BUSINESS STRATEGY, MANUFACTURING STRATEGY AND ENVIRONMENTAL DYNAMISM:THE CASE OF SMALL MANUFACTURING FIRMS

by

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Declaration of Author's Rights

TABLE OF CONTENTS PAGE

TABLE OF CONTENTS	PAGE

TABLE OF CONTENTS	PAGE

LIST OF FIGURES AND TABLES

CHAPTER 2: LITERATURE SURVEY

TABLES

CHAPTER 3: SOME CONSIDERATIONS OF METHOD

TABLES

CHAPTER 4: RESULTS AND FINDINGS

TABLES

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Abstract

The impetus for the current study was to provide a better understanding of the small manufacturing firms operating under varying environmental conditions (dynamism).

This study investigated the influence of dynamism on important strategy variables such as strategy, structure, production technologies employed, and performance. The results indicated that small manufacturing firms, depending on the environmental dynamism, tend to a adopt one of two adaptation approaches: product oriented, and operations oriented.

It was shown that small manufacturing firms operating in unstable environments tend to have an organic organisational structure, follow differentiation strategies, and employ non-routine production technologies (product oriented approach), while small manufacturing firms operating in stable environments tend to adopt a mechanistic structure, along with price/cost leadership strategy, and employ routine manufacturing technologies.

These findings advances the previous work done by Miles and Snow, by clarifying that where they (Miles and Snow) have identified four generic

adaptation types for all firms, it can be reduced to two for small manufacturing firms.

This study also investigated a much discussed issue of planned versus emergent approaches to strategy formulation processes. The findings rejects both Ansoff's claims that firms tend to adopt a planning approach in unstable environments, and Mintzberg's argument that small firms regardless of the environmental conditions adopted an emergent approach to strategy formulation. The findings showed that small manufacturing firms operating in stable environment tend to adopt a planning approach, while small manufacturing firms operating in unstable environment adopted an emergent approach to strategy formulation.

Another important area under investigation was the importance of manufacturing strategy for small manufacturing firms. The results showed that firms in stable environment tended to place a higher emphasis on production departments than their counterparts in unstable environments. However, this importance did not translate into a clear manufacturing strategy; rather it reduced the manufacturing strategy to a single important decision of choosing the right type of production technologies employed.

Finally the current study investigated the relationship between environmental dynamism, strategy, and performance. The empirical findings indicate that dynamism interacts with strategy to determine performance.

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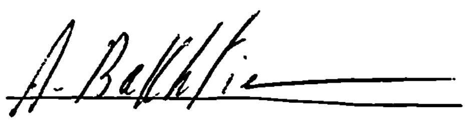

Glossary

Goals (or Objectives)

Goals (or objectives) state ***what*** is to be achieved and ***when*** results are to be accomplished.

Strategy

The determination of the basic ***long-term goals*** of an enterprise, and the adoption of courses of actions and the allocation of resources necessary for carrying out these goals.

Strategic Decisions

Strategic decisions are those that determine the ***overall direction*** of an enterprise and its ultimate viability in the light of the predictable.

Strategy Process (How)

Strategy process is concerned with ***how strategy is formulated***. It defines the key players in charge of formulating and implementing strategy, methods used, tasks to be accomplished and their sequence, and how the results are communicated to the various constituencies both inside and outside of the organisation.

Strategy Content (What)

Strategy content is the core of the strategy. It outlines on what basis a company is to compete. It can be price leadership, differentiation (quality, design, etc.); or it can be a combination.

Policies

Policies are ***rules*** or ***guidelines*** that express the ***limit*** within which action should occur.

Programs

Programs specify the ***step-by-step sequence of actions*** necessary to achieve major objectives

Chapter 1

INTRODUCTION

Development of "business strategy" as a branch of management science can be traced back to the creation of large corporations at the beginning of this century. Mass-production allowed many companies to grow rapidly and prosper at a rate that had never been seen before in history. Companies such as Ford, General Motors, Standard Oil Company, and many others grew from small businesses to large corporations, who's turnover matched the GNPs of many small nations.

Until early 1920s, these corporations were primarily single business units. Ford manufactured cars, while Standard Oil was concerned with oil exploration, extraction, and refining. The driving force behind these corporations were their owners/managers (entrepreneurs) who knew their business well and exercised total control. The competition was "managed" through monopolies, trusts, cartels, or other "gentlemanly" agreements between major rivals. This allowed the "robber barons" to concentrate on increasing internal efficiency of their organisations. The process of strategy formulation and implementation was quite informal and simple. The entrepreneur's goals and visions formed the basis of the company's strategy.

Shortly after World War I, two important factors, " marketing and decentralisation", were to transform the role and tasks of corporate managers from one of internally focused "style" of management to that of the "externally" focused. In the 1920s, few companies such as E. I. du Pont de Nemous & Co., General Motors Corporation, and Standard Oil Company, began to devise the "decentralised" form of organisational structure. For the first time a large corporation could have many business units with different products, serving different markets.

The co-ordination and control of these units required an internal planning system. Although the planning systems laid the foundation for modern business strategy processes, it was marketing which had the greatest influence on the business strategy content. By the early 1980s, marketing strategy basically determined the overall business strategy of many companies. Its rise in 1932 also heralded the dawn of the production-dominated management of companies in most of the industrialised world.

Mass-production fuelled and indeed was the main power behind the creation and expansion of early corporations. It was manufacturing that allowed corporations to expand and nations to prosper. By 1914, manufacturing had become not only the growth engine of the major powers of that time, but also the economic force. As such manufacturing objectives tremendously influenced and shaped corporate strategies. That influence was to change drastically in 1932 by the introduction of the marketing concept. What had been the focus of attention for companies from the industrial revolution to the first World War was to be replaced by a new concept. Marketing was to take attention away from manufacturing. Over the years, the role of manufacturing was to decline to such an extend that many industries lost their competitive edge and died one after the other. Those countries that neglected manufacturing paid dearly for it. By early 1980s heavy industries such as steel and ship-building in the traditional industrialised countries such as UK and United States were in deep trouble. In United States, television factories closed their doors. Even new industries such as memory chips and composite materials were not safe from competition. As more and more European and American industries came under attack from newly industrialised countries such as Japan, Korea and the like, corporate executives began to rethink their priorities. At last manufacturing is once again being considered as an important business issue. The problem today is not so much of accepting the importance of manufacturing as a competitive weapon, as the inclusion of the manufacturing in the overall business strategy considerations. To understand this problem better one has to look at the rise and fall of manufacturing in the recent history.

Industrial Revolution

The modern manufacturing history started with the first industrial revolution. The term industrial revolution was first popularised by the English economic historian Arnold Toynbee (1852-83) to describe England's economic development from 1760 to 1840. In the period 1760 to 1830 the industrial revolution was largely confined to Britain. In mid 1800 to early 1900 other European countries such as France and Germany followed Britain into the industrial era. By late 1800 and early 1900 a modern industrial infrastructure was established both in some European countries and the United States.

The main features of the first industrial revolution were both technological and socio-economic-cultural. The technological changes included:

a) the use of new basic materials,

b) the use of new energy sources, including both fuels and motive power such as coal, the steam engine, electricity, etc.,

c) the invention of new machines,

d) a new organisation of work known as factory system, which entailed increased division of labour and specialisation of function,

e) important development of transportation and communication, and

f) *the increasing application of science to industry.*

There were also many new developments in the non-industrial sector including the following:

a) improvement in the agricultural sector (use of machines and new techniques) which allowed the provision of food for a larger non-agricultural population,

b) wider distribution of wealth,

c) decline of land as the source of wealth (as a result of rising industrial production),

d) political changes reflecting the shift in economic power, as well as new state policies representing the needs of an industrialised society,

e) growth of cities and sweeping social changes,

f) development of the working-class movements, and

g) the emergence of new patterns of authority.

The concept of management as a science was not yet developed. The main activity of the industrialist at the time was mainly in developing new technologies. *Competition in this era meant "domination or absorption of the competitors"(Ansoff, 1979:22).* In places where this was not possible, "*protectionism and closure of markets against outside competition was the norm*" .(Landes, 1972:359).

One of the characteristics of this era was total lack of formal planning. One could state that this period was the era of improvisation. The manager (typically the entrepreneur) based his decisions on "rule of thumb" that he had developed over time. He led the company, to quote Hofer (1980), by "the seat of his pants".

Mass-Production Era

The period from 1900 to late 1930s is called the mass-production era. This period saw the consolidation and development of the industrial structure. The focus, as the name implies, was on development and perfection of the mechanisms of mass-production, which basically was translated into designing plans and systems for internal efficiency. Henry Ford's mass production of T-model automobiles was an example of one of the achievements of this era.

The conscious and systematic application of science to industrial technology was the root cause of fundamental changes in the structure and functioning of the modern economies of that period. New inventions revolutionised the way manufacturing was done. "Cheap steel, machine tools and interchangeable parts, precision manufacturing, moving assembly, electricity and increasing automaticity and a revolution in transportation (rail roads), all contributed to the birth of the mass-production era". (Landes, 1972:359)

Mass-production led to the creation of much larger business units than in the previous periods of the economic development when single proprietorships, family firms, and partnerships had been the prominent form of business organisation. Large organisations were more difficult to manage and control than family firms. The complexity of these large organisations prompted the development of formalised policy making. "More important, they led to the development of explicit functional area strategies designed to integrate individual policies developed within each functional area." (Hofer, 1978:15)

Competition by and large was still seen as dominate or absorb with one exception: the creation of cartels. "Price competition among large-scale rivals proved mutually destructive to profits, and after a brief period of cut-throat competition, business enterprise turned to cartels, trusts and other monopolistic forms of organisation designed to eliminate price competition."(Dillard, 1967:363) Here the theories of Cournot(1960) (monopoly, duopoly, and oligopoly), first published in 1838, were put to work.

The consumers' influence on such things as colour, quality, reliability, etc. played little role in the formulation of business strategies of the time. This was perhaps best described by Henry Ford when he told his sales force "sell them any colour as long as it is black". The creation of cartels and monopolies effectively limited the competition arena, hence the need for focused strategy. This comfortable arrangement was soon to be changed by what is known today as "marketing".

Marketing Era

Until early 1930s, Henry Ford's black T-model cars were the most widely available (and sold) cars in the United States. The advances in automation, machine tools, and planning systems had reduced the price of a car to such an extent that now every middle class family could purchase a car. Ford Motor Company, of course, was not the only car manufacturer in the US . There were others who competed with Ford for the market share.

Until 1932, price was the only qualifying and competitive criterion. Model, colour, quality, etc., were not considered as important issues. This was soon to be changed by General Motors. In 1932-1933, General Motors introduced the concept of annual model change. This effectively triggered a shift from production to marketing mentality. The shift to the marketing orientation meant a shift from an internally focused, introverted perspective to an open, extroverted one. *It also meant a transfer of power from production-minded to marketing-minded managers (Ansoff, 1979:23).* This shift of power could be best demonstrated through the changes of the definitions of the marketing from 1900 to the present day.

In 1914, Butler *(1914)* defined marketing as: "concerned chiefly with various methods of getting goods from the manufacturer to the consumer, and with many problems arising from the complicated trade relations of modern commerce". In this definition the chief concern is the logistics of the commerce. In the 1930s the definition was expanded to include the rights of the consumers. According to Vaile (1949) "marketing in the full sense of the word must involve changes in ownership; physical movements merely facilitate this change or make possible the use of the commodity by the new owner. All of the rights, privileges and the responsibilities either of use or of further sale attached to ownership are passed on with a change in ownership". By 1950, marketing was becoming a potent force in the corporate culture and power structure. By this time the definition was expanded to include the determining of the market area for the corporation. In 1952, Converse & Huegy (1952) defined marketing as " all activities involved in the creation of place, time and possession, which is often called distribution, makes goods and services more valuable by getting them where they are wanted, when they are wanted, and transferred to those who want them". By 1970 marketing's influence was to be found in many functional areas. Marketing strategy had become the guiding factor and in many cases the determining factor in strategy formulation process of other functional areas. By 1980s all aspects of the organisation came under the scrutiny of marketing. Kotler(1991:10) defined marketing as "a social and managerial process by which individuals and groups obtained what they need and want through *creating, offering, and exchanging products* of value with others". Here all aspects of manufacturing from product design to quality were to be influenced by marketing.

Manufacturing Reconsidered

The late 1960s and early 1970s saw the rise of a handful of Asian countries as industrial economies. Countries such as Japan, Singapore, Taiwan, and Korea were concentrating heavily on manufacturing. Their innovation in process technologies, combined with cheap labour, rigid work ethics, and their emphasis on manufacturing had helped them in building industries that could not only compete with the western industries, but also win.

Many industries such as steel, cars, televisions, and others, came under pressure from these newly industrialised countries. Technologies were borrowed from the West and improved. Many new manufacturing and management techniques were devised. Before long, a host of western industries were wiped out. Unemployment and trade deficits grew year after year. The major thrust of the newly industrialised countries were on manufacturing. When the western leaders were contemplating the shape of the so called "post-industrial" era, the newly industrialised countries were improving their competitiveness through manufacturing.

During this period there were scholars such as Wickham Skinner(1969) who tried to bring the importance of manufacturing to the attention of corporate executives. He observed that although manufacturing engaged 80% of the firm's personnel, and represented 85% or more of firm's expenditures for materials and equipment, manufacturing issues were often treated by top management as perfunctory and operational rather than strategic. He also pointed out the dominance of marketing in formulation of corporate strategies. He wrote: "during 1950s and 1960s the typical major emphasis was on growth in sales and market share, and *top management seemed to be dominated and influenced more by executives who were especially competent in marketing and finance and less by those with a manufacturing point of view*. Manufacturing people felt that they were being asked to do their duty and perform as good soldiers, doing what was asked without complaint." (Skinner, 1985:4)

Current Issues & Problems

The events of the past decades (emergence of Asian manufacturing capabilities) and the constantly changing market environment have forced the corporate executives to re-examine their attitude towards manufacturing. How to formulate a manufacturing strategy and its role within the strategy formulation process, are the two most widely asked questions. In response, researchers and academics have produced a number of models (e.g. Skinner's 15 steps model, Hill's 5 steps model, Hax & Fines 6 steps model) and theories to answer these vital questions.

These models apparently have not been very successful for in 1992 Skinner wrote:

> "But if we are realistic, certain facts dump some rain on our party and ought to dampen our high spirits. For example, since the original ideas are more than 25 years old, someone should be asking why they have taken so long to penetrate the academic world? And what is their influence in industry? What percentage of manufacturing actually employs these management approaches: 1%; 3%? I am afraid that the recent success we academics find so exciting is actually hollow in certain respects and more self-comforting than real. (Skinner, 1992)

Skinner's statement points at major problems facing the academics and practitioners today, namely, are these theories applied, and if they are, what are the results?

The majority of the management literature in general and manufacturing literature in particular has been and still is concerned with large corporations. If there has been any move to answer some of the concerns voiced by Skinner, it has been focused on large or medium size corporations.

Small manufacturing firms, although comprising the majority of the manufacturing firms in any given country, have received almost no attention at all. Indeed the problems of small businesses in general have been neglected by researchers and academics. It is only by the efforts of such people as Paul Burns and Jim Dewhurst (1986) that this important segment of industry has began to attract some attention.

Small businesses are not the smaller versions of the big businesses (Opstad, 1991). Their structure, needs, and controls are quite different from that of the large corporations. While mistakes and wrong turns can damage the large businesses, they still have the resources to correct those mistake. This is not the case with small businesses, where at times small mistakes can literally drive them into bankruptcy.

All the manufacturing strategy formulation process models have been created with large corporations in mind. If understanding and implementing such models are difficult for corporate executives with their level of education, experience and resources, it is nearly impossible for managers of the small manufacturing firms.

