree [] |
| b) I agree [] | b) I agree [] |
| c) No opinion [] | c) No opinion [] |
| d) I disagree [] | d) I disagree [] |
| e) I strongly disagree [] | e) I strongly disagree [] |

Exhibit no. 4

- 8 A formal strategy is often based on policies and programmes already approved. A long range plan covering 5 years is locked in by events which may or may not occur, or at best it is a one year plan extrapolated forward. Thus, a deliberate long term strategy is a formula for failure, as it locks in managers to a narrow way of thinking and thus should not be used by firms.

Scale before discussion

Scale after discussion

- | | | | |
|------------------------|-----|------------------------|-----|
| a) I strongly agree | [] | a) I strongly agree | [] |
| b) I agree | [] | b) I agree | [] |
| c) No opinion | [] | c) No opinion | [] |
| d) I disagree | [] | d) I disagree | [] |
| e) I strongly disagree | [] | e) I strongly disagree | [] |

- 9 Business strategy is supposed to be formed from military principles. However, the key military points of all plans are that they should be clear, direct and be executed to their fullest. The simplest plan is preferred. Then business theorists should stop recommending long detailed plans.

Anthony/58/155

Scale before discussion

Scale after discussion

- | | | | |
|------------------------|-----|------------------------|-----|
| a) I strongly agree | [] | a) I strongly agree | [] |
| b) I agree | [] | b) I agree | [] |
| c) No opinion | [] | c) No opinion | [] |
| d) I disagree | [] | d) I disagree | [] |
| e) I strongly disagree | [] | e) I strongly disagree | [] |

- 10 Strategy planning for innovation is essential to growth. The opportunities to solve problems or to create new products do not arise according to a timetable or to demands by top managers. They generally occur by accident or informally. "Systematic implementation" through the whole company must be done or strategy fails.

Scale before discussion

Scale after discussion

- | | | | |
|------------------------|-----|------------------------|-----|
| a) I strongly agree | [] | a) I strongly agree | [] |
| b) I agree | [] | b) I agree | [] |
| c) No opinion | [] | c) No opinion | [] |
| d) I disagree | [] | d) I disagree | [] |
| e) I strongly disagree | [] | e) I strongly disagree | [] |

- 3 It is very doubtful whether the profit/loss goals of accountancy truly reflect the business goals of an organisation. It ignores the fact that the organisation has many goals other than profit. But are there ways to overcome this?

Scale before discussion

Scale after discussion

- | | | | |
|------------------------|-----|------------------------|-----|
| a) I strongly agree | [] | a) I strongly agree | [] |
| b) I agree | [] | b) I agree | [] |
| c) No opinion | [] | c) No opinion | [] |
| d) I disagree | [] | d) I disagree | [] |
| e) I strongly disagree | [] | e) I strongly disagree | [] |

- 4 One researcher has said that the manager in the 1990's will need to have new skills in being entrepreneurial (whatever that means). He must establish nexus communications (flexible links) with his supplier, employees and customers, and try to create a polyvalent managerial approach, balancing short term operational problems with long term strategical concerns. To many of you this situation is already a reality in your organisation and managers should establish these approaches.

Scale before discussion

Scale after discussion

- | | | | |
|------------------------|-----|------------------------|-----|
| a) I strongly agree | [] | a) I strongly agree | [] |
| b) I agree | [] | b) I agree | [] |
| c) No opinion | [] | c) No opinion | [] |
| d) I disagree | [] | d) I disagree | [] |
| e) I strongly disagree | [] | e) I strongly disagree | [] |

- 5 Big firms are better at innovating by being efficient and smaller companies are better at innovating by being flexible.

Scale before discussion

Scale after discussion

- | | | | |
|------------------------|-----|------------------------|-----|
| a) I strongly agree | [] | a) I strongly agree | [] |
| b) I agree | [] | b) I agree | [] |
| c) No opinion | [] | c) No opinion | [] |
| d) I disagree | [] | d) I disagree | [] |
| e) I strongly disagree | [] | e) I strongly disagree | [] |

APPENDIX A

INTRODUCTION

This appendix, as a supplement to Chapter Two and Table No. 1, provides a discussion of the nine major influences leading to the development of strategic management as a field of study.

It also outlines the key chronological events, the rise and fall of strategic management as a discipline and the coinage of the term, strategic management.

Key Factors Leading to Business Strategy

The nine factors leading up to the development of strategy into a field of study are enumerated below:

1. Business Environment became more hostile.
2. The spread of foreign markets and operations.
3. Unforeseen decline of markets and products.
4. Rise in technical and pecuniary economies theories.
5. Investment cycles became longer and risk greater.
6. Organisational structure became more complex.
7. Management education providers increased.
8. Wealth-creation opportunities in management,
9. Standardization of strategy as a managerial tool.

Foremost of the reasons why business strategy was developed as one of the emerging rational approaches for managing change were the following:

1. The overall business environment became more hostile. Due to a world wide depression in the 1930's, a propensity for business mergers, the rise of unionism and increased statutory

regulations, the environment for business became more uncertain and less controllable. An inability to cope with these negative factors required managers to develop new competences later to be described by Andrews (1961) and Ansoff, (1965) as elements for strategic planning.

2. Foreign markets and operations were becoming commonplace to business after the 1900's. By 1914 scores of leading U.S. firms had factories in Europe; many had four plants or more. Within less than ten years later, most USA automobiles manufacturers, some consumer goods producers and all of its major oil firms had satellite foreign companies. Literature by Vaupel, (1969) and Wilkins, (1970) examined the spread of these international operations in the 1900's. The entry of technology needed new management skills to forecast the effects of these off-shore plants, strategy-making being one of them.

3. The unforeseen decline of certain products and market share reduction due to the strategies of challengers became more pronounced in this period. Kotler (1986) described how the slow-growth period in the late 1930's forced many firms to attack the before ignored markets of its competitors. In this era, planning was mostly centred around strategies that protected a market. Basically, protection of one's existing products or services required a more balanced strategic defence around economic realities than a strategy of growth. Challengers at the expense of market leaders would select strategies to take advantage of their regional, size and price differences by undercutting market leaders's pricing. A primary thrust of business tactics in this period was pricing.

4. The rise in the 1920 and 30's of theories for technical and pecuniary economies were key factors for a more managerial approach to strategy. These were methods using a "critical mass size" objective as a basis for business planning. The use of technical economies principles as functional

strategies were geared to alter the physical production process inside the firm. They also provided an strategic window for management to engage in vertical and horizontal integrations outside the firm.

Pecuniary gains realised by using functional strategies enabled a firm, as a large volume buyer, to pry lower prices from its suppliers. The use of volume discounts reflects not only monopoly power, but efforts to exert market power against the rise of a new competitor strategically.

The theories (economies of Scale, the scientific management techniques and macro-economists theories on industrial barriers) became accepted as the major guide lines for strategic planning by the 1930's. Whilst these theories received their births in the early 1900's, they are still very popular among business planners today such as the concept that the average cost curve of doing business declined as a firm became bigger. Bain (1975) argued that " the need to achieve a certain size for an economy of scale " was the major factor why many industrial organisations sought growth. The other appeal of these theories to many managers is that they are easily understood in an operational context. The results of using them are easily measured in higher profits when costs are lowered. Also the results of using them appear almost immediately upon implementation. They were viewed as a "quick fix " for fast profits, but were seldom used as a strategy for growth.

5. Business investment cycles became longer and risk became greater. From 1937 through 1950 (Shepherd, 1979 and Adam, 1986) firms became larger and more complex in size and product range. Capital expenditures for larger plant and equipment required longer pay-off investment cycles which caused owner equity to be recasted into larger debt. This debt to equity ratio increased resulting in greater financial risk. These longer debt schedules forced many a growing firm to project their plans

over longer term periods than before and to take greater care as to what the future may bring than was the rule previously.

6. The organisational structure and decision-making processes became more complex. With a more hostile environment and larger workforce to control coupled with higher risk investment cycles, managing a growing business was no longer the province of the one man boss. All of these conditions induced many large and private business owners to forego some of their responsibilities and to delegate the policy-making area of management to employees. For the first time in any significant number, they sought professionals to ease the burden of ownership. The setting and agreeing type of meetings on strategy became the major directive to how absentee owners delegated their control to managers.

7. The formation of management education providers as a resource outside the companies training programmes. To meet the demand for trained employees stated above, management schools and business courses (Howell, (1959); and Pierson, (1959)) were being formed to supply the larger family owned firms with managers schooled in business logic. From this attempt to educate and reward potential managers on how to think like owners, the topic of policy-making was introduced into the field of management. It was first introduced as a business topic in 1901 by the Dartmouth Amos Tuck Business School, primarily to acquaint employees how to make policy which enhance the rights of absentee owners.

8. Wealth-creation opportunities were being created for a rising new social class called the professional manager. The motivation for some managers to be wealthy is an often overlooked reason for the development of strategic theories. Studies done by Monsen, (1968) and Lewellen, (1971) indicated how in the 1940's, for the first time, the wages of these professional managers depended more on the size of their

facilities and number of employees reporting to them rather than loyalty to the owner or family as in the past. Therefore, it was financially and personally rewarding for employees to engage in strategies which would increase the size of an employer's company. In this period strategy was used as a growth mechanism by many managers as a way toward advancement to personal wealth and power.