One may even argue against the usefulness of the current manufacturing theories for small manufacturing firms, for being removed from realities of small firm environments. And, anyway, is formulating manufacturing strategy actually necessary for small manufacturing firms? Do they even consider manufacturing as an important issue? What is the actual practice like? How do small manufacturing firms compete in different market environments? These are some of the questions that this study will try to answer.

This dissertation has small manufacturing firms as the main topic. Under this topic, several issues are examined, namely:

- environmental dynamism, business strategy choice and performance,
- manufacturing strategy, its importance to, and actual practice by, small manufacturing firms, and
- environmental dynamism, small manufacturing firms, and adaptation modes.

I have treated these issues in five chapters.

1. Introduction
2. Literature survey
3. Methodology
4. Results and Findings
5. Discussion and Conclusions

Throughout the studies it has been the ambition to study the factors of importance for manufacturing strategy processes for businesses in general and small manufacturing firms in particular. It is hoped that this dissertation can, a) shed light on some of the inadequacies of the current strategy formulation models and theories by focusing on a much neglected group (small manufacturing firms), and b) to provide practitioners and managers with as complete a picture as possible of the ways in which small manufacturing firms operate.

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Chapter 2

LITERATURE SURVEY

History

The word strategy has historically been associated with the military. It's definition as: 'the science of planning and directing large-scale military operations, specifically (as distinguished from tactics), of manoeuvring forces into the most advantageous position prior to actual engagement with the enemy '(Webster, 1979:1799), exemplifies this association.

The origin of the word strategy can be traced back to the Greek word stratègia or generalship. The person practising stratègia was the strategus or strategos, meaning the leader (general) of an army. According to Cummings (1993) the word strategos was a combination of two words: '*stratos*' meaning an encamped army spread out over ground and '*agein*', to lead. Cummings explains that the emergence of the term strategy was the result of the evolution of warfare from simple to complex activity, where success no longer depended on the heroic deeds of individuals, but rather on the co-ordination of many units of men fighting in close formation.

Managing many units of men, motivating, arming, feeding and directing their movement and conduct during a military campaign is not an easy task. It not only requires planning and attention to details, but also a strategist (Greek word strategoi) to plot a course or courses of action(s) ahead of the actual fighting. The strategist's decisions such as formation of units, types of equipment employed, and the posture (defensive or offensive) taken by the forces under his command were determined by quantity and quality of the intelligence available to him. The strategist(s) had to evaluate the strength and weaknesses of the enemy, select a battlefield (if possible), and determine the logistical requirements. In other words, the strategist of the ancient time faced many decisions of the modern day business manager.

Some of the strategy formulation processes developed in the modern time have been based on the ancient military concept described above. These processes were developed based on the belief that strategy formulation should be a controlled and conscious process of thought. The concept as applied to business is rather recent. It was not until the1930s that a formal strategy formulation process was developed (General Motors segmentation strategy developed by Alfred P. Sloan). In 1965, publication of the book 'Corporate Strategy' by Ansoff (1965) finally popularised the concept. Since then, the subject of strategy has received considerable attention from both academia and business leaders. The following section gives a brief history of its development from long-range planning to its present form of strategic management.

From Long-range Planning to Strategic Planning to Strategic Management

Oxford dictionary defines a plan as: "a method of proceeding thought out in advance"(Oxford Dictionary, 1986). Planning is then the act of deciding what to do and when to do it. As such, the use of business planning can be traced back to the early 1900, where the mass-production era (described in chapter 1) put an enormous pressure on the managers for devising methods and procedures for dealing with the increasing complexity of their environment. The manual systems and procedures of the early 1900 were based on the assumption that the environment was stable. The environment, however, as outlined in chapter 1, changed and with it the management's requirement of their planning system.

Changability / Unpredictability of the future	1900 1930 1950 1970 1990
	(Familiarity of events) Familiar Extrapolatable Familiar discontinuity Novel discontinuity
Recurring	Systems & procedures manual Financial Control Management by control
Forecastable by extrapolation	Operations budgeting Capital budgeting Management by objectives Long range planning Management by extrapolation
Predictable threats & opportunities	Management by anticipation of change Periodic strategic planning Strategic posture management
Partially predictable opportunities **Unpredictable surprises**	Management by flexible/rapid response Contingency planning Strategic issue management weak signal issue management surprise management
Turbulence level	**1 Stable** **2 Reactive** **3 Anticipative** **4 Exploring** **5 Creative**

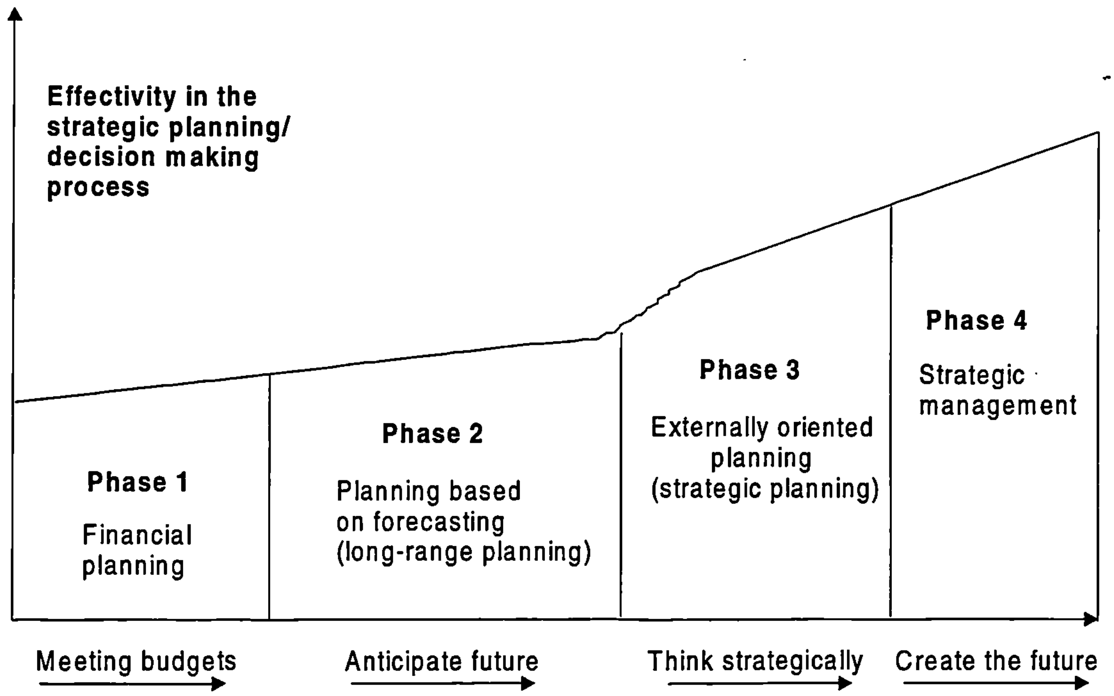
Source: Igor Ansoff and Edward McDonnell (1990). 'Implanting Strategic Management', Prentice-Hall Inc.p.13

Figure 2-1. Evolution of Management Systems

The transition from mass-production era to marketing-era necessitated a review of the manual procedures. The result of that review was the development of the short-range budgeting systems and later the long-range budgeting procedures (fig. 2-1). This development was the direct result of the management's perception of the changing environment. What until then, had been a stable environment changed. The purpose of the long-range budgeting system was to identify and plan for the future financial needs of the company based on the extrapolation of the past activities. This would of course work only when the environment was either stable or predictable. The long-range budgeting system was therefore unable to deal with situations where such things as choice or environmental uncertainty was involved. According to Lorange et al.(1977), this is exactly what happened in the 1960s:

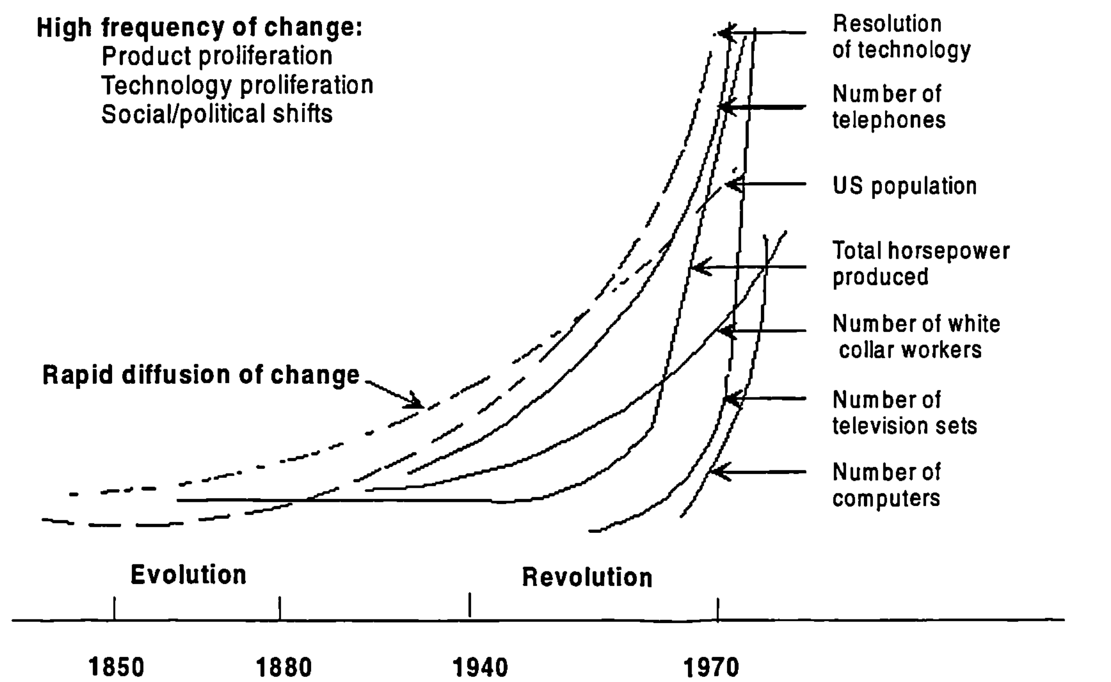
> "The 1960s in the United States was a period of steady economic growth and generated prosperity. Corporate executives, realising that they had many attractive opportunities for growth, also realised that they had to choose. Many businesses during this period chose to diversify, sometimes through acquisition, and to enter international markets. These strategic moves increase the managerial complexity of large corporations in geometric fashion. The problem was particularly intense at the top of such corporations, and new technology was clearly needed to help top management cope with an increasing array of strategic decisions. Formal long-range planning seemed almost like a godsend to these executives. Its primary virtue was that it focused on the right set of issues"(Lorange et al, 1977).

Holbek(1982) based on Ansoff(1976) argues that while long-range budgeting was to a large degree based on the internal data, long-range planning included the external data such as prices, economic climate, etc., as an element in the decision making process. Goals and objectives, based on the forecasts, were formulated for such things as sales, profit, and investment returns. These in turn were translated to programs, budgets, and operational plans for the firm. Long-range planning was primarily concerned with those environmental changes that created a variation at the operations level. Such changes resulted in increasing or decreasing of the activity levels, but without the need for a fundamental change in the business strategy.



Source: Olav Solem (1990). 'Plansjemasamling til Strategisk Ledelse Del. I. Norges Tekniskehøgskole, Trondheim, Norge. p.9

Figure 2-2. Phases in development of the planning systems



Source: Igor Ansoff and Edward McDonnell (1990). 'Implanting Strategic Management', Prentice-Hall Inc.p.9

Figure 2-3. Acceleration of Change

The corner stone of the long-range planning (fig. 2-2) was the assumption that the environment was relatively stable. In a relatively stable environment, it was argued, it was possible to anticipate the future through extrapolation of the historical growth. However, as the rate of environmental turbulence increased, the usefulness and suitability of the long-range planning systems came under question. Ansoff et al (1990), point out that during the twentieth century, environmental change have become more complex and novel. They describe two aspects of change that has impacted on the business firms as the increasing frequency of changes and the rate of diffusion of change (fig. 2-3).

The frequency of changes refers to the exponential growth (starting in the 1960s) in the number of products / services and the new technologies. Diffusion of change on the other hand, refers to the speed with which new products and services invade the market. They outline the consequences of the acceleration of change as:

1. An increasing difficulty in anticipating change sufficiently in advance to plan a timely response.

2. The need for increased speed of implementation of response.

3. The need for flexibility and timely response to surprises which could not be anticipated in advance.

As can be seen, the acceleration of change and the resulting environmental turbulence made long-range planning systems obsolete. The strategic planning was developed to address the increasing complexity of the business environment. Strategic planning is defined as *the systematic process for guiding the future development of an enterprise (Sparkes, 1977).*

According to Radford (1980), although there has been a number of procedures (Gilmore, 1962 ; Ansoff, 1965 ; Grinyer, 1971) proposed for support of strategic planning, the most comprehensive one put forward has been by Gilmore and Brandenburg (1962). Their planning system consists of four basic components which can be described as follows:

1. *Formulation of the economic mission*, which is concerned with the type of activities in which the organisation should be engaged and the performance objectives that should be set with respect to these activities;

2. *Determination of the competitive strategy*, defined as finding the right product-market-sales approach combination for effective accomplishment of the economic mission. This component includes the derivation of associated goals in the various functional areas of the business;

3. *Specification of a program of action*, which involves a search for effective means of implementing of competitive strategy;

4. *Reappraisal of activities and results*, which reflects the need for continuous review of the plan in the light of events and accomplishments.

According to Holbek (1984), strategic planning and strategic management are the right procedures for those situations where there exists a high environmental turbulence. He argues that strategic management includes strategic planning plus the following :

- *Consideration of the social and political environment* in addition to the economic and technological parts that are central in strategic planning.

- *Use of weak environmental signals in long-range planning activities.* (Strategic planning limits itself to the use of strong signals, something that can result in serious delays in strategy formulation.)

- *Co-ordinated development of strategy and organisational capabilities.* (Strategic planning limits itself to a sequential strategy-organisation-development, something that can result in serious delays in strategy implementation.)

- *Conscious planning of strategy implementation* (that is often ignored or neglected in strategic planning).

Holbek argues that the transition from strategic planning to strategic management should take place when environmental turbulence is so high that the use of strategic planning can result in long reaction-time in the business.

Strategy Levels

Most businesses, especially those structured around functionally[1] organised business units, develop and pursue strategies at three levels: corporate, business, and functional (fig. 2-4).

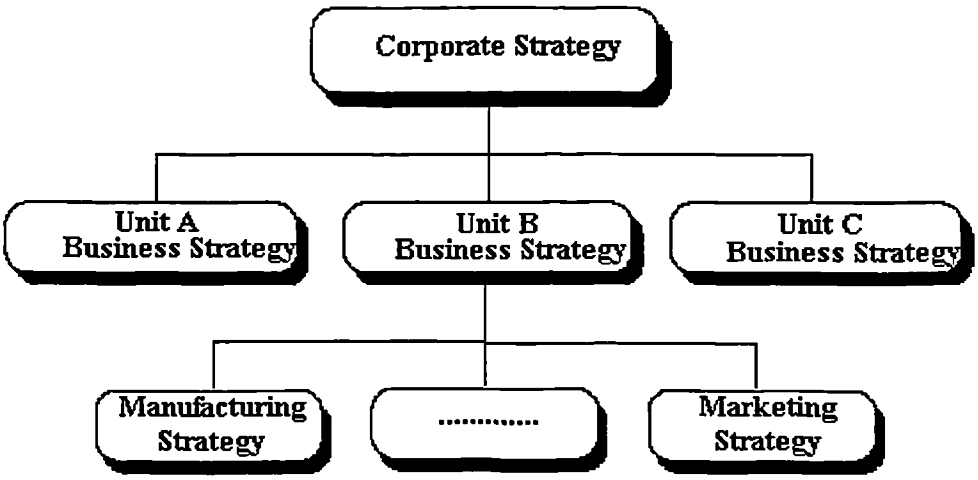


Figure 2-4. Three levels of strategy

The corporate strategy is the overall business game plan. It determines the areas in which the corporate should operate in, and how the different business units should work together (Kuhn, 1989). The business strategy is

1 By 'functional' , it is meant the major disciplines required by the firm, such as marketing, finance/accounting, and production/operations.

derived from corporate strategy (in some conglomerates the businesses operate almost independently) and is a set of guidelines and decision rules (Quinn, 1988) that defines how a firm will compete in a given business. The functional strategy in turn is derived from and influences the business strategy. Functional strategy is 'the specific optimisation of available resources, answering the question of how to accomplish the given objectives most effectively and efficiently.' (Kuhn, 1989)

To be effective 'the functional strategy must support, through a specific and consistent pattern of decisions, the competitive advantage being sought by the business strategy.' (Hayes, 1988)

Concepts

A corporation by definition is a large diversified company. Its strategy should therefore be concerned with issues that affect its overall operations across different strategic business units (SBU), their co-ordination, and synergy.

> "Within the last decade, the conglomerate movement and continued diversification and growth by many of the *Fortune 1000* firms have produced a number of multi-industry companies with multiple layers of general management hierarchy. In such firms, it has become clear that the concept of *corporate strategy* really consists of two distinct, although related, types of strategies. The first, which we shall call corporate strategy, addresses the question, 'What set of businesses should we compete in?', while the second, which we shall call *business strategy* addresses the question, 'How should we compete in the XYZ business?" (Hofer, 1978:15)

It can be argued that the corporate strategy should only be concerned with the functional strategies when it considers the issue of synergy. Thompson

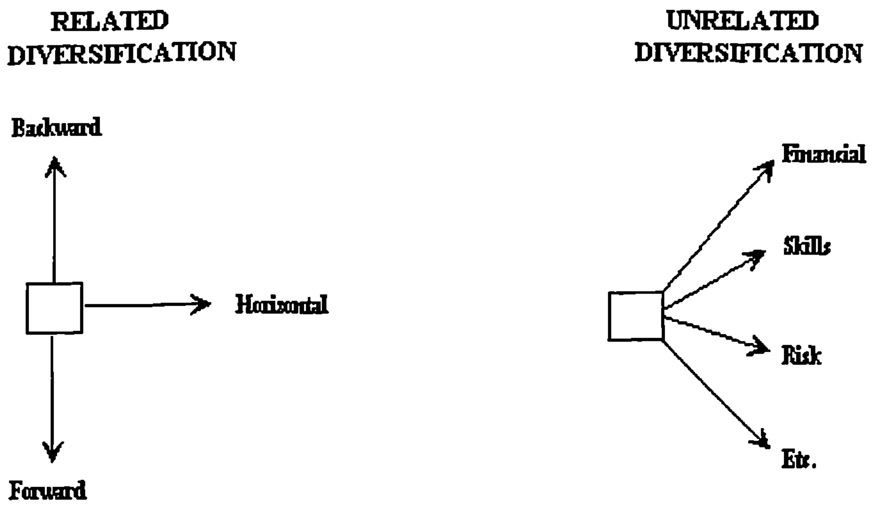
Jr. and Strickland III (1993:34) argue that the corporate strategy should be concerned with only four areas:

1. Making the moves to accomplish diversification
2. Initiating actions to boost the combined performance of the businesses the firm has diversified into.
3. Finding ways to capture the synergy among related business units and turn it into competitive advantage.
4. Establishing investment priorities and steering corporate resources into the most attractive business units.

The subject of corporate strategy has been very well covered in the literature, and I don't think that I could add any more to it. However, I will discuss some of the above mentioned issues that I think are of interest, namely: diversification, synergy, and investment priorities.

Diversification

The reasons behind diversification are many. A company may decide to diversify because it can no longer grow in its basic business, or wants to deploy resources, have cash, manpower, reputation, image and so on, that are under-deployed in the core business and can be used elsewhere. And finally, a company may decide to diversify because it thinks that the newly acquired business can benefit (or benefits from) the other business units within the corporation.



Source: Adapted from H. Igor Ansoff, Cororate Strategy, Penguin, 1968, p.99

Figure 2-5. Alternative directions for diversification

There are two types of diversification: *unrelated diversification* and *related diversification* (figure 2-5). The unrelated diversification is itself divided into two approaches.

The first is usually a *hands-off portfolio management*. In this type of diversification, the management of the acquired company are encouraged and motivated to perform well. The necessary resources are allocated between companies based on their profit potentials. The companies are then autonomous, and can pursue their own strategies. The reason behind this type of diversification is in effect financial. Thomson and Strickland (1993:203) argue that unrelated diversification is a *financial* approach to creating share holder value because it is predicated on astute deployment of corporate financial resources and executive skill in spotting financially attractive business opportunities.

Closely related to financial attractiveness of a business opportunity is the *risk* factor. Here the main point is: how much risk this diversification will represent. In these cases, any company that can be acquired on good financial terms and that has satisfactory profit prospect represents a low-risk acquisition and therefore a good acquisition candidate.

The second approach to unrelated diversification is an *active approach*. That is, the corporate executives are more involved with the running or shaping of the acquired company. In this approach the corporate executives acquire a company because they think that the target company is not run well, and therefore there is the possibility of further improvements in its operations. "In these companies, the industry is fundamentally sound, and the company has some underlying assets, but there just hasn't been enough attention and energy put into running the business effectively" (Porter, 1987). In these cases the corporate executives usually change the target company's management, cut costs, slash overheads, and generally breath life into what has been a rather moribund situation. In effect the management of the mother company considers its management *skills* as the major determining factor in running the newly acquired business.

The related diversification as compared with the unrelated diversification is rather simple and straight forward. The aim of the related diversification is one of synergy. That is, the target company does something or produces something that is related or can benefit from or provide benefits to the other SBUs.

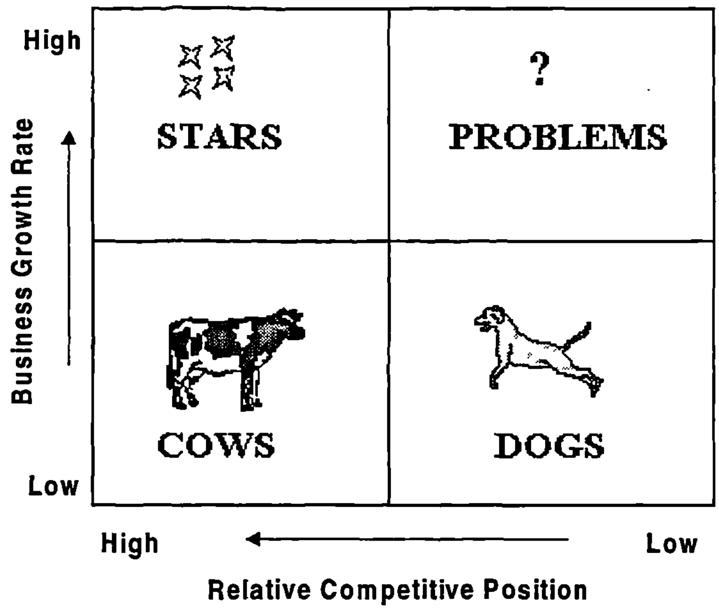
By looking at the tools used to evaluate corporate strategies, one can determine whether functional units play any role in the formulation of corporate strategies. These tools are: the portfolio matrix, the industry attractiveness matrix, and the product life-cycle matrix.

The Portfolio Matrix

One of the most popular tools used in determining the quality of a business that a company has diversified into, is the portfolio matrix analysis. It depicts the corporation's scope which is the major component of corporate strategy.

The portfolio matrix analysis compares the strategic positions of every business in a diversified company.

The first widely used business portfolio matrix was created in 1973 by Boston Consulting Group (BCG). The matrix is composed of two axes : business (or industry) growth rate and the relative competitive position or market share. (figure 2-6)



Source: Adopted from:Doyle, Peter (1994). ' Marketing Management and Strategy', Prentice-Hall Inc.Hertfordshire, UK. p.104.

Figure 2-6. Evaluating diversify portfolios

Using the BCG matrix, the company plots its businesses in different quadrants according to their growth potentials and market share. The matrix is divided into four quadrants: Stars, Cows, Dogs, and Problems. Those companies that are growing rapidly and are financially self-sufficient are referred to as stars.

Those companies that have low growth and large market share are called cash cows. As the name cash cow indicate, the businesses in this quadrant having low debt, low demands for investment funds, and large market share, provide the needed funds for reinvestment, debt capacity, and support for businesses in other quadrants.

The dogs are those companies that have low market share in relatively slow-growth industry. Sometimes, they even can not generate enough cash to maintain their existing position.

The final group of companies are the problem companies. These companies have the weakest financial position of the four groups. They can either turn into stars or be sold off.

> "According to the BCG analysis, a sound, long-term corporate strategy should utilise the excess cash generated by cash cow business units to finance market-share increases for cash hog businesses--the young stars unable to finance their own growth into stars. If successful, cash hogs eventually become self-supporting stars. Then, when stars' markets begin to mature and their growth slows, they become cash cows." (Thompson Jr., 1992:197)

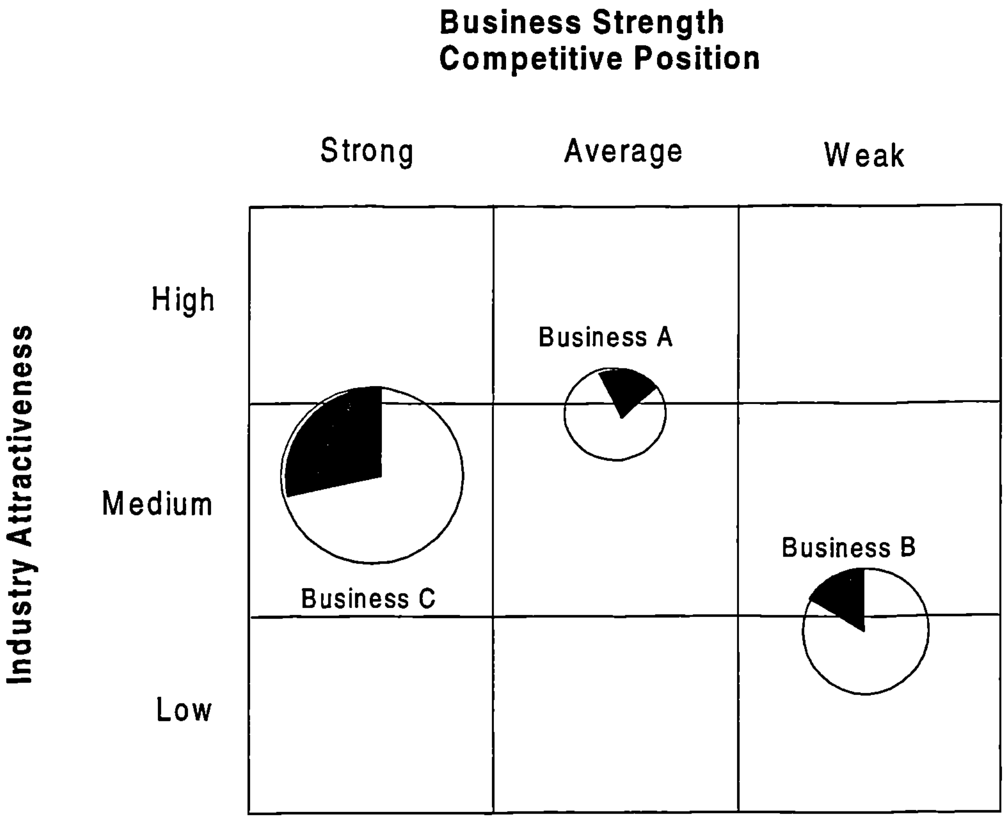
Although the portfolio matrix is extremely popular, it is not without weaknesses. Hofer and Schendel (1978) outline three problems with this method:

1. The use of a four-cell matrix is too simplistic, since the world contains not only highs and lows, but middle positions as well.
2. Growth rate is inadequate as a descriptor of overall industry attractiveness.
3. Market share is inadequate as a description of overall competitive position because it depends so heavily on a definition of the market.

To overcome some of these problems the General Electric (GE) devised (with the help of McKinsey and Company) the industry attractiveness matrix to analyse its own diversified portfolios.

The Industry Attractiveness Matrix & The Life-Cycle Matrix

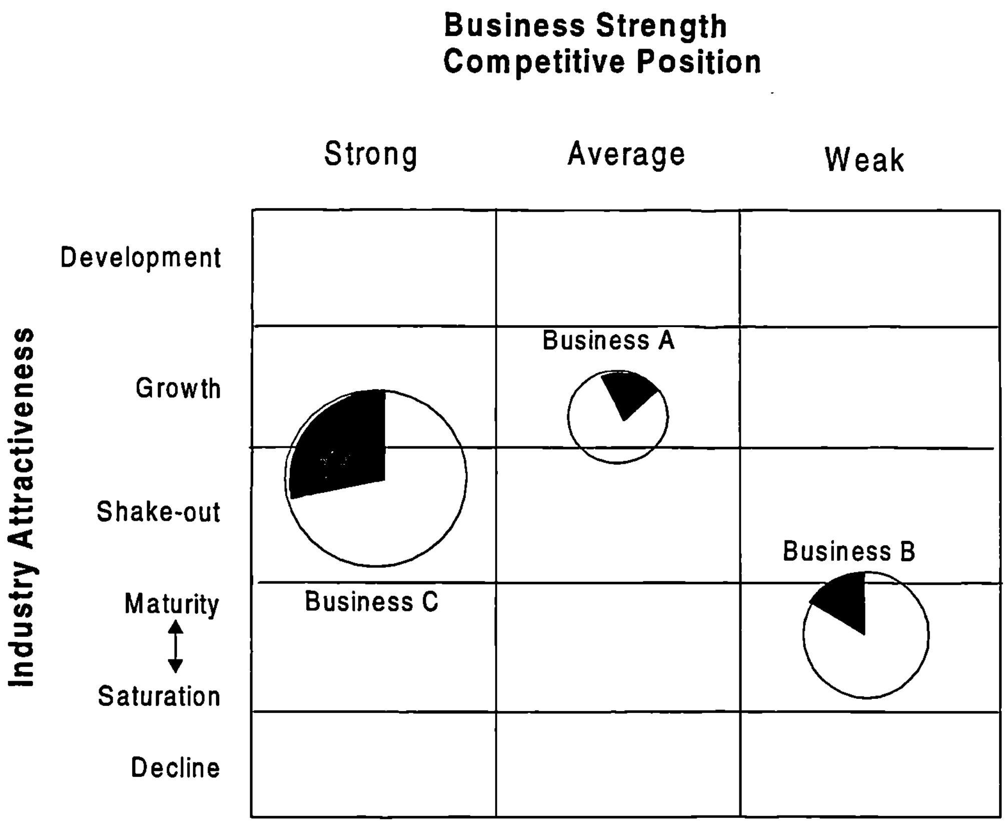
The industry attractiveness matrix is a two dimensional nine-cell matrix, with industry attractiveness and competitive position as the two dimensions (figure 2-7).



Source: Adopted from Thompson, Arthur A., and Strickland, A.J. (1996) 'Strategic Management: Concepts and Cases', 9th Ed., Erwin. p. 229

Figure 2-7. Industry Attractiveness Matrix

The industry attractiveness matrix is rather more complex than the portfolio matrix. In this matrix circles represent businesses. The size of the firm is proportional to the size of the circle. The pie in each circle indicates the market share of that firm. By using this matrix, the corporate executives can plot the position of a firm, its scope and competitive position. Based on this, it is then possible to forecast future positions, market share etc. The only problem with this matrix is that one can not effectively depict the position of new businesses that are just starting to grow in new industries. To overcome this problem Hofer devised a new 15 cell matrix that was a combination of the GE matrix and the life-cycle principle. The power of this matrix is the story it tells about the distribution of the firm's business across the stages of industry evolution.