9. The rise of professionalism and standardization of strategy formulation techniques as a topic and a discipline by management associations, consultancy and journals became evident. The appurtenances of professionalism- societies, journals, university training, and specialized consultants- began to flourish in the 1920's. Managers began to attend the same schools, read the same articles and developed the same common outlook on how business should be operated.

This diffusion of new managerial and administrative procedures was accelerated by the founding of the American Management Association in 1924. This organisation for top and middle management created a need for the exchange of methods and decision-making. In doing so, regional societies were formed, journals published, and more professional development courses were established in major colleges and universities. The formulation and implementation of business policy consumed a larger and larger proportion of attention by these institutions.

The other concrete evidence of this professionalism was the appearance of the management consultant. Chandler (1977) indicates that the first firm established for the purpose of business policy and strategy was Mckinsey in 1925. Within five years there were 42 other firms offering advice on functional activities including personnel and marketing.

In the next two decades following, a wave of books appeared in accounting, finance, marketing and organisational

concerns mostly written by the instructors at the Harvard Business School and the University of Chicago. In the early 1940's, it was estimated that up to one-third of the articles appearing in the Harvard Business Review dealt with topics related to the integration of these separate disciplines.

KEY CHRONOLOGICAL EVENTS FOR STRATEGIC MANAGEMENT

After World War II, industrial firms continued to grow by adding new units. In their efforts for the internalizing of these activities, they began to use methods of co-ordination. Separate departments were created solely for the purpose of planning and the deployment of resources and their exchange between these multi-units. Haspeslagh (1982) expressed the rise of planning units in Fortune 1000 companies, "each year in this period another 25 to 30 organisations joined the ranks by having a planning department".

Concomitantly over 2.5 million American armed forces service men were returning back to industry and began to express their concepts of business co-ordination in military terms... as was true in other parts of the developed western world. Equally, business publications with writers with the same wartime experiences were able to understand these terms and popularised them in literature for management.

It was in these publications that concepts and terms such as management strategic thinking and planning became more focused. The lessons carried over from the military were that planning should be deliberate around five steps: initiation, concept development, plan development, plan review and, finally, supporting tactics.

This process of "deliberate planning" evolved into the belief of Clausewitz that "commerce can and should be compared

to war". Gardner (1986: 26.14) reviewed the nine principles of war and how they could be translated to the world of commerce.

These nine principles were enumerated to be: (1) establish objectives that are clearly defined, decisive and achievable; (2) an offensive action is superior to a defensive one...seize, retain and exploit the initiative; (3) seek to develop mass and concentrate the most resources at the right place and at the right time; (4) allocate the minimum power to secondary efforts; (5) manoeuvre to place the enemy in a position of disadvantage by being flexible; (6) concentrate an unity of effort under one commander for each objective; (7) never permit the enemy to acquire an unexpected advantage; (8) always seek to surprise the enemy at a time, in a manner or place for which they are least prepared; and (9) prepare a clear and simple plan which can be placed in action by a clear and concise order.

Further it should be stated that these principles being executed will not be a substitute for a desire to win or to replace judgement by a decision-making unit.

A review of some of the philosophies germane to strategy by prominent generals illustrate this in the following citations: D. MacArthur..."gain the most while losing the least by hitting them where their supplies and strengths are not...let them die on the vine"; Sun Tsu, who wrote 2500 years ago..."in war, information is power and be like eggs, the freshest the better" to G. Patton, the American General, who said "understand first the situation, visualize what could happen, and grasps the opportunities but understand the risks" and the statement by D. Eisenhower as Commander in-Chief of the Allied Forces, " the plan is nothing, but planning is everything".

How Research Lagged Behind Business Strategy

Attempts to convert the principles and generalship of war into strategy for commerce dragged years behind actual practice.

In fact, Paul (1978) estimated that writing about developing the elements of strategy in business journals was no more than around 25 years old. The gap between understanding the practice of "strategic thinking " as executed by business executives and academics writing about it has a mismatch going back some 75 years.

For example, in 1914, Henry Ford made a landmark strategic decision to offer five dollars for eight hours of labour. The prevailing wage was \$2.90 for nine hours of labour at the time with a great labour surplus so many questioned his judgement. This decision was discussed in business journals and in academic circles as the first step toward bankruptcy to the extent that none of his competitors followed suit for up to three years after.

A more complete review of Ford's decision as related by Mr. Charles Sorensen, a top Ford employee, is given space here because it provides a key landmark on the insight on the strategic nature of this action. He writes (1941)

'In fact we made \$3 million profit in the first year of the wage change and tripled our profits the second and so on. It was purely a decision made after we had a strike in Manchester, England on December 13, 1913. Upon my return Mr. Ford and I spent many a hour discussing ways to discourage that from happening here. We also reviewed an persistent labour problem with workers leaving to work for competitors on a week to week basis when they offered a penny more.

We also tried to forecast if a strike would happen to a competitor (General Motors) how could we gain from it. We both agree higher wages would be unexpected by our competitors and discourage the workers from striking or leaving us for another job. Above all, we could plan at least six months ahead on a stable workforce if we made that a condition of service for receiving this higher

wage. In Ford's judgement we could control the market if we could in the next six months produce more units to the increasing popular demand for the motor car'.

History proved Ford's strategy to be correct. Against new and existing competitors, over the next seven years it increased its market share from 25 percent to over 60 percent. The decision embodied many of the military principles of strategy.... Clear objectives, an element of surprise, developing the right concentration of resources at the right time with an offensive action .

Another example of doing business in accordance with the facts and circumstances of this industry was in 1921 when Sloane (1964) indicates how General Motors (GM) when it was losing both market share and revenue, its Chairman Pierre du Pont established a special planning committee. The aim was to chart the "true best course for the future".

At the time, GM's policies and plan of action were directed to creating a number one objective.. "GM was to make money by lowering costs and attracting more customers than Ford through better product line over the next couple years" (pp. 82-94). This marked the change of GM from an entrepreneurial entity to a managerial one.

Again, literature in business journals on the whole failed to understand Pierre du Pont's generalship at GM in formulation of a long term product strategy. The literature being written (Taylor, Going, Knight, Robb, Shaw, Kimball, Butler, Diemer, Jones and many others) was directed more to accountancy, marketing, economics, personnel, and engineering tactics than to the study of strategy. Most business pundits ignored the significance of this type of planning activities.

THE RISE AND FALL OF STRATEGIC MANAGEMENT

At first many of the business strategies being used in the period of 1950 through the 1960's centred around product.

These were mostly planning-product modes; if a firm had a product or service, then it developed a product market strategy for it. The hallmarked titles to achieve in this period as a professional planner were "strategic planner", when the staff reported directly to top management and "corporate planner", when the firm had developed layers of strategies. It was at this time, larger firms began to convert overall corporate goals from divisional or product ones.

General Electric (GE) of the USA became the pioneer in strategic planning by establishing a formal planning

department in 1948. Its staff of 60 professionals developed models of planning which were directed to identify emerging markets and the development of new products to exploit them. One of GE's senior directors managed this department and possessed "go or no go authority" over new and existing projects.

At this time GE was the most respected planning group in the world and its techniques of industry attractiveness charts for business strategy were used without modifications by many industries. Annual meeting of stockholders at GE included charts and projections from this staff for over 25 years (Gardner 1986). It was the flagship of strategic planning.

Using GE as a model, hundreds of firms began to emulate the planning principles using strategic business unit methods as a guide, then the fall...

Suddenly in almost every industry and in companies which dominated their markets in the 1960's, sales plummeted.

This was true even with those using formal planning departments. By the early 1980's GE, for example, had cut its staff from 60 to less than 30. Dozens of the top firms did the same. Planning theory was being attacked in business journals and board rooms (Business Week, September 18, 1984) ... "line managers are successfully challenging the power and influence of professional planners".

Methodologies and planning approaches once held in esteem were being questioned. The planning functions went from development of growth strategies to retrenchment. Strategic planners when retained were used more for the analysis of capital and resources allocation than strategy formulation. They became skilled in "number-crunching" computerised schemes and began to pore over reports from the field for errors and deviations from the corporate plan.

At the same time, executives like Harold Geneen of ITT, Matthews Edwards of British Leyland and Ian MacGregor of British Steel became known as "streamliners of cost and functions". They represented the new style of "hands on" management. Planners were ignored as a whole. Many left the corporate world and joined the faculties of universities.

Also, this was the era (1971-1982) in the USA where business schools came under their most severe attack and academics in turn questioned the style, decision-making and abilities of many business leaders to manage (Peters 1981:34). The gap between how and why decision-making was done in a theoretical sense and how and why it was being done in a pragmatic sense became widened.