Source: Hofer, C.W. (1977). 'Conceptual Constructs for Formulating Corporate and Business Strategies', Boston: Intercollegiate Case Clearing House, # 9-378 -754. P. 3.

Figure 2-8. A Product/market evolution portfolio matrix.

So far as can be seen from the discussion above there is no role for the functions (manufacturing, marketing, etc.) in the corporate strategy formulation and/or analysis. It is clear that in the diversified firms, the unrelated diversification strategies do not need to consider functions at all. In the related diversification, however, the various functions' strengths, inputs, outputs, and requirements can play an important role in a diversification strategy.

Related Diversification

As was described earlier, a related diversification strategy involves diversifying into businesses that possess some kind of *strategic fit*; that is, there exist one or more activity-cost chains that are important opportunities for activity sharing in one business or another. This strategic fit and the management's skill in capturing the benefits of the interrelationships can become a basis for competitive advantage.

There are three types of related diversification: *backward* integration, *forward* integration, and *horizontal* integration. Backward integration refers to diversifying into those activities that are related to the inputs into the company's current business. The input into the businesses can be for example, component supply, machinery supply, raw materials, financing, etc. The forward diversification is concerned with the output of the company's current business. This can be distribution outlets, servicing and repair, transportation, and so on. And finally, horizontal diversification is concerned with acquiring companies which are competitive with, or directly complementary to, a company's present activities. Major oil companies provide a good example of the three types of integration. They are into oil exploration and extraction (backward), refining, distribution (forward), and chemicals by-by products (horizontal).

The subject of backward and forward integration, their advantages and disadvantages, and appropriate strategies are covered well by the existing literature and requires no further deliberation here save one. And that is: the functional units', especially manufacturing's, cost, lead-time, and quality can be effected by the type of integration chosen. However beyond the input and output advantages to the company, there are few roles for functional units to play.

Horizontal integration, unlike backward and forward integration, is based on the existence of one or more value-added activities in either businesses that can complement, replace, or enhance those activities in one or both firms. Some of the areas where advantages can be gained from horizontal integration are: product/process technology, procurement, raw materials, fabricated components, assembled products, testing, distribution, sales and servicing, etc. As can be seen, in this type of integration, functional units not only are affected, but also play an important role.

Horizontal Strategy

The central point in the related diversification is the strategic fit. Strategic fit relationships can arise out of technology sharing, common human resource management policies: skills and requirements, common suppliers and raw materials sources, potential for joint R&D, joint manufacturing of parts, same type of marketing, sharing of the managerial expertise, etc.

Horizontal strategy is the acknowledgement of the existence of these *interrelationships* across the business units and consciously pursuing their integration.

> "Horizontal strategy is a co-ordinated set of goals and policies across distinct but interrelated business units. It is required at the group, sector, and corporate levels of a diversified firm. It does not replace or eliminate the need for separate business units and/or business unit strategies. Rather, horizontal strategy provides for explicit co-ordination among business units that makes corporate or group strategy more than the sum of the individual business unit strategies. It is the mechanism by which a diversified firm enhances the competitive advantage of its business units." (Porter, 1985:318)

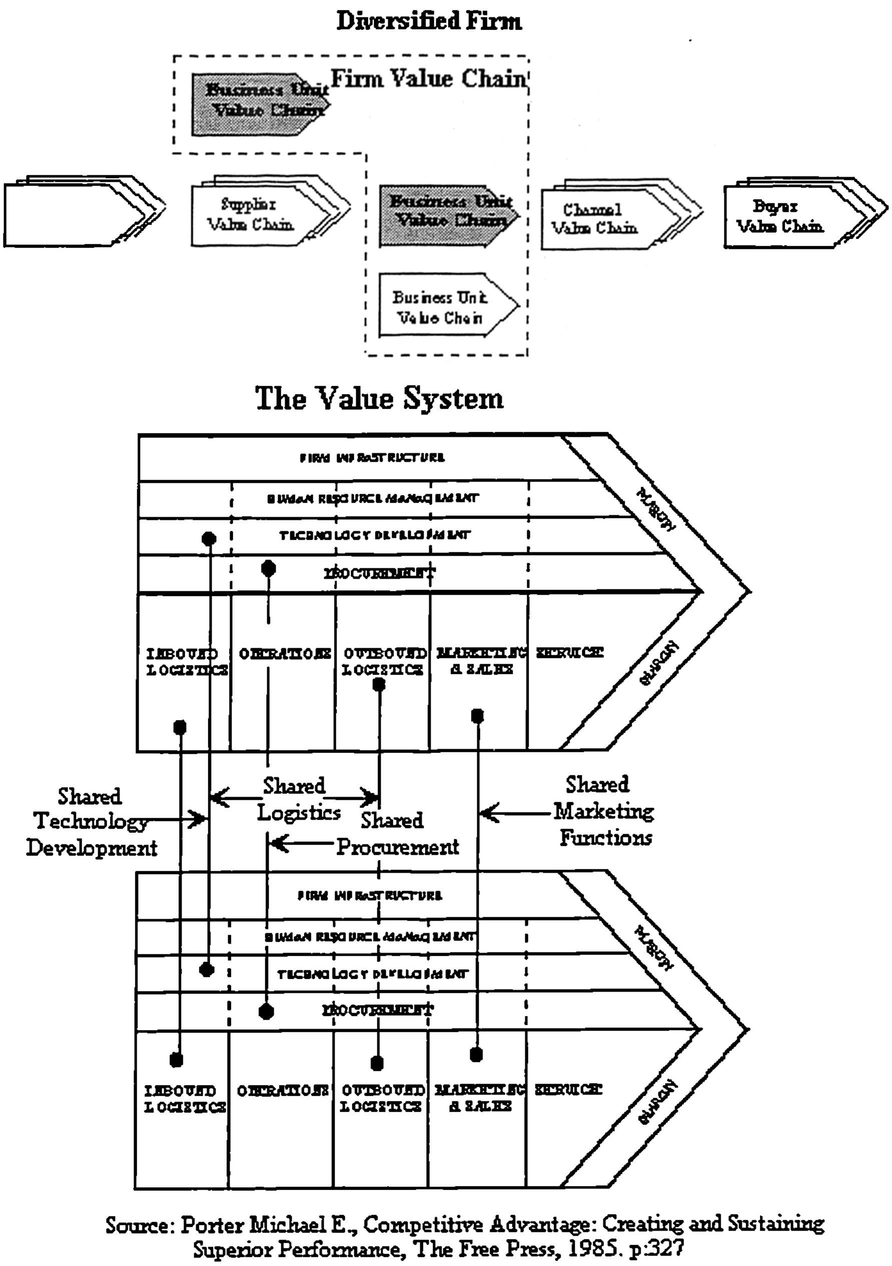


Figure 2-9. Interrelationships between value chains in paper products.

Horizontal strategy is a concept based on competitive advantage and not on purely financial considerations or stockmarket perceptions. It proposes that instead of portfolio management strategy, the executives concentrate on identifying strategic interrelationships that exists between business units and then exploiting them (fig. 2-9). Strategically important interrelationships have long been present in many diversified firms, however, little attention has been given to identifying and systematically exploiting them.

According to Porter there are three types of interrelationships: tangible interrelationships, intangible interrelationships, and competitor interrelationships.

Tangible interrelationships exist when there are opportunities for sharing activities in the value chain among related business units. These can be common buyers, distributors, technologies, transportation, etc.

Intangible interrelationships refer to the soft activities, such as transfer of management know-how from one business unit to the other. Businesses that cannot share activities may have similar type of activities such as type of manufacturing process (e.g., cars and washing machines use similar type of cutting machines and assembly operations).

Diversified firms can and often do compete with each other in more than one industry. Porter refers to these firms as multipoint competitors who link industries together. This multipoint competition creates *competitor interrelationships*. It is a very important interrelationship since a firm's action in one industry may have implications in another. An example of this is the financing of cars in the USA. A reduction in price of cars by one competitor may influence the financing arrangements of competitors' cars such as zero financing or no down payment, etc.

Identifying interrelationships among business units and exploiting them is one of the most important tasks of the corporate executives. To this end horizontal strategy can be most useful.

Formulating horizontal strategy is a seven step process(Porter, 1985):

1. Identify all tangible interrelationships.

2. Trace tangible interrelationships outside the boundaries of the firm.

3. Identify possible intangible interrelationships.

4. Identify competitor interrelationships.

5. Assess the importance of interrelationships to competitive advantage.

6. Develop a co-ordinated horizontal strategy to achieve and enhance the most important interrelationships.

   - Share appropriate value activities.
   - Co-ordinate postures of related business units.
   - Distinguish the goals of business units.
   - Co-ordinate offensive and defensive strategies against multipoint competitors and competitors with different interrelationships.
   - Exploit important intangible interrelationships through formal programs for exchanging know-how.
   - Diversify to strengthen important interrelationships or create new ones.
   - Sell business units that do not have significant interrelationships with others or that make the achievement of important interrelationships more difficult.

7. Create horizontal organisational mechanisms to assure implementation.

Before one can identify any of the three types of interrelationships, one has to have a clear idea of what value activities and value chains exists in one's company (single business/diversified firms).

Corporate Strategy: Assessment

Corporate strategy is concerned with macro-issues: identifying opportunities and threats, determining the type of diversification (related or unrelated), environmental analysis (PEST analysis: Political, Economic, Social, and

Technological), overall investment policies, and capturing synergy through exploitation of the existing interrelationships.

Corporate strategy is concerned with the functional strategies only when it is trying to capture synergy through exploitation of the existing tangible or intangible interrelationships (fig. 2-10). In these cases, the corporate strategy is only concerned with the sharing of activities between the business units or transfer of know-how from one to the other.

Manufacturing may represent the core activity of a business and as such very important, but nevertheless it is a functional unit within a business unit. It would be wrong to try to include it in the corporate strategy. As was explained above, corporate strategy's focus is on macro-issues and not the functional units. The proper place for inclusion of functional strategies, including manufacturing strategy is at the business level and not the corporate level.

This author has developed a corporate strategy formulation model, in which the role of SBUs in corporate strategy formulation process are clearly defined. As can be seen from figure 2-10, there is no role for functional strategies such as manufacturing strategy in corporate strategy formulation process.

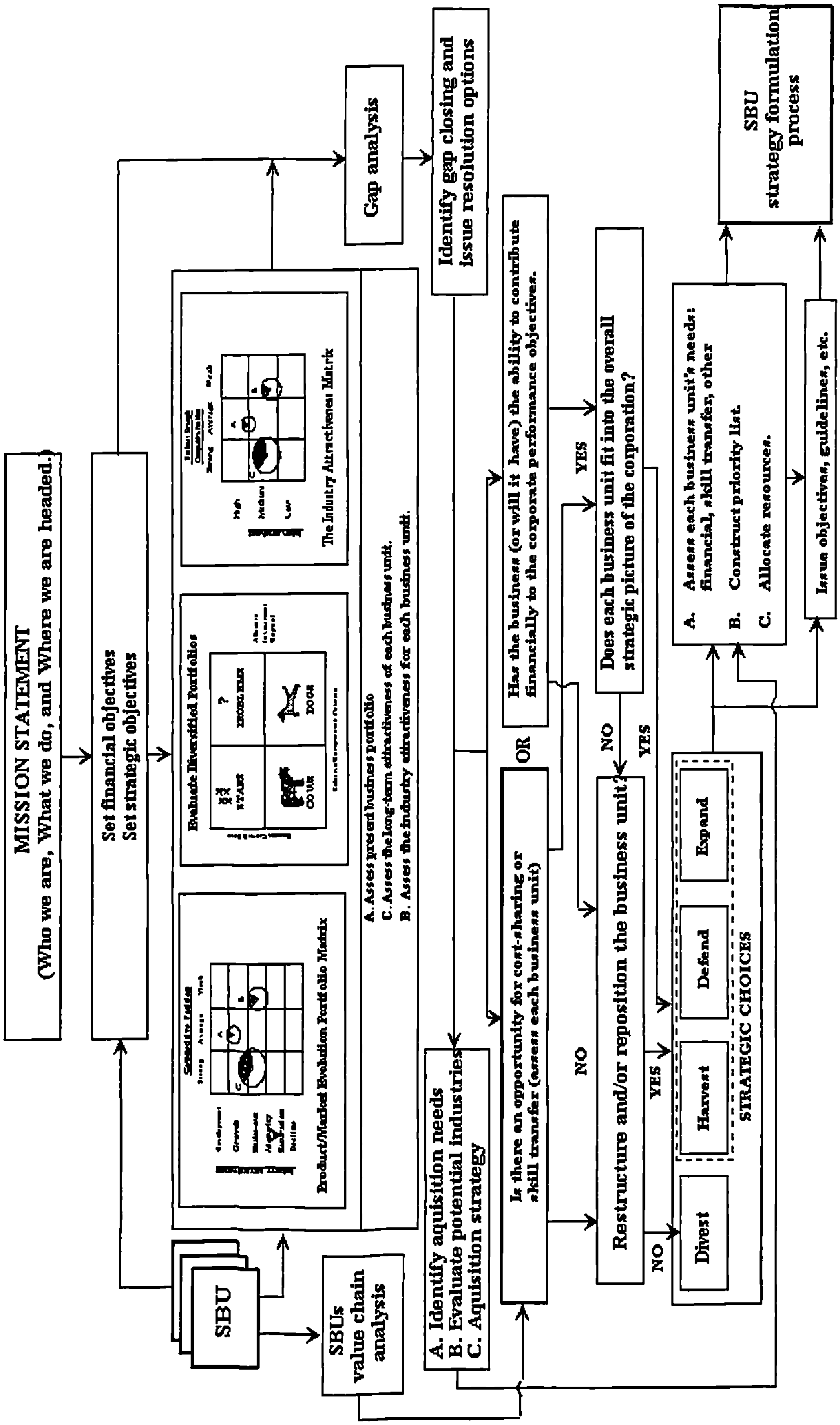


Figure 2-10. A corporate strategy formulation process

Business Strategy Formulation Process

Andrews (1987) defines strategy as the *pattern of decisions* in a company that determines and reveals its objectives, purposes, or goals, produces the principal policies and plans for achieving those goals, and defines the range of business the company is to pursue, the kind of economic and human organisation it is or intends to be, and the nature of the economic and non-economic contribution it intends to make for its shareholders, employees, customers, and communities. Those decisions that are either related to or are the outcome of the strategy process are called strategic decisions. *Strategic decisions (Johnson, 1988:8)* are concerned with:

- The scope of an organisation's activities.
- The matching of an organisation's activities to its environment.
- The matching of the activities of an organisation to its resource capability.
- The allocation and reallocation of major resources in an organisation.
- The values, expectations and goals of those influencing the strategy.
- The direction an organisation will move in, in the long term.
- Implication for change throughout the organisation - they are likely to be complex in nature.

Strategic decisions are directly connected to the strategic levels at which those decisions are taken. While strategic decisions at the corporate level, for example, are concerned with determining what set of businesses the corporate should be involved in; the business-level strategic decisions determine how a Strategic Business Unit (SBU) should compete effectively in a particular business. At the lowest level we have the functional strategic decisions.

Functional-level strategic decisions, are concerned with the specific optimisation of available resources, outlining the directions on how to accomplish the given objectives most effectively and efficiently.

Strategic decisions are the outcome of a number of processes. Some of these processes include such activities as identifying an organisation's competitive strengths and weaknesses, determining the firm's external opportunities and threats, analysis of the position of the firm within an industry, and so on. The collection of these activities is referred to as strategy formulation process. The implementation of those decisions taken at the strategy formulation process is called strategy implementation. Together, the strategy formulation and implementation is referred to as the "strategic management". Hofer et al (1980:7) define strategic management as the process that deals with fundamental organisational renewal and growth, with the development of strategies, structures, and systems necessary to achieve such renewal and growth, and with the organisational systems needed to effectively manage *strategy formulation and implementation.* Strategic management is always referred to as a process or systematic approach, rather than a concept. Teece (1990:40) describes strategic management *process* as an objective, *systematic approach* for making major decisions in a business enterprise. If strategic planning and strategic management are processes, then they can be formalised, something that would not have been possible if they were concepts.

Schools of Thought

According to Mintzberg (1990) (based on a literature survey of 1495 articles and books), strategy processes can be grouped into 10 schools of thoughts depending on their approaches to strategy formulation/formation process. These are presented in table 2-1.

1. The **Design School** : strategy formation as a *conceptual* process. 2. The **Planning School** : startegy formation as a *formal* process. 3. The **Positioning School** : strategy formation as an *analytical* process.	**Prescriptive**
4. The **Entrepreneurial School** : strategy formation as a *visionary* process. 5. The **Cognative School** : strategy formation as a *mental* process. 6. The **Learning School** : strategy formation as an *emergent* process. 7. The **Political School** : strategy formation as a *power* process. 8. The **Cultural School** : strategy formation as an *ideological* process. 9. The **Environmental School** : strategy formation as a *passive* process.	**Descriptive**
10. The **Configurational School** : strategy formation as an *episodic* process.	**Config-urational**

Table 2-1. Schools of thoughts

The first three schools (design, planning, and positioning) are ***prescriptive***, that is, they are concerned with how strategies *should be* formulated. The following six schools (entrepreneurial, cognitive, learning, political, cultural, and environmental) are ***Drescriptive*** in their approach. They are concerned less with prescribing ideal strategic behaviour than with describing *how strategies get made.* Finally, the configurational school's approach combines the two into what Mintzberg calls the configuration. He argues that the writers of this school, in efforts to be integrative, cluster the elements and behaviours of organisations-strategy-making processes, content of strategies, and structures and/or contexts at distinct stages or episodes in their histories, sometimes sequenced over time in life cycle models.

Here, of interest to us are all the three prescriptive schools and the entrepreneurial, the learning, the configurational, and the environmental schools of the descriptive type. As will be shown later, the dominant methods of strategy formulation (empirical work presented in literature) are of the prescriptive type. I have included the entrepreneurial school to describe the prevalent strategy formulation process in small businesses (Drucker 1970, 1985; Murray 1984; Carland et al. 1984; Cooper and Dunkelberg 1986; Kaplan 1987; Peterson 1981).

The learning school is included because the proponents of this school (e.g., Quinn, Mintzberg, James) totally reject the idea of formal strategy formulation process and instead argue for an emergent, and informal approach. The configurational school with its emphasis on the life-cycle of things is very close to one of the central ideas in manufacturing strategy literature, namely product life-cycle. And finally the environmental school is included here because, as Mintzberg puts it, the environmental school positions environment alongside leadership and organisation as one of three central actors in the process. This is something that has been conspicuously absent (and if present, rather passive) in other schools.

The Cognitive, Political, and Cultural schools are not considered here because: a) they are unsuitable for organisations with manufacturing activities, and b) because they are unable to provide any concrete and useful method to follow. For example, the Political school, as its name implies, views strategy formulation as fundamentally a political activity. The Cultural school considers strategy formulation as a process of collective behaviour.

The Prescriptive schools have until now provided the most widely used models for industry. Mintzberg belonging to the learning school (descriptive) himself, roundly criticises all other schools. To get a better understanding of his criticism of these schools and their differences, I shall describe the work of one author from each school (Design, Planning, Positioning, Entrepreneurial, Learning, Configurational, and Environmental).

The Design Schools (Kenneth Andrews)

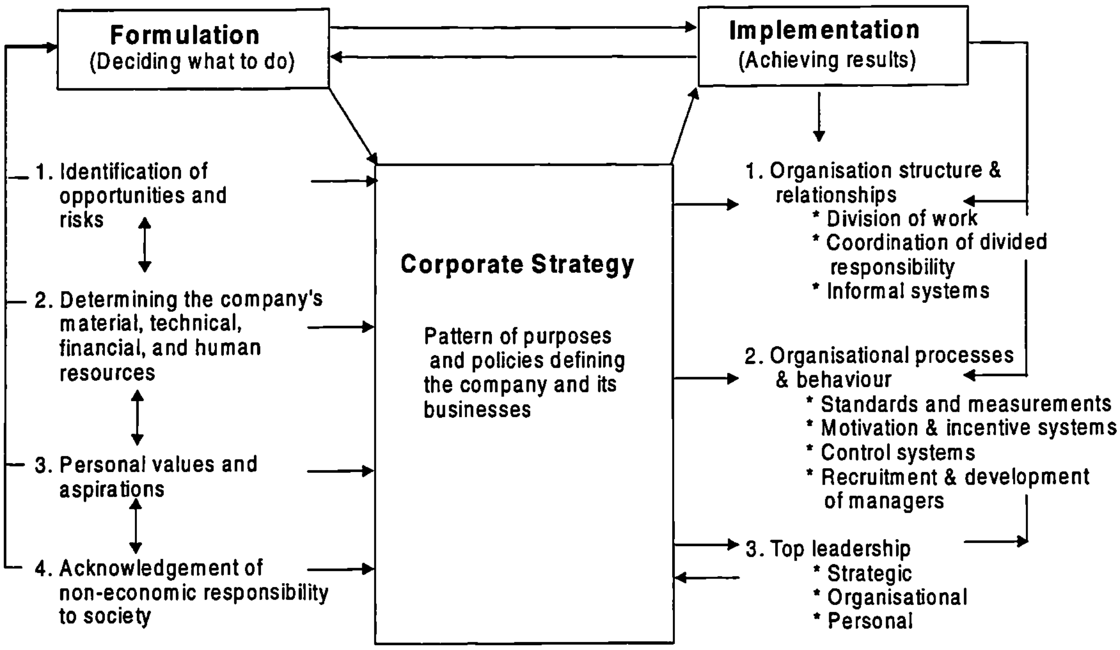
One of the first authors to focus explicitly and exclusively on the concept of strategy and the processes by which it should be developed, was Kenneth Andrews (Andrews, 1965 ; Andrews, 1971). He defined strategy as: "the pattern of objectives, purposes or goals and major policies and plans for achieving these goals, stated in such a way as to define what business the company is in or is to be in and the kind of company it is or is to be". Central to Andrews's model is the concept of congruence or fit. This is achieved through the evaluation of strengths and weaknesses, opportunities and threats (SWOT). An strategy in Andrews' model should:

1. Be made clear either in words or practice.
2. Be unique.
3. Fully exploit domestic and international environmental opportunities.
4. Be consistent with corporate competence and resources, both present and projected.
5. The major provisions of the strategy and the major policies of which it is comprised internally should be consistent.
6. The level of chosen risk should be feasible in economic and personal terms.
7. Be appropriate to the personal values and the aspiration of the key managers.
8. Be appropriate to the desired level of contribution to society.
9. Constitute a clear stimulus to organisational effort and commitment.
10. There must be early indications of the responsiveness of markets and market segments to the strategy.

Andrews' model is built on several assumptions. These are:

- The CEO is the architect of purpose. That person is the strategist (1987: 3).

- The strategy process should be divided into two distinct processes: strategy formulation and strategy implementation (1987:18)
- The strategy formulation process should be a controlled and rational conceptual process (1987:18).
- The strategy model should be kept simple (figures 2-11 and 2-12).



Source: Andrews, Keneth (1987). 'The Concept of Corporate Strategy', 3rd Ed., Irwin, Homewood, Illinois, USA. p.21

Figure 2-11. Strategy as a pattern of interrelated decisions

Andrew never constructed an explicit diagram of his strategy formulation model. Figure 2-12 is based on Andrews writings, and his model (figure 2-11) of economic strategy development (Andrews, 1987: 50).

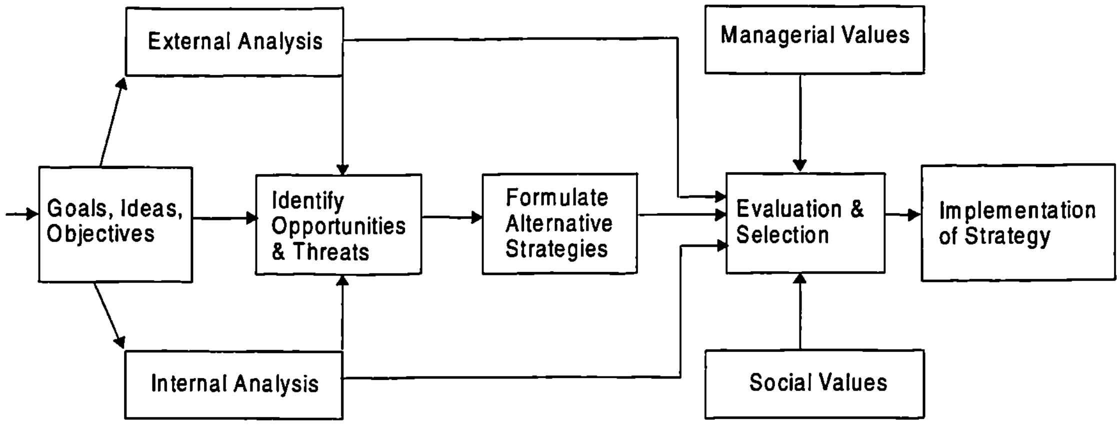


Figure 2-12. Andrew's Strategy formulation process.

Mintzberg argues that: "our conclusion about the design school is not that the model is wrong but only that it has *limited capability*. The proponents of this school should have heeded their own prescription about fit. To use this model, and organisation must be simple enough to be understood fully in one central place, and it must *exist in a situation stable or predictable* enough to enable it to settle on a clear strategy that will be viable well beyond the period of implementation. We believe this best describes structures we have called machine bureaucracy, which can best use the model during periods we call re-conception -- coming out of a time of conceptual change into one of new stability" (Mintzberg, 1990:116) .

The Planning School (Igor Ansoff)

I have outlined the development of the planning school earlier in the beginning of this chapter, titled 'from short-range planning to long-range planning to strategic planning. One of the founders of this school is Igor Ansoff. The concept of strategy formulation as a formal process was introduced by Ansoff in 1965. His approach to strategy formulation became dominant in the 1970s, and although still in use, is now only a shadow of its former self.

The planning school is very similar to the design school, with two exceptions:

a) while the design school considers strategy formulation as a conceptual task, the planning school considers it as highly formal and systematic, and b) the inclusion of planners as aids to the CEO, and responsible for the execution of the strategy, in the planning school.

Ansoff outlined what he called the "new method" (Ansoff, 1987:41) for strategy formulation as:

1. The method should include: "perception of decision needs or opportunity, formulation of alternative courses of action, evaluation of alternatives for their respective contribution, and choice of one or more alternatives for implementation"(Simon, 1960). Emphasis should be on the first two steps, monitoring the environment for changes and searching for attractive product opportunities.

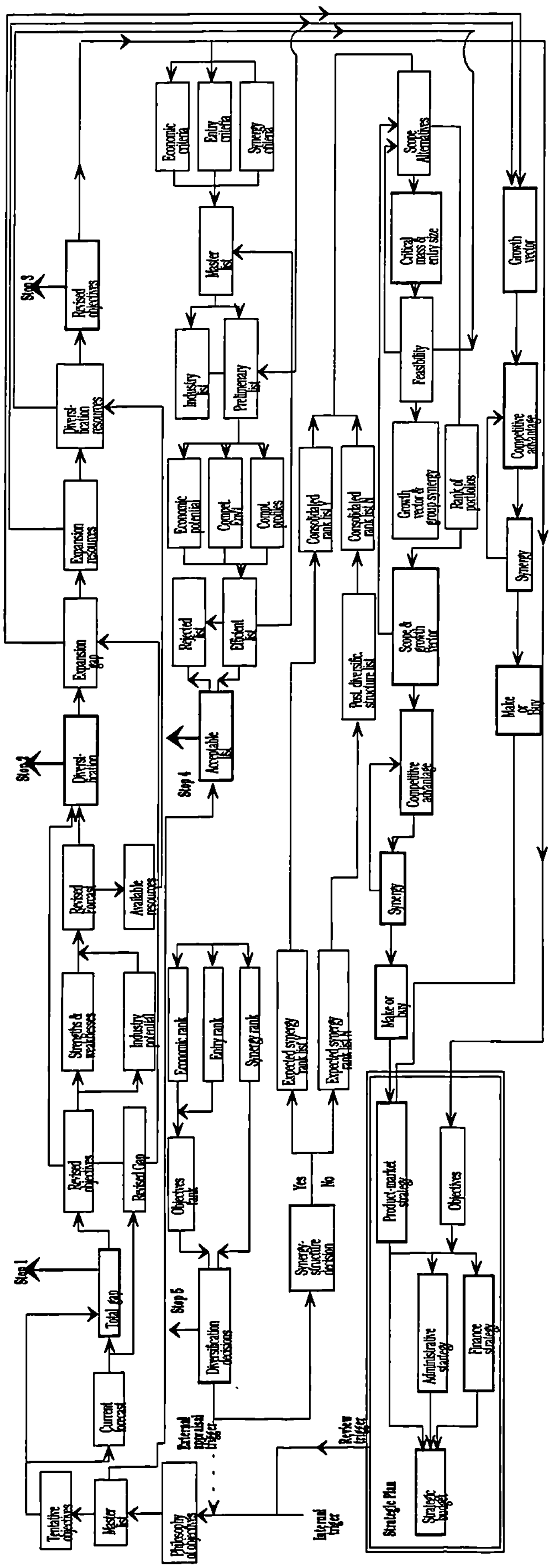
2. Handle allocation of the firm's resources between opportunities in hand and probable future opportunities under conditions of partial ignorance.

3. *Evaluate joint effects (synergy) resulting from addition of new product market to the firm.*

4. Single out opportunities with outstanding competitive advantages.

5. Handle a vector of potentially antagonistic objectives.

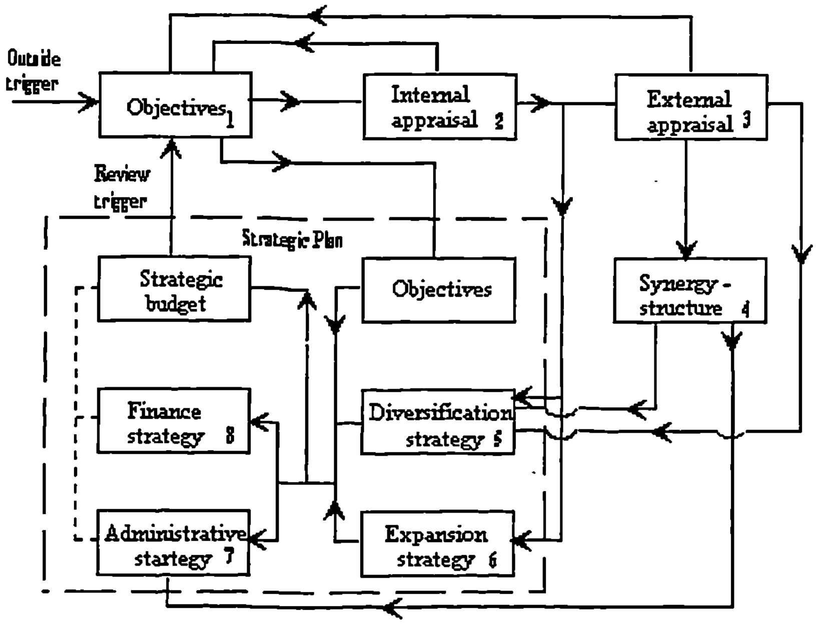
6. Evaluate the long-term potential of projects even though cash-flow projections are unreliable.