To fill this gap between the theories of the academic community and the practitioners of management, the use of management consultancy firms became the fashion. They in turn offered portfolio planning devices, some fresh buzzwords, new organisational theories and simplified planning techniques. In this epoch, Drucker's (1973) "Get back to profits using basic managing principles" seemed to set a key theme.

The Return of Strategic Management

Throughout the early eighties, organisations became more concerned with the delivery of products and services in the most profitable ways rather than pure growth strategies. At this point, to some degree, business strategists became mainstream with the publications of four key pieces of literature.

The first publication to signal a return to the use of strategic management principles was a book by Michael Porter (1980), a Harvard Professor.

Porter wrote about the market positioning techniques being taught by him over the past three years. His analysis of the five forces of competition outlining the strategic relationships between suppliers, customers, direct competitors, substitutes and new competitors made sense to many business executives. It regenerated interest in strategy implementation as well as strategic formulation. Planners (and new business school graduates) who understand the inherent planning concept were being hired to implement its strategic principles.

The second key piece of literature was an article by Gluck (Harvard Business Review July/August 1980), who argued that like everyone else managers in companies react to trends.

" strategic management is not merely a collection of methodologies nor is it a collection of systems and procedures and planning, it required a whole new type of dimensions. Strategic management requires a frame of mind and a set of behavioural patterns that must be reinforced through an organizational culture for a strategy to work. These patterns should be based on the belief that change is good, should be welcomed and nurtured through the training of its people as a strategic objective"

This article clearly uplifted the old concept and limitations of strategic planning into the more complex

process of strategic management. It outlines how the process must integrate culture, change, people, systems, and innovation.

The third publication was a book by Waterman and Peters (1982) in which an edict of eight rules were furnished to assist firms in reaching for excellence.

This book built on the principles of the McKinsey's "7-S" model indicated that change in an organisation is possible through a network of people, in and out of the company. The seven "S" dealt with systems, style, structure, shared values, skills, staff, and strategy. These "S's" highlighted how the strategy had to be interweaved with the style and culture of a company to be effective. From a study of 62 companies, a list of about a dozen American companies were used as examples as to how it should be done. Their argument was that the qualitative goals of a strategy were the true engine to propel a company to be competitive rather than the quantitative process of strategic planning (pp. 34-38).

The fourth piece of literature was an article in Fortune Magazine (April 30, 1984) where 13 companies were profiled for making profits and gaining market share at the expense of their competitors.

This was written in the period of 1974-83 when many firms were losing market share. Yet, these firms enjoyed an average return on equity of over 20 percent. Their success reinforced the view that strategically-managed companies which accepted and exploited change were to be the winners throughout the eighties.

THE COINAGE OF STRATEGIC MANAGEMENT

All four of the above writings spoke of strategic management as the key feature for corporate success when it is combined with a complex relationship between suppliers, customers and employees. Some feel that an overall strategic theory is emerging (Moss, 1981; Kay, 1984; Porter, 1980 and Kanter, 1986).

With strategic management now being viewed in a favourable light again, many practitioners argued for a more encompassing corporate title for strategic planning. In May, 1981, at the North America Society of Corporate Planners, Ken Ohmae spoke about the new planning requirements in an ever increasing complex and changing world.

"It is time for us to think of a more accurate word for us than corporate planners. Our present name is misleading and isolates us from other types of managers. A better

expression may be strategic managers, corporate development specialists, or corporate path-finders, anything but planners.

Strategic management as a theory of management require a host of new skills and knowledge not imagined just five years ago. We now must deal with new technologies, strategic partnering, spin-offs, new products with a life cycle of months, and even view former competitors as partners in joint ventures. Customers which are thousands of miles apart with language differences but who all understand the same values. Globalization requires us to be prepared for the unexpected from Europe, Japan as well as across the street". It is time for a change.

It was unanimously passed that the name of this society be changed to the Society of Strategic Management Personnel. Secondly, a certificate programme was implemented for the rank and title of a certified Strategic Manager. These changes will form a basis for the development of an overall theory when managers and academics have a common understanding of this field of study.

SUMMARY

Looking more closely at strategic planning through the past 80 years, it became clearer during this enquiry phase of the investigation why some of the principles of planning before 1960 and through 1970 were doomed to fail.

A contributing factor to its failure as a planning discipline, was the inadequate understanding of how implementation for strategy-making should be done and the lack of, or perfunctory, involvement by senior managers. The other misgiving was that while management recognized the role of the planners, the motivation of the managers was needed to make a strategy happen. The legitimacy of strategic management as a managerial tool suffered because of this shortfall.

This shortfall in the mis- understanding of the key strategic concepts was even true of the academics during this period of time. Certain articles written on strategic management (Ansoff, 1965; Andrews, 1971) had the same basic weaknesses. Generally, these articles stress the formulation of data, but fail to explain how the accumulation of this data cannot be substituted for poor implementation. Overall this section shows how, we, academics failed to keep abreast with what was happening in the business world as shown by the Ford Motor Company's case study, 1914.

APPENDIX B

Glossary of Terms

Business Policy: A study of management that looks inwardly as to how a firm's resources can be formulated toward a common goal.

Business Strategy: The second of three levels of strategy-making, its should determine how a firm should compete against others in the same industry by its major strengths, and weaknesses (Porter).

Certainty: In decision making, this is a condition in which how each decision will react and the consequent of a decision is known for sure.

Classical School of Management: A school of managerial thought emphasizing rationality. It includes bureaucracy, scientific management and administrative principles. Fostered By Weber, Taylor, and Fayol respectively.

Context-descriptive Model: A model describing in greater details the relationship of all variables and their impacts upon the other.

Content-prescriptive Model: A model describing in a particular situation what a firm should do.

Contingent Elements: This is a group of elements that reflect the configuration and range of activities with a firm. They are dependent on the amount and quality of three resources (people, monies, and contracts) at any one time.

Corporate Strategy: One of three levels of a firm's strategy-making, it addresses what business a firm should be in, what percentage of a firm's resources should be invested in each business and how each of them should be managed (Hofer, Murray and Pitts).

Core Competences: Those skills (physical, mental, and human processes) needed to produce resources into core products/services.

Critical Success Factors: Essential factors which are valued by customers that separate a firm's strengths from a competitor's.

Culture: Socially-shared and transmitted beliefs of knowledge, myths, customs, and values passed from one generation to another.

Decision-making Unit: The body of leadership that can make a commitment which can not be changed without its consent.

Distinctive Element: This is a element that will stimulate a firm, singularly by its presence or when used in combination will overcome the absence of other elements.

Element: An essential factor affecting a decision, condition, or attitude. It can be stimulated by events occurring within a firm's organisational structure or arising from its external environment.

Empirical-rational Strategy: This is a strategy assuming that when people are presented with all the facts, knowledge and information available, they will act in their own best interest and change their behaviour accordingly.

Extrinsic Rewards: These are social or economic incentives that are external to the firm and the task being performed.

Functional Strategies: These are the lowest ranking of the three types of strategies used by a business. Their main purposes are to assure that a host of a firm's functional areas (technological, manufacturing, administrative, etc.) are in tune with current changes.

Gap Analysis: An emotionally-based process of a firm being aware that there is a strategic gap between a desired and an anticipated outcome. It is the first step in strategy-making (Glueck and Jauch).

Goals: Objectives that the firm seeks to accomplish in support of a stated mission.

Individual Risk taking Propensity: The degree to which managers take or avoid chances based on their own risk-taking experience.

Innovation: Any new process, idea, plan, service, that supplants and improves an existing process, idea, plan, service or concept.

Innovation-Investigating and Developing Activities: These include R & D efforts, conceptualising, funding, testing, marketing and designing of an innovation before it is sold for a profit.

Intrinsic Rewards: Internal incentives that are psychologically motivated by the performance of the tasks being performed.

Intuitive Strategy: This is a strategy based on a manager's experience, common recipes within an industry on what to expect, and a personal reaction to how to handle a problem.

Learning Curve: A pattern of how resources are consumed; where the costs of initial units are higher and the costs to produce later units will be progressively lower.

Life Cycle: The useful life of a product in a particular market; includes the stages of development, growth, maturity and decline.

Management Science-based Strategy: This is a strategy employing scientific, rational and economic influences to make the best choice available.

Model: This is a scaled-down representation and a view of something real; it is used to show variables that can predict or explain.

Mission: An expressed purpose of a firm in general and specific terms formulated by its Decision-making Units as to where they aspire their firm to be xxx amount of time from a given point. It is a higher level than goals which are assigned to the detailed planning of a firm. A firm can have economic, financial, business and intangible missions simultaneously.

Motivational Elements: A group of elements used to motivate employees based on the principles of the Expectancy Reward Theory.

Nescience Principle: A belief that most managers act in ignorance because they are not aware of or lack techniques to consider other more rational solutions. It is emotionally-based.

Nexus -Strategic Structure: This is a structure using a flexible link between members of an organisation that are autogenous to each other (products, innovation, customer) but share the same strategic goal.

Normative-reeducative Change Strategy: A strategy assuming that people have attitudes and value systems and when presented with facts and knowledge and information directed at these attitudes and values, they will change accordingly. It is stimulated by internal and external elements.