Source: Ansoff Igor, Corporate Strategy, published by Pelica Books, 1971. p:172-173

Figure 2.23 Ansoff's decision flow in product-market strategy formulation

The planning school, as the name implies, places heavy emphasis on the formal, procedural approach to strategy formulation. Ansoff realising the problems that can arise from such a detailed procedure, tried to simplify it. In his words "the model is detailed to a point where we can not see the 'woods' for the trees". A simplified model is presented in figure 2-14.



Source: Ansoff Igor, Corporate Strategy, published by Pelica Books, 1971. p:177

Figure 2-14. Ansoff: the strategic plan.

The Ansoff's strategic plan is triggered either by outside signals or by an internal review. The reaction to a trigger is to make explicit or to review objectives (stage one) of the firm. The second stage of the process is concerned with the internal appraisal. The internal appraisal is concerned with the "firm's growth and expansion opportunities within the present product - market posture". Stage three, the external appraisal, is concerned with the analysis of the field of opportunities open to the firm. In stage four, the firm will consider whether, and to what extent, the firm will *vary its organisational structure* and other administrative arrangements in order to take advantage of the joint-effects (synergy) potential available in various industries. The stages five and six deal with diversification and expansion strategies. Stage 7, administrative strategy, outlines and establishes rules for the organisational evolution of the firm. Stage 8, financial strategy, specifies the rules and means by which the firm will seek to finance growth and expansion.

As can be seen from figure 2-13, the Ansoff's model is rather elaborate. Mintzberg calls this elaboration the grand fallacy. He lists three "fallacies" of the strategic planning as:

1. The fallacy of predetermination.

Mintzberg argues that "formal planning typically reduces the extrapolation of known trends and favours periods of relative stability (or else one of favourable growth, when errors that exceed the forecasts can be forgiven, as was the case often in the 1960s, the golden years of planning)" (Mintzberg, 1990:122).

2. The fallacy of detachment.

Here, Mintzberg argues against the separation of strategic management from operating management, with the former to be informed by an MIS of hard data. He argues that if the management instead of having close and first hand knowledge of the operating details, rely on the MIS for all their information, their strategy making become superficial.

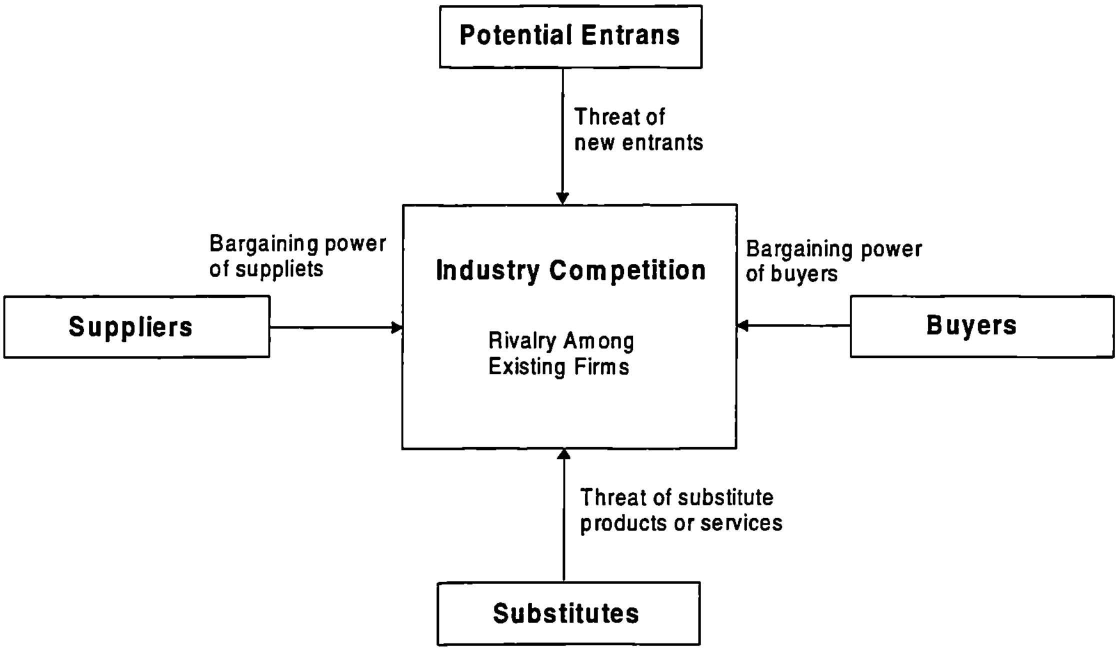
3. The fallacy of formalisation.

Mintzberg's last argument is about the formalisation of the strategy making process. He argues that a formalised process is nothing more than a series of black boxes on paper that, instead of showing how to create strategies, merely implores managers to do so. He states that what the formal process really does is to provide a means to program the strategies created by other means. This point is also supported by others such as Daniel H. Gray. He argues that:

"Strategic planning is usually seen, on adoption, as a separate discipline or a management function. It involves the allocation of resources to programmed activities calculated to achieve a set of business goals in a dynamic, competitive environment. Strategic management, on the other hand, treats strategic thinking as a pervasive aspect of running a business and regards strategic planning as an '*instrument around which all other control systems - budgeting, information, compensation, organisation - can be integrated*'. This interdependency usually comes to light when a business has trouble implementing the results of a free-standing strategic planning process." (Gray, 1986:495)

The Positioning School (Michael E. Porter)

The rise or, as some may say introduction of, the positioning school started in 1980 by publication of Competitive Strategy by Michael E. Porter. The positioning school like the design and planning schools is prescriptive. This school accepts, with some exceptions, the underlying premises of the planning and design schools as well as their fundamental models.



Source: Porter, Michael E. (1980). 'Competitive Strategy: Techniques for Analysing Industries and Competitors'. Free Press.

Figure 2-15. Forces driving industry competition.

The strategy formulation according to Porter is a two stage process: the structural analysis of the industry and the positioning of the firm within that industry. The strategy formulation begins with the structural analysis of the industry (ies) that a firm is in. It is the five competitive forces, Porter argues, that determine the attractiveness of an industry (figure 2-15),.

> "The five forces determine industry profitability because they influence the prices, costs, and required investment of firms in an industry - the elements of return on investment. Buyer

power influences the prices that firms can charge, for example, as does the threat of substitution. The power of buyers can also influence cost and investment, because powerful buyers demand costly service. The bargaining power of suppliers determine the cost of raw materials and other inputs. The intensity of rivalry influences prices as well of the costs of competing in areas such as plant, product development, advertising, and sales force. The threat of entry places a limit on prices, and shapes the investment required to deter entrants" (Porter, 1985:5).

The next step in the strategy formulation process is the evaluation and determination of the relative position of a firm within its industry (figure 2-16). "Positioning determines whether a firm's profitability is above or below the industry average. A firm that can position itself well may earn high rates of return even though industry structure is unfavourable and the average profitability of the industry is therefore modest" (Porter, 1985:11).

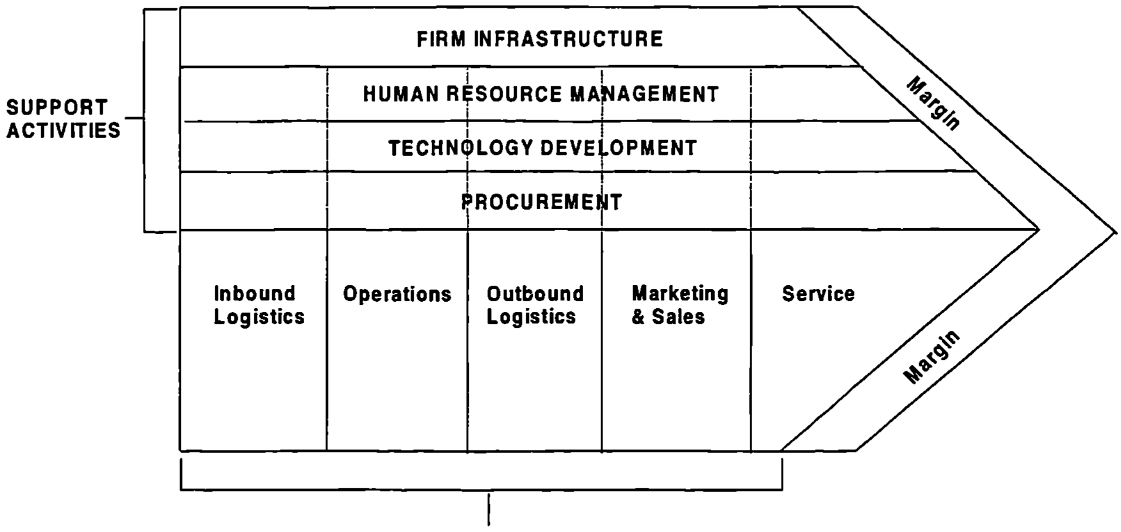
		Lower Cost	Differentiation
Competitive Scope	Broad Target	**1. Cost Leadership**	**2. Differentiation**
	Narrow Target	**3 A. Cost Focus**	**3 B. Differentiation Focus**

Source: Porter Michael E., Competitive Advantage: Creating and Sustainin Superior Performance, The Free Press, 1985. p:12

Figure 2-16. Three generic strategies.

Porter argues that the competitive advantage is at the heart of any strategy, and achieving competitive advantage requires a firm to make a choice about the competitive advantage it seeks to attain and the scope within which it will attain it.

The basic tool for formulating (diagnosing) and implementing a generic strategy is the "value chain". The value chain (fig. 2-17) is the systematic division of a firm into discrete activities that it performs in designing, producing, marketing and distributing its products. The value chain is strongly influenced by the firm's competitive scope (broad or narrow).



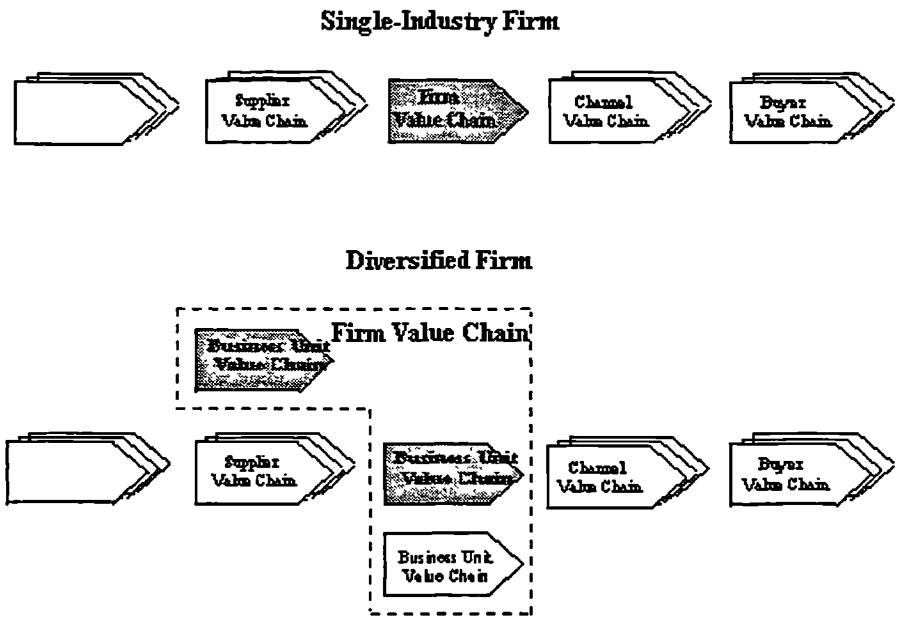
Source: Porter, Michael E (1985). 'Competitive Advantage: Creating and Sustaining Superior Performance', The Free Press. P.37.

Figure 2-17. The generic value chain.

A firm's value chain is embedded in a larger system of value chains (fig. 2-18). The buyer and supplier value chains do affect the firm's value chain. Porter argues that:

> "Suppliers have value chains (upstream value) that create and deliver the purchased inputs in a firm's chain. Suppliers not only deliver a product but also can influence a firm's performance in many other ways. In addition, many products pass through the value chains of channels (channel value) on their way to the buyer. Channels perform additional activities that affect the buyer, as well as influence the firm's own

activities. A firm's product eventually becomes part of its buyer's value chain. The ultimate basis for differentiation is a firm and its product's role in the buyer's value chain, which determines buyer needs. Gaining and sustaining competitive advantage depends on understanding not only a firm's value chain but how the firm fits in the overall value system." (Porter, 1985:34)

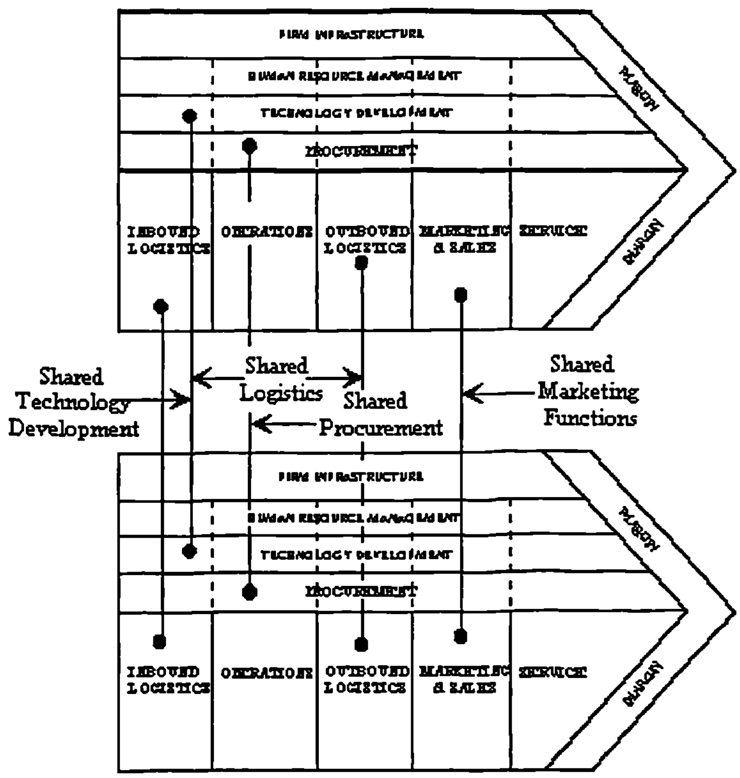


Source: Porter Michael E., Competitive Advantage: Creating and Sustaining Superi Performance, The Free Press, 1985. p:35

Figure 2-18. The value system.

The strategy formulation process in the positioning school is to be undertaken at the top through formal analysis of the industry structure - market's value system and the firm's value chain. Based on the formal analysis, the strategies are selected from three generic strategies. A full blown plan is then constructed, articulated, and then implemented.

The positioning school's approach to a diversified firm is similar to that of the planning school. According to Porter, "synergy", a central concept in the planning school, although a nice idea, has occurred rarely in practice. The failure of synergy, he argues, stemmed from the inability of companies to understand and implement it, not because of some basic flow in the concept. To remedy this problem he proposes *horizontal strategy* for the co-ordination of the strategic business units (synergy). He defines horizontal strategy as a co-ordinated set of goals and policies across distinct but interrelated business units.



Source: Porter Michael E., Competitive Advantage: Creating and Sustaining Superior Performance, The Free Press, 1985. p:327

Figure 2-19. Interrelationships between value chains in paper industry.

Porter argues that the growing importance of these interrelationships (e.g., figure 2-19) and the co-ordination of them (Horizontal strategy) has been the result of a number of changes in the business environments. Some of these changes were a more pronounced move towards a related diversification, shifting emphasis from growth to performance, changes in technology (allowing the corporations to achieve the interrelationships), and finally an increase in multipoint competition (firms that compete with each other not only in one business but in a number of related businesses.

According to Porter, there are three broad types of interrelationships: tangible, intangible, and competitor interrelationships. Tangible relationship is created when a number of activities can be shared among several business units, due to the presence of common buyers, channels, technologies and so on. Intangible relationship is the sharing of the management know-how between the business units. And finally, the competitor relationship arises when a firm actually or potentially competes with diversified rivals in more than one business unit. Porter argues that the competitive position of a multipoint competitor is often more a function of its overall position in a group of related industries than its market share in any one industry because of interrelationships.

Based on the above description, one can conclude that the positioning school is similar in some aspects to that of design and planning schools. The strategies are formulated at the top, a full blown plan is created and then implemented. What distinguishes the positioning school from the others is the emphasis on the content of strategy and its analytical approach to strategy formulation.

However, despite the popularity of this school throughout the last decade, Mintzberg criticises this approach on the same ground as he criticised both the design school and the planning school, namely, that the positioning school like the design and planning schools separates the formulation from the implementation, emphasises strategy making as a deliberate process and thereby downgrades the importance of strategic learning. Mintzberg also criticises the positioning school on other grounds as well, namely:

narrowness of focus, narrowness of context, and narrowness of the strategy itself. He argues that:

A) The positioning school's focus is narrow, being oriented towards the economic and especially the quantifiable, as opposed to the social or political or even non-quantifiable economic.

B) The Context of the positioning school, being biased toward the traditional big business, not taking into consideration the fragmented industries. The main thrust of the Porter's literature on fragmented industries is on the consolidation of these industries rather than proposing a clear-cut approach to strategy formulation.

C) The strategy itself has a narrow focus, for it sees a generic position, not a unique perspective.

The Entrepreneurial School

The entrepreneurial school is of the descriptive kind, seeking to understand the process of strategy formulation as it unfolds. The entrepreneurial school, like the design school, takes the formal leadership seriously. As will be shown here, the leader (owner or CEO) is at the centre of attention. In the entrepreneurial school, the strategy formulation process is a mental task carried-out by the entrepreneur.

> "Not only does this school focus the strategy formation process exclusively on the single leader, but it also stresses the most innate of mental states and processes -- intuition, judgement, wisdom, experience, insight. This promotes a view of strategy as perspective, associated with image, sense of direction, and above all, vision" (Mintzberg, 1990:137).

Entrepreneurial organisations are usually simple organisations that are run firmly and personally by their leader. They are simple, informal, flexible, with little staff or middle-line hierarchy. Strategy is "broadly deliberate but emergent and flexible in details" (Mintzberg, 1989:117). Entrepreneurial firms (i.e., small firms) not only have very little control over their external environment, but also lack the tools or organisational capabilities for monitoring that environment. (Mancuso 1984:5-13)

Lacking the ability to properly monitor the external environment, the entrepreneurial organisation has to rely on the organisational flexibility to co-align itself with that environment. In this fluid environment, the process of strategy formulation can only be of the short-term nature. However, having said that, I should point out that the entrepreneur can have a long-term strategy broadly defined but lacking any details or plans. This absence of strategic planning was investigated by Robinson and Pearce (1983). They reviewed over 50 planning-related studies from small firm settings and concluded in their findings that small firms lacked comprehensive planning. They gave four reasons for this non-use of strategic planning:

1. **Time.** Managers report that their time is scarce and difficult to allocate to planning in the face of continual day-to-day operating problems.
2. **Getting Started.** Small-firm owner/managers have minimal exposure to and acknowledgement of, the planning process. They are unfamiliar with many planning information resources and with how they should be utilised.
3. **Broad Expertise.** Small-business managers typically are generalists. As such, they often lack specialised expertise that is necessary in a planning process.
4. **Lack of trust and openness.** Small-firm owners/managers are highly sensitive and guarded about their businesses and the decisions that affect them. Consequently, they are hesitant to share their strategic planning with employers or outside consultants.

The difficulty of formalising the strategy process of an entrepreneur is made even more difficult by what Kets de Vries (1985:160) calls the dark side of entrepreneurship. He outlines these negative characteristics as :

1. **Need for control**

   Occasionally the entrepreneur's preoccupation with control affects his/her ability to take direction or give it appropriately. This has serious implications for how he/she gets along with others. Some entrepreneurs are strikingly ambivalent when an issue of control surfaces - they are filled with fantasies of grandiosity, influence, power, and authority, yet they also feel helpless. They seem to fear that their grandiose desires will get out of control and place them ultimately at the mercy of others.

   Consequently, some entrepreneurs have serious difficulty addressing issues of dominance and submission and are suspicious about authority. This attitude contrasts greatly with that of managers. While managers seem able to identify in a positive and constructive way with authority figures, using them as role models, many of the entrepreneurs lack the manager's fluidity in changing from a supervisor to a subordinate role. Instead they find it very difficult to work with others in structured situations unless, of course, *they* created the structure and the work is done on *their* terms.

2. **Sense of distrust**

   Closely related to the need for control is proclivity toward suspicion of others. They live in fear of being victimised. They want to be ready should disaster strike. When a strong sense of distrust assisted by a need for control takes over, the consequences for the organisation are serious: sycophants set the tone, people stop acting independently, and political gamesmanship is rampant. Such entrepreneurs can interpret harmless acts as threats to their control and see them as warranting destructive counteractions.

3. Desire for applause

Quite a few entrepreneurs feel that they are living on the edge, that their success will not last (their need for control and their sense of distrust is symptomatic of this anxiety) but they also have an overriding concern to be heard and recognised, to be seen as heroes. Some entrepreneurs need to show others that they amount to something, that they can not be ignored.

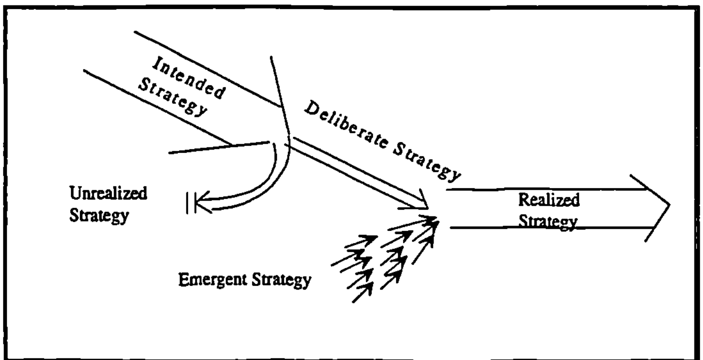
Lack of time for planning, unfamiliarity with the planning process, lack of specialised expertise, the need for control, sense of distrust, and desire for applause are some of the problems that are associated with the entrepreneurial spirit and character. "Given these strong needs, it would be reasonable to ask if it is possible to harness such drives. Can such entrepreneurs relinquish their need to invest in certain organisational symbols? Can they live under the constraints of corporate budgets, expense controls, and *long-range* plans?" (Vries, 1985)

Mintzberg criticises this school on same points as outlined above. He argues that "on one hand, this school has viewed strategy as wrapped up in the vision of a single individual. On the other hand, it could never really say much about what the process was. It remained a black box, buried in human cognition. Thus, for the organisation that ran into difficulty, this school's central prescription was all too obvious, and facile: Find a new visionary leader" (Mintzberg, 1990:141).

The Learning School (Henry Mintzberg)

Mintzberg (1990) categorised the strategy processes into five categories (or five *Ps*): *Plan*, *Ploy*, *Pattern*, *Position*, and *Perspective*.

Strategy as a plan is some sort of consciously intended course of action, or guideline (or set of them) to deal with a situation. Mintzberg calls this plan as intended strategy. If the plan is successfully implemented, it would then become the realised strategy. In other words, strategy, a) should be made in advance of the actions to which it is applied, and b) be made consciously and purposefully. A & B are the two characteristics of the planned or intended strategy as defined by Mintzberg. Strategy as a ploy is also a plan; but the plan is designed to be a specific manoeuvre to outwit the competitors. Strategy as a pattern is a stream of actions. Patterns may appear with or without a preconceived plan.



Source: Quinn & Mintzberg (1987), p. 15

Figure 2-20. Emergent approach to strategy 'formation'

Mintzberg argues that:

> "For a strategy to be truly deliberate--that is , for a pattern to have been intended exactly as realised--would seem to be a tall order. Precise intentions would have to be stated in advance by the leadership of the organisation; these have to be accepted by everyone else, and then realised with no interference from the market, technological, or political forces, etc. Likewise, a truly emergent strategy is again a tall order, requiring consistency in action without a hint of intention. (No consistency means no strategy, or at least unrealised strategy.) Yet some strategies do come close to either form, while others-- probably most--sit on the continuum that exists

> between the two, reflecting deliberate as well as emergent aspects".(Quinn et al., 1985:13)

One of the most interesting aspect of the learning school is at best its incremental approach and at its worst the complete negligence of strategy formulation.

> "Emergent strategy means, literally, unintended order. So in its most extreme form there is technically no learning. The patterns just form, driven by external forces or needs rather than the conscious thoughts of any actors. But real learning surely takes place at the interface of thoughts and action, as actors reflect on what they have done. In other words, strategic learning must combine intention with realisation" (Quinn, 1988:20).

The learning school completely rejects the concept of strategy formulation as a process. Mintzberg argues that strategies appear first as patterns out of the past, and only later perhaps as deliberate plans for the future. The basic idea is then a trial and error situation where the firm will "learn" from its mistakes and successes, and hopefully will avoid repeating those mistakes. The role of the leadership in here, Mintzberg argues, is not then so much formulating strategies than managing the process of strategic learning.

Configurational School (Miles & Snow)

As the name implies, those writers who favour categorising states, or lumping things tend to belong to this school. For example, on the organisational structure side, we have Henry Mintzberg with his structures in five or seven, or Miles & Snow (Miles, 1978) typology of prospectors, defenders, analysers, and reactors.

The configurational writers tend to describe behaviour of organisations in terms of configurations, distinct, integrated clusters of dimensions concerning state and time. They also tend to believe in the 'punctuated equilibrium' with its stable duration followed by a sudden change in the environment. Accordingly:

> "...the process can be one of conceptual design or formal planning, systematic analysis or intuitive vision; it can be one of individual cognition and/or collective learning or politics; it can be driven by personalised leadership, organisational culture, or the external environment; and the resulting strategies can take the form of plans or patterns, ploys, positions, or perspectives; but each must be found at its own time and in its own context.
>
> These periods of the clustered dimensions tend to sequence themselves over time in patterned ways that define common life cycles of strategy formation." (Mintzberg, 1990:182)

One of the best known literature of this school is that of Miles & Snow (1978). They consider three general perspectives of the organisational adaptation.

A) ***Natural selection*** asserts that, within a given group of organisations, some by chance alone will develop characteristics more compatible with emerging environmental conditions than will their counterparts. Those organisations fortunate enough to have the "right" structure at the time will perform best, forcing their competitors to emulate these structures or cease to exist.

B) ***Rational Selection*** approach asserts that while environmental conditions largely determine the efficacy of different organisational structures and processes, the managers of successful organisations efficiently select, adopt, and discard structural and process components to maintain the organisation's equilibrium with its environment.

C) ***Strategic Choice*** approach argues that organisation structure is only partially preordained by environmental conditions, and it places heavy emphasis on the role of top decision makers who serve as the primary link between the organisation and its environment.

Miles & Snow adopt the strategic-choice approach by arguing that:

> "... organisational adaptation is governed by the strategic choices of top management. We have attempted to demonstrate that although these choices are numerous, complex, and more or less continuous, they can nevertheless be profitably analysed by broadly categorising them as entrepreneurial, engineering, or administrative decisions and by examining the consistency among them. Finally, we have noted that not all top-management groups approach these decisions in the same manner. We have suggested four types of organisations, each of which has its own unique adaptive strategy." (Miles, 1978:30)

They list these organisation types as: *defenders*, *prospectors*, *analysers*, and *reactors*.

1. **Defenders** are those organisations that have narrow product-market domains. Because of this narrow focus, these organisations tend to face a more stable environment, (in terms of technology, structure, or method of operations), than firms with a wider product-market base.

2. ***Prospectors,*** in contrast to defenders, continuously search for new market opportunity, hence facing higher instability. These organisations are often the creators of change and uncertainty to which their competitors must respond.

3. ***Analysers*** are those organisations that operate in two different product-markets, one relatively stable, and the other unstable. In their stable market, they have a highly formalised structure, and in their unstable market, they tend to act as a follower of their competitors.

4. ***Reactors*** are organisations that, although perceive the instability within their environments, are unable to respond effectively. Because these organisations lack a consistent strategy-structure relationship, it seldom makes adjustment of any sort until forced to do so by environmental pressures.

The Environmental School (Howard Aldrich)

One of the most cited writers of this school is Howard E. Aldrich. Aldrich bases his theories and work, on the population ecology which in turn is based on the natural selection model of biological ecology. In his view, environmental pressures make competition for resources the central force in organisational activities, and the resource dependence perspective focuses on tactics and strategies used by authorities in seeking to manage their environments as well as their organisations (Aldrich, 1979).

Aldrich focuses on the nature and distribution of resources (information included) in organisations' environments. By adopting the population ecology and natural selection approach, he argues that, variation, selection, and retention constitute a model of the process of organisational change.

Variation within and between organisations are listed as the first requirement for organisational change. He argues that:

> 'Some variations arise through members' active attempt to generate alternatives and seek solutions to problems, and the rational selection model of traditional organisational theory focuses on such planned variations. The population ecology model, however, is indifferent to the ultimate source of

> variation, as planned and unplanned variation both provide raw material from which selection can be made. I review arguments for the strategic choice position and note that, while there are some occasions on which "strategic choice" may be exercised, there are usually severe limits to decision-maker autonomy.'(Aldrich, 1979:28)

Aldrich argues that since organisations compete for resources within a given environment, **selection** *occurs through relative rather than absolute superiority in acquiring resources.* An effective organisation is therefore one that has achieved a relatively better position in an environment it shares with others. Resources can be ranked in terms of why they are sought: liquidity, stability, universality, and lack of alternatives. Each distinct combination of resources and other constraints that support an organisation form constitutes a niche, defined in ecological terms as " any viable form of living."

Aldrich argues that **retention** of organisational forms in a population is directly affected by environmental and organisational characteristics. Organisational characteristics are formed and persist because of many factors, such as government's role in providing political stability, ideological legitimation, educational system, improvement in transportation and communication, and so on. Tradition within the organisation, standardisation, specialisation, centralisation of authority and normalisation of duties are but a few examples of factors that are involved in retaining the organisational characteristics and form. However, as with the other two stages, environment still plays a more important role, since it is the environment that makes resources available to the organisations.

Aldrich lists 6 dimensions in which environments make resources available to organisations. These are: *environmental capacity* (the relative level of resources available to an organisation within its environment), *homogeneity-*

heterogeneity (the degree of similarity or differentiation between the elements of the population dealt with), *stability-instability* (the degree of turnover in the elements of the environment), *concentration-dispersion* (the degree to which resources, including the population served and other elements, are evenly distributed over the range of the environment or concentrated in particular locations), *domain consensus-dissensus* (the degree to which an organisation's claim to a specific domain is disputed or recognised by other organisations including governmental agencies), and *degree of turbulence* (the extent to which environments are being disturbed by increasing environmental interconnection, and an increasing rate of interconnection).

Business Strategy Assessment

As mentioned earlier, Mintzberg divide the strategy schools of thought into three broad categories: prescriptive, descriptive, and configurational.

We have seen that of the seven schools described, only the prescriptive group (design school, planning school, and the positioning school) try to formalise the strategy formulation process. Of the three prescriptive schools, the first school (design) offers a simple, informal, but deliberate model, while the second school (planning) provides us with a highly deliberate, decomposed, formal, and detailed plan for strategy formulation. The third school (positioning) is highly analytical and systematic in its approach.

The remaining four schools considered here were the entrepreneurial school, the learning school, the configurational school, and the environmental school. The entrepreneurial school although correctly describes the mental process of strategy formulation for an entrepreneur, does not provide any guideline for the entrepreneur to follow.