Occupational Obsolescence: This is a condition where an employee's skills and knowledge erode away over time until they are no longer useful or current.

Policy: A statement serving as a guide for action and a desired behaviour.

Polyvalent Firm: This is a firm which is structured simultaneously to deal with current problems, whilst innovating for its future.

Polyvalent Workforce: This is a workforce in which most employees are trained to be highly efficient in meeting current job obligations while simultaneously are trained to innovate for the future.

Power-coercive Strategy: The use of political, personal and economic influences to force a change in behaviour.

Procedural-How To Do It Model: A model constructed in a series of solutions in sequence for solving a particular problem.

Product Life Cycle: A concept used to describe the chronological stages of demand for a product based on its useful.

Project: A one-shot set of activities, a venture with a definite beginning and ending point.

Proportional Chance Criterion: This indicate the percentage above 50 percent to indicate by an expected percentage of correct classifications if assignments were made randomly. It is defined as:

$C_{prop} = p + (1-p)$ where the proportion = firms answered " yes" and $1-p$ = the proportion of firms answered "No".

Risk: In decision problems, a condition in which the ultimate state of nature is not known for sure, but probabilities are estimated.

Strategic Business Unit: This is any unit within a firm that has its own markets, personnel, name, resources, and goals that are measurable as part of a larger business entity.

Strategic Focus: The awareness of the DMU that is directly proportional to a firm scanning system and historically, how a firm prefers to do business, and the ability of the DMU to link the past achievements of a firm and its future goals together successfully.

Strategic Management: An integrated and continued process of using culture, people 's aspirations, systems, corporate venturing, and innovation to meet a negotiated series of goals in a changing environment. The preferred term to business policy (Gluck).

Strategic Planning: The process of linking a firm's current mission and its environment; and then setting forth a guide for tomorrow's decisions and results.

Strategy: An unifying element in which all of a firm's activities are linked (Ansoff). A complete plan as to where a firm is headed (Game Theory). A process of planning before being engaged in battle (Military). Strategy sets the direction of an enterprise. It becomes a master strategy when the dimensions of timing and targets are attached to it.(Newman). The allocation of resources toward a broad goal (Andrew). What Business are you in? (Drucker).

Sovereign Element: The supreme element (based upon a firm's cumulative history of being successful or the newness of a situation) in which all other elements- culture, ventures, boldness of strategy,etc. reacts to and is dependent upon it for guidance.

SWOT: An analysis of a firm strengths, weaknesses, opportunities and threats. This is the second step in a firm's strategy-making.

Tau Measure: This compares the errors made in the classification using the function with errors expected by a random assignment.

Technology: The scientific expertise in blending skills, knowledge, labour usage, capital gains, and management into useful outputs.

Time: In strategy-making, the planning horizon and speed in which decisions are made and realized.

Managing for a Triage: The abilities of management in assigning a limited amount of resources to get the maximum effect.

Triggering Strategic Element: The one reason which forces a decision-making unit take action. In the constellation of

circumstances theory, it is an incident (loss of profit, new technology, customer complaints, etc) which trigger a decision that some type of action must be taken.

Uncertainty: In strategy-making, a condition in which the probabilities surrounding a decision are not known.

Value System: An individual's or a firm's beliefs as to when a concept is desirable, good, or bad.

II. The following are detailed descriptions* of some Business Strategies:

Adaptive Strategy: This is a reacting type of strategy which is triggered by changes in the environment. It seeks to negotiate with a complex environment for a position of survival. The strategic focus is directed to the solving of current problems rather than exploiting opportunities.

Dependent Strategy: This strategy depends on customers to supply the specifications needed for innovation. Its leadership seeks a continuous dialogue between suppliers, and customers acting as a bridge between the two parties. The organisation is partly controlled by customers' needs for certain kinds of quality, production and marketing specifications which are formally written and the suppliers' ability to be flexibility. The overall technological strategy is informal since the firm engage in little or no research (e.g. Marks and Spencers, jobbing shops).

Disconnected Strategy: This is a strategy in which the members or subunits of a firm are loosely coupled to the rest of the organisation, deliberately. These subunits can act in direct contradiction to the culture, common skills, and core products of the organisation at large, but have the sponsorship to do so. They are controlled by formal channels of communications (proposals, and regular reports), funding, pre-determined objectives, and withholding approval to continue pending the review of previous efforts (e.g. skunkworks, intrapreneurs, new product development divisions).

Entrepreneurial Strategy: This is a random and unfocused strategy tightly controlled by a personal unarticulated vision of a single leader or by a relatively small leadership unit. Its objectives are intuitively-formed and its leadership is extremely erratic in stimulating and reviewing new innovations and business opportunities. It is most effective operating in a protected niche within a moderately changing environment when its leadership is still ambitious. It becomes non-innovative within a short period of time because of having a great success or failure (e.g. McAlpine Industries).

*Adapted from Quinn, Mintzberg and James (1988:16); Littler (1985:93-97); Baker (1975:147); Newman and Logan (1976) and Rothschild (1979)

Fatalist Strategy: This is a neo-technological strategy used by firms (who must innovate to survive) within a sector of an industry dominated by other innovators. The leadership unit is a strong management centre of financial controls, and generally controls by the screening of investment projects and the use of short-term payback criteria to eliminate the weak ones. They must establish research departments, and to acquire other more innovative firms which are loosely linked to the core business in order to grow. The overall strategy is informal by delegating downward to each business unit using a flexible combination of process and disconnected strategy methods (e.g. GEC, Hanson, Tarmac, BTR).

Formal Strategy for Innovation: It has a mission of innovation clearly defined as an objective and value of its business. There is a hierarchy of strategies: corporate strategies, competitive strategies, organisational short term operating plans, and functional strategies. It seeks to establish working relationships with suppliers and customers, who also welcome innovation. There is an exhaustive set of written operating procedures covering most eventualities (hiring, training, acquiring of patents, scanning of the environment, funding of employees' experimentation, and licensing) which the mission to innovate may create.

Follower Strategy: This is a marketing or technological strategy in which a firm seek to be second, or third to enter a market with an improved differentiated version of an innovation developed earlier by a pioneering firm. It may have actively developed an improved version almost simultaneously as the pioneer, but have postponed the final marketing of the product/process until the demand is great enough to ensure it of quick profits or an established market position.

Functional Strategy: This is an administrative type of strategy used to coordinate the flow of information and supplies needed to complete a task shared by several departments (e.g. How the marketing department would receive only the information it needs, and no more, from the departments of sales, production, and finance). It balances the practical needs of one particular department for supplies, information, and technical support, etc. without burdening another department, unnecessarily.

Imitator Strategy: This is a technological, and niche-filling strategy based on improving an innovation to the needs of a few customers. The leadership unit seeks volume to obtain economies of scale by offering major desirable features of an innovation at a lower cost in a more functional form. It generally enters the market in the late growth or maturity stages when technology is established and well diffused. The strategy is formal, and its organisational structure is partly- controlled by specialists (partial informal) operating to defined objectives (e.g. Amstrad's Computers).

Imposed Strategy: This is controlled by patterns and demands being imposed on its leadership unit from external forces in the environment (by outside owners, suppliers, governments, and customers). The formulation of these strategies are done by informal

methods (pressures of strong customers, reacting to competitors, etc.) although once formulated are executed formally.

Pioneering Strategy: This is a neo-technological strategy that is used when a firm decides to be the first to apply the newest technology ahead of its rivals as a mission statement for its business. Its leadership is committed to innovation and all levels of supervision have clearly defined limits of authority and responsibility to do so. Because it possess large and significant amounts of financial and marketing resources, it uses a formal strategy (written procedures and programmes) to offset any risk in being innovative. It deliberately spends a significant amount of its resources in basic research, R & D, training its employees, and educating its customers. It is most effective using a very flexibility organizational structure which is multi-structured with specific programmes to attract, and motivate an enterprising workforce ranging from the professional researcher to intrapreneurs. It uses disconnected strategies (informally) and functional strategies(formally) to maintain a leadership role within its industry (e.g. IBM, 3M Corporation, Linn Products, Glaxo).

Process Strategy: In this strategy, a leader controls the process aspects of strategy (who gets hired, promoted, and is able to influence strategy by the type of structures they create for employees to work within, etc.) leaving the actual content of a strategy to others; these strategies are partly formal (concerning the process) and partly informal (concerning contents) and deliberately informal about stimulating innovation and new business opportunities.

Production-driven Strategies: These are either capacity-based, proprietary equipment/system-based; efficiency-driven; supply-driven and deployment-driven (by customer demands) types of strategies.

Punctuated Strategy: This type of strategy is done in bursts and starts. It is highly flexible, feeds off a flow of new information and a motivated workforce. It uses a concerted pattern of short term plans. They are best used by the finance, human resources and technical areas of a firm to support a long term strategic goal, and acts very similar to tactics used by the military, except repeated.

Opportunist Strategy: This type of strategy responds quickly to market opportunities in which products have short life cycles and requires a minimum of R & D. It innovates in order to gain great profits by strategic venturing with a large variety of products and processes peripheral to its core business. The leadership unit is divided over several business streams and geographic areas. Its organisational structure is very flexible, much like a matrix by function. The overall strategy is best characterised as being informal giving each business unit an opportunity to innovate, to pursue or drop new products and new markets at will (BP, Cadbury Schweppes, Gulf-Western).

Technological Strategy: A strategy based on a firm willingness to purchase, acquire, develop, or use any process or product that is skill-enhancing or skills-destroying for an economic advantage (Rothschild). It is a business-second level strategy (Hofer:78:29)

Traditional Strategy: The mission of this strategy is precisely formulated and articulated by a central leadership unit, and backed up by formal controls to ensure a surprise-free implementation. It believes in purchasing and applying innovation that reduces labour costs, and the substitution of current material for cheaper ones, but does not undertake any R & D, itself. It operates best in an environment that is benign, controllable, or predictable; and most of its tactics are highly deliberate and formal (e.g. Clark Footwear,).

APPENDIX C

PRE-SURVEY INTERVIEWS AND SUMMARY OF FINDINGS

This section summarises the findings of the pre-survey interviews held between May and December, 1988 and is in three parts.

The names and a brief description of each of those interviewed follows the first section, Summary of Comments. Section III provides copies of the innovation rules and leadership discussion guides which were developed from these interviews. Most of the interviews took over several hours, although one was for less than 45 minutes. All comments and terms of the participants will be in quotation marks.

Section I: Summary of Comments

They were asked: (1) what rules and procedures do you recommend that any firm can follow to stimulate its workforce; (2) do you believe in the concepts of a strategy for innovation; and (3) how should they be tested in interviewing other companies.

The first question about rules and procedures that they recommend:

They stressed that "innovators always appoint themselves" and the company should provide a system (plan, strategy, or programme) to identify them and then to encourage them. They recommended that an idea should not be "handed-over" to someone else to implement and should remain with the innovator. One of those interviewed, Mr. Brand of 3M Corporation, stated these beliefs were two major points in 3M's programme.

The next major point was to let those who are "deciders" (bosses, or innovation committee members) meet as soon as possible with those who are proposing to be the "doers". At that point resources (time, monies or approval) should be allocated for the project to go ahead or reasons be given at that time why the idea will not work.

There should be a variety of programme, policies, and ways for an idea to be tested. Above all, there should be a corporate policy as to how long and to what degree a project will receive sponsorship within the company before it is placed on a "back burner", but never let it be forgotten. "Be patient and allow a fair amount of mistakes and failures... but praise and recognise the most innovative employee."

"Go to the marketplace as soon as possible-making a little and selling a little to find out what will work commercially. They recommended that supervisors should openly request any new ideas no matter how small".

The second question about what makes up a strategy for innovation:

The key point to which they all agreed to was that the concepts of a strategy for innovation should be devised so a series of "informal ways were available and each employee should be given the freedom to tinker and experiment without having to answer to a lot of people about what they are doing... There must be clear goals and a mission to innovate... there must be controls about the time and resources expended by employees". Thus, they recommended a series of policies be developed to that purpose.

Ms. Patterson of Motorola Corporation stressed that a series of training programme be made available as part of any company decision to launch a strategy for innovation. She stated "once you have discovered who is the innovator there must be a process to develop them to their fullest potential".

Several of the participants of the larger firms stated that a strategy for innovation should be parallel to other strategies in which the company was involved... "Not part of and answerable to any one sector of the company".

It was further recommended that cross-functional teams and working relationships should be established in the development of an innovation as soon as it is possible to do so. However its ownership and who will be considered the driving force of an innovation should be made clear at the beginning. "Turf-fighting or turf-defending is why many innovative ideas become side-tracked" stated Mr. Watson, manager of a 1200 person transportation firm.

The third question on how to test other companies as to how they innovate was answered a couple different ways.

This question was answered by Professor Quinn of Amos Tuck Business School, who stated, "talk to as many managers as you can in groups and later one on one, but first get out and survey them so when you meet there will be something for them to argue with or agree to".

The next point made by most of those interviewed was that the informal cooperation often dictated which of a firm's goals were important. Those from the smaller organisation stated, "if you believe in something in a close group, you must visibly show it or the employees will get mixed signals about what the true goals".

One of the examples given was a company's policy to always offer the higher price on a bid. If you don't practice that yourself as boss, in time, everybody will be offering lower bids. It is the same with innovation, you must show how you want it handled".

The final points by several of the managers gave me some insight on how that the appearance and wording of the survey instrument should be structured to encourage participation. "Don't use the word strategy, try the word "plan" instead if you can. This

is the word which 90 percent of most managers use in place of strategy on a daily basis.

" Where the word strategy has many different and specific meanings...corporate, product, functional, etc. The word "plan " means we have some input and strategy means that what the top management has decided on after receiving the planning documents from all the divisions, worldwide.... we learned long ago if we want employee participation, we give it a name and called it a programme."

When asked, what in their opinions,made up a good programme for innovation, several specific features were given. Based on their comments, as later reflected in the research model (Figure 7.2), it was recommended that any survey instrument should test if the sponsoring firm has provided, at least, four sub-components:(1) separate budgets; (2) a formal system of scanning to determine the strategic implications of a new product/idea being developed an employee or a firm; (3) a support service to advise and motivate the employees; and (4) a network system to publicise the programme and an employee's effort regardless of the success of the project

II. Names of Persons Interviewed

Exploratory discussions were held with the following individuals:

Professor James Brian Quinn is the William and Josephine Buchanan Professor of Management at Amos Tuck School of Business Administration at Dartmouth College in the USA. Professor Quinn is an authority in the fields of strategic Planning, the management of technological change and entrepreneurial innovations. In addition to consulting with the leading US and overseas companies and publishing quite extensively, he is the dean of a Japanese business school.

Mr. William Whiland, Chairman and Managing director of Whiland & Son located in Dumbarton, Scotland. His firm is closely-controlled and engages in steel fabrication and manufacturing. He employs about 45 persons and negotiates projects throughout Europe. His firm, at the time of the interview, is best classified as using a dependent strategy.

Mr. Adam Brand is the Director of 3M United Kingdom Ltd's Pathfinder programme in Bracknell, England. He manages a staff of 31 persons, who are responsible for corporate entrepreneurship and implementing an Europe- wide corporate strategy for the stimulation of innovations. His parent firm grossed over \$10 Billion of which more than 23 percent was derived from new products. It uses a pioneering strategy.

Ms. Jill Patterson is the Director of Personnel, Manpower Planning and Training at the Motorola Plant in East Kilbride, Scotland. Her division employs 1,400 person and is part of an international, multi-billion dollar electronic firm located in Chicago, Illinios, USA. Their strategy is best classified as pioneering.

Mr. Frazier Falconer is the General Manager of the Goodwill Industries in Glasgow, Scotland. His company is an associate member of the Goodwill, International and employs 95 persons. In addition to providing contract services to industries, it manages 5 retail outlets which specialised in repairing and re-selling second-handed goods.

His firm has increased its sales and services by more than 300 percent in the past two years under his stewardship and plans to expand throughout Scotland. The strategy used by this company is niche-focused or an imitator.

Mr. George Watson is the Managing Director of Clydeside Bus, Ltd in Paisley, Scotland. His firm within of the State of Scotland's Bus and Transit Group employs about 1200 persons, with 420 vehicles for hire, grosses over £21 million, and it is considered one of the most innovative within this group.

His environment is fiercely competitive. At the time of his interview, he was implementing an organisational plan to convert a traditional, and tightly-structured organisation with a formal planning type of strategy into one characterised as being opportunistic.

Other contributors were Ms. Cathy Smith, who was a researcher at the British Institute of Management on the topic of Intrapreneurship; James Mackinnoch, the Training Director of the Inland Revenue Services in East Kilbride; and Mr. James Harvey, the Managing Director of Glaxochem UK.

Con't of Appendix C

THE "LEADERSHIP" RULES FOR INNOVATION BY EMPLOYEE

1. Self-selection. Most innovators prefer to appoint themselves to their role and receive the corporation's blessing for the self-appointed task. Despite this, some corporations foolishly try to appoint people to carry out innovation.
Does your company encourage the self-appointed intrapreneur? How, do you have a programme?
2. No handoffs. When the innovation process involves switching the people working on an idea—that is "handing off" a developing business or product from a committed intrapreneur to whomever is next in line—often someone not as committed as the originator of a project.
Does your company provide ways for "enterprising employees" to stay with their project?
3. The doer decides. Some organizations push decisions up through a multilevel approval process so the doers and the deciders never even meet.
Have you separated the doers from the deciders?
Are people in your company permitted to do the job in their own way, or are they constantly stopping to explain their actions and ask for permission?
4. Corporate "slack." Enterprising employees need discretionary resources to explore and develop new ideas. Some companies give employees the freedom to use a percentage of their time on projects of their own choosing, and set aside funds to explore new ideas when they occur. Others control resources so tightly that nothing is available for the new and unexpected. The result is nothing new.
Has your company evolved quick and informal ways to access the resources to try new ideas?
5. Ending the home-run philosophy. Today's corporate cultures favor a few well-studied, well-planned attempts to hit a home run. In fact, nobody bats 1000, and it is better to try more times with less careful and expensive preparation for each.
Has your company developed ways to manage many small and experimental products and businesses?
6. Tolerance of risk, failure, and mistakes. Innovation cannot be achieved without risk and mistakes. Even successful innovation generally begins with blunders and false starts.
Is your system set up to encourage risk taking and to tolerate mistakes?
7. Patient & money. Innovation takes time, even decades, but the rhythm of corporations is annual planning and profits immediate.
Can your company decide to try something and stick with the experiment long enough to see if it will work, even when that may take years and several false starts?
8. Freedom from turfiness. Because new ideas almost always cross the boundaries of existing patterns of organizations, a jealous tendency to turfiness blocks innovation.
Are people in your company more concerned with new ideas or with defending their turf?
9. Cross-functional teams. Small teams with full responsibility for developing an enterprise solve many of the basic problems of innovation. But some companies resist their formation.
How easy is it to form functionally complete, autonomous teams in your corporate environment?
10. Multiple options. Entrepreneurs live in a multioption universe. If one venture capitalist or supplier can't or won't meet their needs, there are many more to choose from. Corporate innovators, however, often face single-option situations that may be called internal monopolies. They must have their product made by a certain factory or sold by a specific sales force. Too often these groups lack motivation or are simply wrong for the job and a good idea dies an unnecessary death.
Do employees in your company face internal monopolies or are they free to use the resources of other divisions and outside vendors if they choose differently?

These Rules developed from interviews and secondary research: Pinchot 1986; Drucker 1985

APPENDIX D

This section supplements the descriptions of the five broad categories of questions used in the first questionnaire and mentioned in Chapter Seven (para.7.5). This is to be used as a guide to the questionnaire to Exhibit No. 1 and their tabulation in Exhibit No.2 as to which questions were used and for what purpose.

1. Typological Elements

Two major elements contained in questions no.3 & 4 were used to develop a typology of users of a formal strategy and non-users: namely (1) a dichotomous (yes/no) variable by indicating whether or not a formal programme for innovation was used; and (2) the number of innovations and training arising from its use. Using question no. 3, each of the firms in the sample was to tick one of the two groups as follows:

Strategy Users . This question reflected those firms employing a formal programme and was accepted by the investigator provided that the firm could establish that it had a name, budget, at least one year old, record of innovative accomplishments and had support services allocated to it.

Strategy Non-users . This question reflected those firms, who did not employ a formal programme (which had a name, budget, and supporting services), but could have done so, at least, in principle.

2. Strategic Elements

The strategic elements are to indicate the foremost way that a firm could be described by its market-technological strategy as contained in question no. 12 (i. e. whether they were pioneer, follower, etc.- as explained in Appendix B). It would be used in concert with other questions that assessed an organisation's abilities to be innovative.

3. Organisational Elements

Beyond the classification of the respondents as users/nonusers, the following types of elements were:

The group of elements, in questions no. 1-8, to be used as standard descriptors: nationality; reporting unit size; years it operated in Scotland; description of business; nationality of ownership; and parent company size.

The contingent elements, in Questions no. 23-25, are to indicate a firm's structure and how it was organised for the stimulation of innovation.

4. General Elements and Innovative Measures

To understand how firms motivated their workforce to stimulate innovation and the methods they used, there were five areas covered by a series of the questions and dispersed throughout the questionnaire. These elements were for the measures of a firm's innovativeness.

1. Elements for stimulating innovation. Any question using a five point rating scale (5= "very important", 1-"not very important") was to measure the range of methods used to stimulate innovation and the importance given to them by the respondents.

2. Importance of analysis tools. Question no. 6 using a comparative three-point rating scale (1= "most important", 2= "next important", 3= "important") was to measure which of the eight categories used in determining their company's strengths and weaknesses are relative to innovation, and their importance.

3. Technological Environment. A series of questions about risk and uncertainty in a firm's production process, perceived environment, and perceived rate of development were included. They were to measure six possible descriptive categories of uncertainties facing company (supplier, technological, market, production, product, and lose of key customers).

4. Organisational and Operating Conflicts. This series of questions are found in question no. 31 which is used to measure the type of conflicts arising in a firm when certain business objectives are used in contrast to a firm's pricing and marketing policies.

5. The Best Ways to Motivate Innovation. These questions provided a list of reputed methods which are available to a firm as to how it can motivate its employees to be more innovative. They will measure (by the frequency of ticks received from respondents, in total) how users or non-users feel about their effectiveness.

5. Distinctive Elements to assess Strategy and Innovation

The combination of how the above stated elements were linked was dispersed throughout the question no. 32. They were to measure a firm's culture and other elements which allow it to be the first to try a new line of products, and how employees and management worked together.

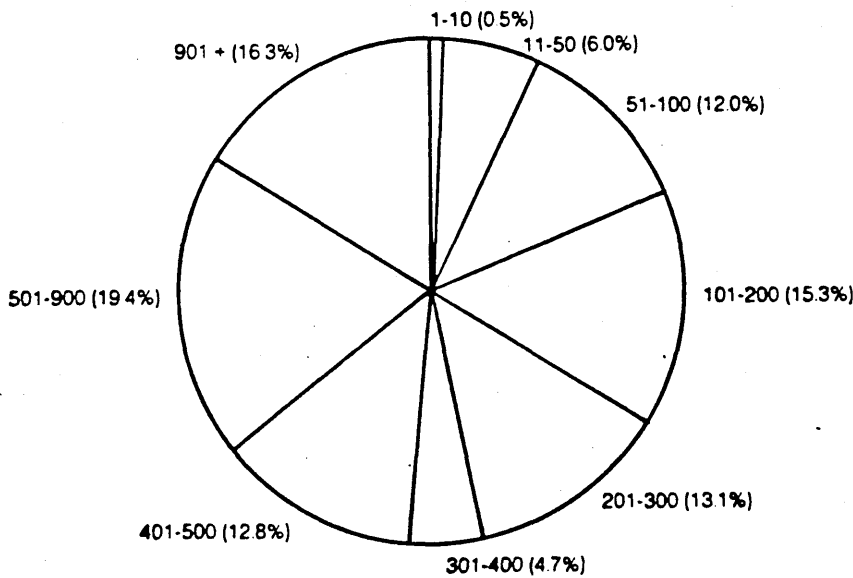
STATISTICAL PROFILE OF EUROPEAN AND OVERSEAS COMPANIES IN SCOTLAND

APPENDIX E

1. COMPANIES BY EMPLOYMENT BANDING

Employment Banding	No. of Companies	Employment
1-10	13	79
11-50	39	862
51-100	22	1725
101-200	17	2215
201-300	8	1885
301-400	2	675
401-500	4	1845
501-900	4	2799
901 +	3	2350
TOTAL	112	14435

EMPLOYMENT IN OVERSEAS COMPANIES IN SCOTLAND BY EMPLOYMENT BANDING



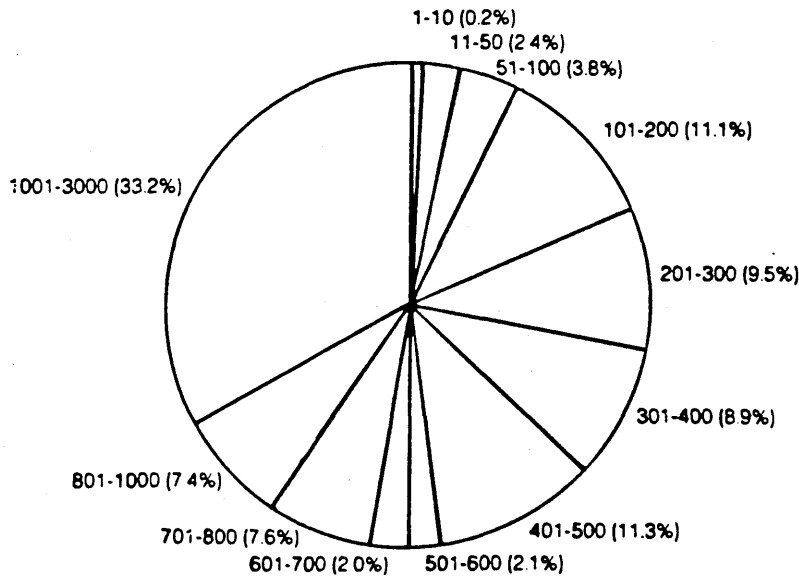
**Source: Scottish Development agency: Business Information Department
Overseas and European Companies Manufacturing in Scotland, September,
1987**

STATISTICAL PROFILE OF NORTH AMERICAN COMPANIES MANUFACTURING IN SCOTLAND

APPENDIX E

Employment Banding	No. of Companies	Employment
1-10	15	113
11-50	45	1211
51-100	25	1878
101-200	37	5498
201-300	19	4681
301-400	12	4429
401-500	12	5570
501-600	2	1034
601-700	2	1280
701-800	5	3717
801-1000	4	3642
1001-3000	11	16438
TOTAL	189	49491

EMPLOYMENT IN NORTH AMERICAN COMPANIES MANUFACTURING IN SCOTLAND BY EMPLOYMENT BANDING



Source: Scottish Development agency: Business Information Department
North American Companies Manufacturing in Scotland, October, 1987

APPENDIX F

This is the list of variables used by the SPSSX as taken from the first questionnaire.

These are 137 variables used for frequency and cross-tabulation:

Data List File = Data Records = 2

/1 Ident 1-3 Source 4 title 5 Parent 6 No.employ 7 Totsize 8 Ageloc
9-11 Corebusi 12 Formalst 13 Howlong 14-16 Reports 17 Delvest 18
Typeinvo 19 Purpose 20 Whenyr

21 Anexpert 22 Anaudit 23 Anplan 24 Angroup 25 Andepart 26 Anbuyer 27
Anoutput 28 Ansource 29 Anone 30 Namesize 31 Marktpos 32 Sycultur 33
R&D 34 Workers 35 Network 36 Facloc 37 Vision 38 Exenviro 39 Fubudget
40 Fuworker 41 Fumarket 42 Futools 43 Fugovern 44 Futech 45 Timeplan
46 Review 47 Emission 48 Emanuals 49 Eopplan 50 Ebudgets 51 Esop 52
Eshedule 53 Eprogram 54 Enone 55 Pioneer 56 Follower 57 Imitator 58
Dependnt 59 Traditnt 60 Opportnt 61 Fatalist 62 Why 63 Formal 64
Rewards 65 S-groups 66 Vislead 67 Founder 68 Trained 69 Opencom 70
Ezsystem 71 Culture 72 Bosswelc 73 Explore1 74 Explore2 75 Goodfac1
76 Goodfac2 77 Badfac1 78 Badfac2 79 /

/2 Buyin 1 First 2 Maxtime 3 Bemore 4 Fimpose 5 Fholdup 6 Fapprove
7 Freward 8 Forgive 9 Freedom 10 Return 11 Keyneeds 12 keystaff 13
Keylink 14 Keylead 15 keymedia 16 keyinfo 17 keyusers 18 keyideas 19
keyprog 20 keycult 21 keyspin 22 KeyR&d 23 Depts 24 Siminvol 25
Siminvo2 26 Typeorg 27 Busenvi 28 Budgets 29 Mobonus 30 Motypes 31
Motrain 32 Mosolver 33 Motime 34 Moboss 35 Mochamp 36 Moaward 37
Moopen 38 Mogoals 39 Moexpert 40 Moseljob 41 Mofund 42 Moffsite 43
Allocate 44 Opinion 45 Opgoals 46 Opresult 47 Opprice 48 Opmoney 49
Opdecide 50 Opteam 51 Optarget 52 Opmarket 53 Opstrato 54 Orgidea 55
Orginfo 56 Orgtop 57 Orgnew 58 Orgmarkt 59 Orglines 60 Orgrisk 61
Orgbold 62 Orgfirst 63 Orgadapt 64/

Total of variables used for Discriminant Analysis:

Used 12 Formalst; 5 Parent; 8 Ageloc; to discriminates against the following:

23 Dept, 21 Anexpert 22 Anaudit 23 Anplan 24 Angroup 25 Andepart 26
Anbuyer 27 Anoutput 28 Ansource

30 Namesize 31 Marktpos 32 Sycultur 33 R&D 34 Workers 35 Network 36
Facloc 37 Vision 38 40 Fuworker 41 Fumarket 42 Futools 43 Fugovern
44 Futech 47 Emission 50 Ebudgets 51 Esop 52 Eshedule 53 Eprogram

55 Pioneer 56 Follower 57 Imitator 58 Dependnt 59 Traditnt 60
Opportnt 61 Fatalist 63 Formal 64 Rewards 65 S-groups 66 Vislead 67
Founder 68 Trained 69 Opencom 70 Ezsystem 71 Culture 72 Bosswelc

CON'T OF APPENDIX F

Buyin 1 First 2 Maxtime 3 Bemore 5 Fholdup 6 Fapprove 7 Freward 8
Forgive 9 Freedom 11 Keyneeds 12 keystaff 13 Keylink 14 Keylead 15
keymedia 16 keyinfo 17 keyusers 18 keyideas 19 keyprog 20 keycult 21
keyspin 22 KeyR&d

26 Typeorg 27 Busenvi 28 Budgets 29 Mobonus 30 Motypes 31 Motrain
32 Mosolver 33 Motime 34 Moboss 35 Mochamp 36 Moaward 37 Moopen 38
Mogoals 39 Moexpert 40 Moseljob 41 Mofund 42 Moffsite

45 Opgoals 46 Opresult 47 Opprice 48 Opmoney 49 Opdecide 50 Opteam 51
Optarget 52 Opmarket 53 Opstrato 54 Orgidea 55 Orginfo 56 Orgtop 57
Orgnew 58 Orgmarkt 59 Orglines 60 Orgrisk 61 Orgbold 62 Orgfirst 63
Orgadapt 64/

Variables Labels

Part I: Questions Describing the respondents

Ident "ID Number of Company"
Source "Survey Source from addressee or not"
Title " Title of Respondent"
Parent "Parent Company Size"
Noemploy "No. of Employees in Scotland location"
Totsize "Parent Company Size"
Ageloc " Years in business at this Scottish location"
Corebusi "Core Business Purpose"
Formalst "If a formal Strategy was being used"
Howlong "No. of Years which company has a formal strategy"
Reports "Level to which the formal strategy reports "
Delvest "Past three years of innovation accomplishments"
Typeinvo "Type of Innovations"
Purpose " Purpose for Innovation"
Whenyr "The year when accomplishments were done"

Anexpert "If an expert is used to analysis for Swot"
Anaudit "When auditing team is used for SWot"
Anplan "If a business plan is used for Swot"
Angroup "If ad hoc group is formed from managment personnel"
Andepart "If a department is used for SWOT"
Anbuyer "If buyers are surveyed by company in a SWOT"
Anoutput "If outputs are compared to a business plan"
Ansource "If sources as publications are reviewed"
Annone" None of those earlier stated are used"

Namesize" Name and size are ranked as a strength"
Marktpos" Marketing position is ranked as a strength"
Sycultur "system and culture of corporation are ranked"
R&D "Research and development activities are ranked"
Worker" If innovative workers are ranked as a strength"
Network "financial position or distribution network are ranked"

CON'T OF APPENDIX F

Facloc "Facilities and location are operational strengths"
Vision "Leadership and vision of management are ranked"
Exenviro "external environment is understood by company "

Fubudget "If financial budgets are projected"
Fuworkers "If manpower needs for workers are projected"
Fumarket "If promotional and marketing are projected"
Futools "If facilities and equipments are projected"
Fugovern "If governmental regulations are considered"
Futech "If technological advances are incorporated"

Timeplan "How far ahead in years a company plans in advance"
Review "How often plan is reviewed by an organisation "

Emission "If mission statement is in a business plan"
Emanuals "If manuals are used to control the business plan"
Eopplan "If an operating plan is used by companies"
Ebudgets "If budgets are used"
Eso "If standard operating procedures (sop) are used"
Eshedule "If a schedule of activities are used"
Eprogram "If a programme for innovation is used"
Enone "none of those stated above are used"

Part II: Questions about Strategy and Innovation

Pioneer "first with the newest"
Follower "follow market leaders by plan"
Imitator "improves on others innovation"
Dependnt "innovates to needs of customers"
Traditnt "does not innovate by a plan"
Opportnt "innovates for high return"
Fatalist "must innovate to survive by industry"
Why "Why a firm picked one of the above strategies"

Formal "formal programme used to be an innovative company"
Rewards "employee are rewarded to be an innovative company "
S-groups "small groups are used to be an innovative company"
Vislead "visionary leadership is used by an innovative company"
Founder "founder set practices of innovation"
Trained "training of personnel used to be entrepreneurial"
Opencom "open communication between employees is used"
Ezsystem "feedback and approval are easy to receive"
Culture "Corporate culture is why a company is innovative"
Bosswelc "bosses welcome suggestions"
Explorel "explore innovation"
Explore2 "explore innovation"
Goodfac1 "good factors that occurs from Innovation"
Goodfac2 "Good factors occurring from Strategy"
Badfac1 "bad factors occurring from innovation"
Badfac2 "bad factors occurring from Strategy"

CON'T OF APPENDIX F

Strategy "The technological Strategy used"

Buyin "How or if a company should buy into an innovation"

First "First thing a company should do to innovate"

Maxtime "Maximum time a company will develop an innovation"

Bemore "Ways to be more innovative"

Fimpose "Imposing time limits is why some fail"

Fholdup "holding back on funds are why some fail"

Fapprove "Approval being difficult to get is why some fail"

Freward "Not rewarding a product champion causes failure"

Forgive "Not forgetting past mistakes is what cause failure"

Freedom "lack of freedom for innovator causes failure"

Return "ROI is estimated for innovation"

Keyneeds "needs of customers are keys"

Keystaff "staff encouraged to be innovative is key"

Keylink "links with outside innovators is key"

Keylead "entrepreneurial leadership at top is key "

Keymedia "media to inform and educate users is key"

Keyinfo "information is key"

Keyusers "potential users for demand is key"

Keyideas "ideas are welcomed is key"

Keyprog "programme for innovation is a key"

Keycult "climate as entrepreneurial is a key"

Keyspin "spin-off projects are keys"

KeyR&D "research and development programme is key"

Depts " departments are used for innovation"

Siminvol "how innovation is stimulated"

Siminvo2 "how strategy is stimulated"

Taskorg "How tasks are managed and type of organisation"

Busenvi "What is the business environment" and how competitive"

Budgets "How innovation budgets are allocated"

Mobonus "Motivate by bonuses to employees "

Motypes "Motivate by types of employees

Motrain "Motivate by training"

Mosolver "Motivate by solvers of problem"

Motime "Motivate by time to develop ideas"

Moboss "Motivate by boss encouraging others

Mochamp "Motivate by champions of new products"

Moaward "Motivate by awarding efforts"

Moopen "Motivate by open communication on problems"

Mogoals "Motivate by goals setting by employees"

Moexpert "Motivate by experts being used "

CON'T OF APPENDIX F

Moseljob "Motivate by job being self-designed"
Mofund "Motivate by funding ideas of employee"
Moffsite "Motivate by off-site training"

Allocate "What percent of turnover used for innovation"

Opinion "An expressed opinion on innovation"

Opgoals "Operating to goals"

Oproresult "Results identified and achieved"

Opprice "Prices matches markets"

Opmoney "Money used as resource"

Opdecide "Decisions using Info."

Opteam "Team trained"

Optarget "Operating Targets are used"

Opmarket "Operated by markets"

Opstrato "Strategy is expressed in a mission statement"

Orgideas "ideas are exchanged"

Orginfo "Information is spread "

Orgtop "Top level accepts suggestions"

Orgnew "New methods are tried"

Orgmarkt "Marketing is emphasised"

Orglines "product lines are changed"

Orgrisk "High risk projects are tried"

Orgbold "Bold strategies are used"

Orgfirst "First to try new lines"

Orgadapt "Adapts to change easily"

LABELS USED FOR THE ATTITUDINAL SURVEY

Alculture "Firm exhibits a culture which nurture innovation"

Aladd "To add new skills"

Alupdate "To update existing skills"

Alchance "To improve the chances of a promotion"

Alcourse "Firm does not sponsor courses"

Alassign "Courses assigned by Firm"

Alorient "orientation of the firm is be innovative"

Alnew "firm practice new ventures or new product development"

Alchange "There are conventional ways of doing things in our firm
which rarely change"

Alpolicy "In our firm, policy changes occur slowly"

Alspeed "Quick decisions and actions are not characteristic of our
firm"

Alideas "News ideas are always being tried out here"

Alplan "The setting up of unusual plans is encouraged here"

Allatest "The latest discoveries make few changes in the way this
firm is run"

Alfuture " Most people in our firm talk about the future"
Alview "Our employees are encouraged to adopt a long-term outlook"
Aldevnew " For our firm the development of the new is of secondary
importance"

Allist " New product development ranks high in our firm's list of
priorities"

APPENDIX G

RANKING OF THE MOST INNOVATIVE FIRMS IN SCOTLAND

INDEX FOR DETERMINING THE MOST INNOVATIVE FIRMS

The factor loading index was based on responses to how the sample compared to a weighted scale of responses taken from the questionnaires of 3M Corporation, Hewlett Packard, and Pilkington Optics. The indexing scale was further modified by independent variables as to whether or not the 187 firms had ticked the specified nine elements indicating a formal programme for innovation (questions 5-11 by frequency and total count); their profile of ranking specific responses (questions 13, 22, and 28); and how they assessed themselves against questions no. 31 and 32.

This index was programmed on SPSS, by its "ONE WAY" procedure which required a dependent variable (DELVEST) and the independent variables grouping into one value with a minimum and maximum range. The range was based on > 0.05 alpha to exclude and produce a matrix outputs of showing the counts, means, and standard deviation of the variables stated above.

Based on this index, 36 firms were identified as being innovative and scheduled for a post interview.

Including the 3M Corporation, Hewlett Packard, and Pilkington Optics, the following 14 firms were ranked as being "the most innovative" of the sample: Glaxochem; John McGavigan & Co; Digital Equipment Corporation; Ferranti International; F. J. Lilley; SCI UK Limited; Cannongate Technology; Flexible Technology; Spider Systems; Johnson Control MacLauren; and De La Rue Systems. The rating in this group ranged from 80 to 95 percent.

The next 12 firms with a greater than 65 percentiles ratings were Apple Computer; Biotechnology Group of United Distillers; Devro Limited; Weir Paper Products; Rippin Group Limited; Honeywell U.K.; Vetco Gray; Surgikos, Inc.; Wang Laboratories of Scotland; Motorola; and the National Cash Register.

And those 10 firms with a greater than 50 percentiles ratings were Norson Power, Ltd.; Optima Enclosures Ltd.; Roche Products Company; Veeder-Root Limited; Scottish Heritage Trust, plc; The Miller Group; Walter Alexander; Shanks & Mc Ewan Group; The Royal Bank of Scotland; and Thomas Reid & Sons.

THE PURPOSE OF THE POST INTERVIEWS

These interviews completed the fifth phase of the investigation and included Mr. Michael Small and two Representatives of the Scottish Development Agency as subject matter experts. The bulk of the interviews were conducted from July, 1989 through November, 1989.

The purpose was to clarify any findings arising from the 2nd symposium and the first questionnaire. Using the Leadership Rules in Appendix C as a guide, questions were asked on how they managed innovation.

Other issues that were discussed included: (2) the best type of organisational structure; (3) which methods for training personnel/supervisory were being used ; (4) the strategic use of the product life cycle theory; and (5) the effects of having or not having a management policy/strategy for innovation were discussed.

Excerpts from some of the post interviews were stated where appropriate to illustrate an observation and dispersed throughout Chapter Eight

LIST OF INDIVIDUALS, WHO AGREED TO BE INTERVIEWED

Interviews were held with 26 of 33 respondents as listed below:

TITLE	SURNAME	JOB TITLE	COMPANY
Mr W D	Maclean	Financial Controller	Baker Oil Tools (UK)
Mr D B	Pattullo	Group Chief Exec. & Dep. Governor	Bank of Scotland
Mr Donald	Campbell	Design Engineer	Barr & Stroud Ltd.
Mr J A	Jones	Works Director	Beecham Pharmaceuticals
Mr David	Horsburgh	Regional Director - Scotland	Booker Cash and Carry
Mr B G	Duncan	Managing Director	Briggs oil
Mr J A F	Alexander	Director	Burmah Oil Trading Ltd
Mr Kenneth M	Duerden	Traffic Manager	Caledonian Macbrayne Limited
Mr Gordon A	Eadie	Manager	CHH Technology (Crouch and Hogg)
Mr John	Dolan	Managing Director	Compaq Computer Manufacturers
Mr G W	Bowen	Managing Director	Compugraphics International Limited
Mr Colin G	Carnie	Partner	Crouch and Hogg
Mr W A	Archibald	Director of Marketing	De La Rue Systems
Mr Graeme	Alexander	Operations Director	Devro Ltd, Gartferry Road
Ms Carol M	Slaven	Manufacturing Marketing Manager	Digital Equipment Corp.
Mr David	Lawrence	Managing Director	Digital Equipment Scotland Ltd
Mr W B	Ritchie	Chief Engineer	Ethicon Limited
Mr John Patrick	Wimbush	Managing Director	Ferranti Indus. Electronics Ltd.
Mr John	McAleenan	P A to the Chief Executive	FJC Lilley plc
Mr A J W	Broadway	Managing Director	Gardiner (Contractors) Ltd
Mr Travis	Moore	Technical Director	Gates Rubber
Mr R I	Woodger	Factory Manager	Glaxochem Limited
Sir Matthew	Goodwin	Chairman	Hewden Stuart
Mr R S	Byers	Managing Director	Hewlett-Packard Int'l Ltd
Mr David	Deck	MP Labs,	Hewlett Packard
Mr A M	Marshall	Assistant Managing Director	Hughes Microelectronics Ltd
Mr James A	Maskell	Managing Director	Johnson Controls McLaren Products
Mr Jack	McGowan	Manufacturing Manager	Keystone Valve (UK) Limited
	Tiefenbrun	M D	Linn Products Ltd
Mr Norman	Cadenhead	Personnel Manager	Joy Manufacturing Co. (UK) Ltd
Mr David	Kilmurry	Managing Director	John McGavilan & Co Ltd
Mr Alastair	Munro	Technical Director	John McGavilan & Co Ltd

Those interviewed were re-identified according to Table No. 8 to indicate their firms' technological strategies (i.e. Follower, etc) and by a double lettering system (i.e. Respondent KK) so the pledge of confidentiality could be kept

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