The learning school (descriptive) rejects the formalised strategy formulation out-right, arguing for a trial and experience approach. The proponents argue that no formal organisation-wide strategic planning should be used, except under special circumstances, where the strategy is implicit in the historical sequence of successful trials.

The configurational school with its 'punctuated equilibrium' and life-cycles, approaches strategy formulation from a predetermined set of activities that one could follow in each phase of the life-cycle.

The environmental school on the other hand emphasises the paramount role of environment within the process of strategy formulation.

All the schools presented above have some positive and negative aspects. One can not with certainty argue for one "absolutely correct"/ "answer all" model. However, one can, based on the studies and empirical data exclude those that are non-performers. The studies carried out so far indicate that while the descriptive schools are more suitable for service industries, *it is the use of formal approach (design, planning, and positioning) to strategy formulation that is associated with superior organisational performance for manufacturing companies (* Rue and Fulmer 1973a and 1973b).

The Ansoff et al (1971) study, although focused exclusively on the merger and acquisition issues, demonstrated that planners out-performed the non-planners. Another study carried out by Krager and Malik (1975) over a period of ten years (machinery, electronic, and chemical industries) also showed that planners out-performed the non-planners. Yet another study by Rue and Fulmer (1973a ; 1973b) of service and manufacturing firms concluded that while non-planners performed better than planners in services, *it was planners that performed best in manufacturing companies.*

One should note that, for the most part, the studies have focused on the planners vs. non-planners, and manufacturing vs. service industries; without considering the environment within which these companies competed. This is despite the fact that the large part of strategy literature claim that the aim of *strategy is to coallign the organisation with its environment thereby improving its performance.*

A survey of strategy literature by Chaffee and Chaffee (1985) identified three distinct groups: Linear, Adaptive, and Interpretive; with each model of strategy defining its own focus.

In Linear model, the external environment was seen as uni-dimensional and composed mainly of competitors. Chaffee and Chaffee, based on Ansoff and Hayes (1976), argues that the emphasis moved away (in mid-1970s) from the linear model to adaptive model as the strategic problem came to be seen as much more complex, involving several dimensions of the managerial problem and the process, including technical, economical, informational, psychological, and political variables.

The adaptive model assumes that the environment and the organisation are dynamic and susceptible to change. Since it is difficult to change the environment, the adaptive model tries to change the organisation to coallign itself with the environment.

Although Chafee and Chaffee also list the Interpretative model, it is of no particular interest to us here, since it is rather symbolic and outside the strategy literature. What we are concerned with, however, is the environmental stability-instability, since as was mentioned above, the adaptive model (the current practice) tries to change the organisation to coallign itself with the environment.

According to Ansoff (1987), rules for developing the firm's relationship with its external environment should answer the following questions: *what* product technology the firm will develop, *where* and to *whom* the products are to be sold, and *how* will the firm gain advantage over competitors, is referred to as the business strategy.

Ansoff argues that it is the nature of change that will determine the main mode of strategy formulation. *If the change is familiar change, then an incremental approach is the suitable form. However if the change is unfamiliar, then a planning approach is called for.*

Ansoff's argument in 1987 was voiced much earlier by Miles and Snow (1978), though in different terms. Miles and Snow identified four strategic orientations. Two of them 'prospector' and 'defender' represent *strategies to meet the demands of respectively, dynamic and stable environments;* the former representing diversity, flexibility and innovation, while the latter embodying efficiency, convergence, and gradualism. In this respect, the theory's propositions resemble conventional contingency theory, Ansoff's theory included, in offering two principle routes to market success. The other two strategic types in the model are the 'analyser' and the 'retractor'. The analyser maintains a stable operational core, but also follows market innovations through a more flexible secondary capacity. The reactor is a more loosely defined category to cover all other cases of incoherent or inconsistent strategies.

The consistency principle in the theory relates to how the strategic orientation is represented internally in three areas of organisational operations. These are portrayed as three successive 'problems' that organisations have to solve: the entrepreneurial problem (market strategy), the engineering problem (technical/operating strategy), and the administrative problem (the management/planning system). Table 2-2 summarises the Miles and Snow formulation.

	Prospector	Defender	Analyser	Reactor
Entrepren-eurial	To find and develop new markets and products	To seal off segment of the market	New markets/ producta by competitor imitation, but maintaining a firm base of traditional products and customers	Weak or outmoded strategy
Engineering (Operational)	Flexible, people- centred technology	Emphasis on convergence and efficiency in production and throughput	Dual-core (stable and flexible technology)	Uncoordinate d and inconsistent relations between subsystems
Administrative (HRM)	Decentralised co-ordination, dominated by R&D and marketing.	Hierarchical control, dominated by production and financial functions	Matrix type systems for co-ordination and planning	

Table 2-21. Miles and Snow's (1978) strategic types

These problems are described as causally linked over time in an 'adaptive cycle'. Organisations have to figure out how to make entrepreneurial choices about the nature of their business: what is being produced and for whom (business strategy). They have to establish an operating strategy (manufacturing strategy), and they need to develop a management system that will control the process and schedule the decision-making.

Of the four 'generic' types, one can exclude the analyser and the reactor, since the former is a combination of the prospector and the defender, and the latter is a category that contains all other types that do not fit into the first three. This leave the two most important generic types: prospector and defender, implying that firms operating in unstable environment tend to be more flexible in their strategies, organisational orientation, and technologies employed following what Mintzberg refers to as emergent pattern, while firms operating in stable environment tend to be more cautious, sticking to the market they already have, adopting a more mechanistic organisational structure. The positions taken by Mintzberg, Ansoff , and Miles and Snow are presented in the table 2-3.

Nature of Change	**Familiar**	**Unfamiliar**
Strategy Formulation **Ansoff**	Emergent	Planning
Strategy Formation **Mintzberg**	Emergent	Emergent
Strategy Formulation **Miles & Snow**	Planning	Emergent

Table 2-3. A comparison of strategy formulation approaches.

As is evident from the table above, there are certainly some opposing views. This creates the following problems: which one is correct, and how is the environmental instability defined?

The second question is much easier to answer than the first. Dess and Beard (1984), using industry as the basis of their analysis have proposed three dimensions of organisational task environment, namely: *munificence* (capacity), *dynamism* (stability-instability, turbulence), and *complexity* (homogeneity-heterogeneity, concentration-dispersion). These dimensions, while conceptually similar to those proposed by Jurkovich (1974) and Mintzberg (1979), are almost identical to the important environmental conditions identified by Child (1972).

According to McArthur and Nystrom (1991), these three environmental dimensions significantly interact with strategies to affect performance. The degree of this interaction, however, is not equal among the three dimensions. Based on their analysis of data on 109 large firms in 35 manufacturing industries, they found that, although each of the three major environmental dimensions moderated the form of strategy-performance relationship, it was only ***dynamism (stability-instability)*** *that exhibited both a direct and moderator effect on performance.*

Now, considering the research done in the area of planners vs. Non-planners, and the environmental effects on firm performance, one could propose answer to the first question of, which one of the three propositions are correct with regards to small manufacturing firms, in form of the following hypotheses:

Ha1: *Small manufacturing firms operating in an unstable environment tend to follow the emergent approach to strategy formulation.*

Ha2: *Small manufacturing firms that operate in an stable environment tend to follow the planning approach to strategy formulation*

But if environment influences the business level strategy, then it should also, indirectly and through business level strategy, determine the manufacturing strategy of the firm. Before we consider this matter, let us examine the manufacturing strategy literature, and see how others see its role and place within the decision making hierarchy.

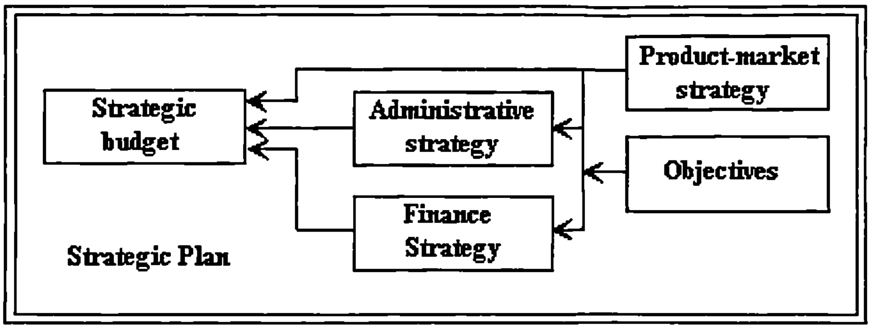
Manufacturing Strategy

Sections above described various models and approaches to the corporate/business strategy formulation or formation processes. Of the seven schools presented, three were proposed as being most suitable for the manufacturing firms. These were the planners, i.e. design school, the planning school, and the positioning school. One of the major advantages of these school were the use of *formal approach* to strategy formulation. The three schools address the functional strategy issues in different ways.

Starting with the design school, we see that the main emphasis is on the corporate/business strategies. Here the functional strategies are seen as separate entities that are to be addressed within their own context. Andrews argues that 'functional strategy can be identified in any consciously managed company - it is the combination of *purpose and policies* that guides the conduct of the function. *The goal of functional strategy is recognisable as natural to the function, like market share for marketing, efficiency for manufacturing, and return on investment for finance*' (Andrews, 197:xi).

One should note that the design school does not recognises the need for formulating functional strategies. For instance, in his book "The Concept of Corporate Strategy" Andrews mentions functional strategy only once, and not even in the main text but rather in the preface. Andrews and many others in the design school do not refer to functional strategy as strategy, but rather as policies, or functional policies. Policies are a set of guidelines that express the limit within which actions can be taken. Consequently the functional strategy in these models is the recipient of instruction, and not a contributing part to the strategy formulation process. This is best described by Hofer. He argues that: "because of the lesser importance of operating policies to strategy formulation, we will not discuss the nature of the determination of operating policies further in this book, except to note that all organisations must establish such policies in order to guide effectively their *day-to-day* decision making"(Hofer, 1978:23).

The planning school's approach to the functional strategy is similar to the design school, with the exception that it is heavily biased towards the marketing and finance. Ansoff's strategy formulation model (fig. 2-13 & fig. 2-21) ,although very detailed, clearly identifies the importance of the marketing, finance and administrative strategies, and their role in the overall strategy formulation process.



Source: Ansoff Igor, Corporate Strategy, published by Pelica Books, 1971. p:172-173

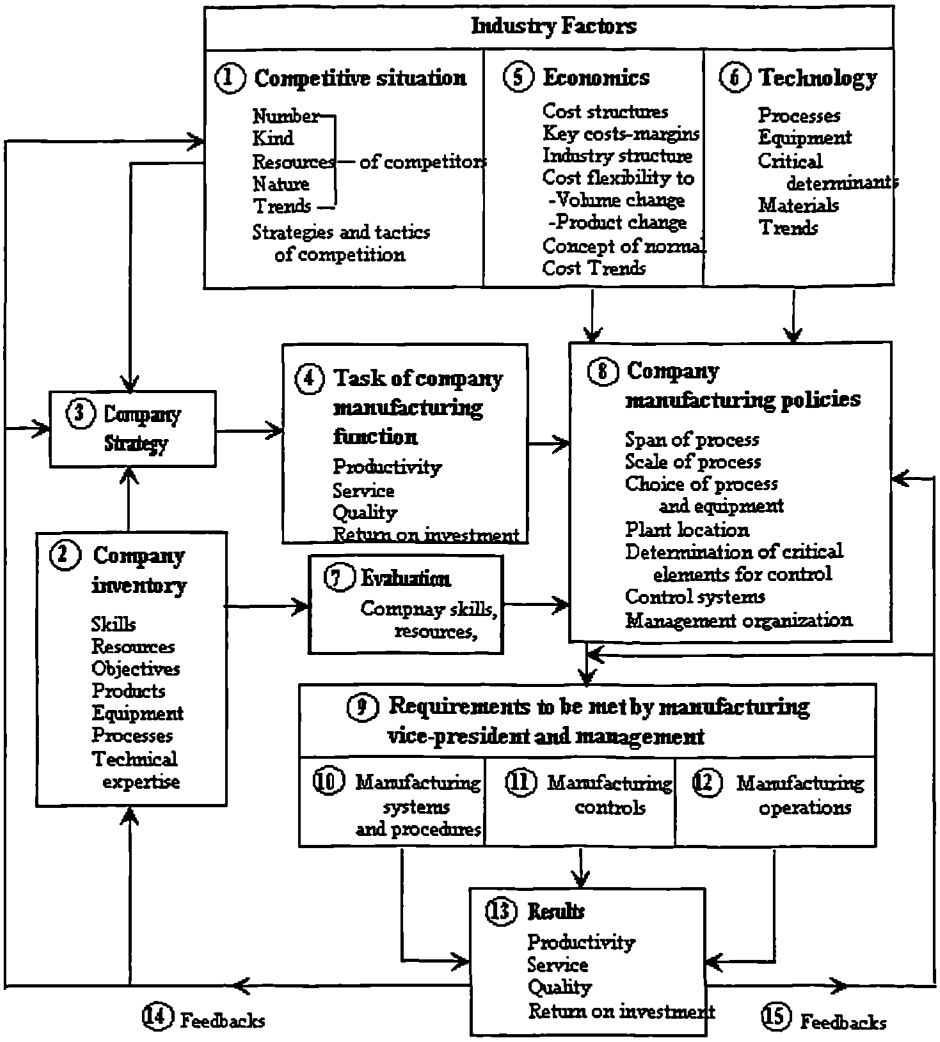
Figure 2-21. Ansoff's strategy formulation process: biased towards marketing and finance.

The positioning school is perhaps the best of the three, not in so much as addressing the functional strategies directly, but in defining the business strategies in such a way as to make them easily understandable by all functions with regard to their priorities and how they are to be set.

This lack of attention by business strategy scholars to functional strategies has created a gap in strategy literature that has been filled by functional specialists. The following is a brief review of some of the literature.

Wickham Skinner: 15 Step Model

In 1985, Skinner proposed a 15 step model (fig. 2-22) for manufacturing policy determination, which he argued, would end the isolation of the manufacturing and tie top management and manufacturing together. He wrote: ' It (the model) shows that effective manufacturing policy must stem from corporate strategy and that the process of determining this policy is the means by which top management can actually manage production'(Skinner, 1992:44).



Source: Wickham Skinner, Manufacturing: The Formidable Competitive Weapon, John Wiley & Sons, 1985. p: 65

Figure 2-22. Skinner's 15 step model.

The Skinner's model has the following components: (a) external analysis or industry analysis-steps 1, 5, and 6, (b) internal analysis-step 2, (c) formulation of company strategy-step 3, (d) determining the broad manufacturing policies- steps 7 and 8, and (e) implementation-steps 9 to 15. He argues that, not only his model is totally different from those that have been used before, but it can effectively solve the industry's problems.

> "What I am suggesting is an entirely different approach, one adapted far better to the current era of more products, shorter runs, vastly accelerated technological and product changes, and increased marketing competition. I am suggesting a kind of 'top-down' manufacturing. This approach starts with the company and its competitive strategy; its goal is to define manufacturing policy. Its presumption is that only when basic manufacturing policies are defined can the technical experts, industrial and manufacturing engineers, labour relations specialists, and computer experts have the necessary guidance to do their work.
>
> With its focus on corporate strategy and the manufacturing task, the top-down approach can give top management both its entree to manufacturing and the concepts it needs to take initiative and truly manage this function. When this is done, executives previously unfamiliar with manufacturing are likely to find it an exiting activity" (Skinner, 1992:67).

By 1992, it became apparent that his model had not been very successful, for he wrote: "But if we are realistic, certain facts dump some rain on our party and ought to dampen our high spirits. For example, since the original ideas are more than 25 years old, someone should be asking why have they taken so long to penetrate the academic world? And what is their influence in industry? What percentage of manufacturing actually employ these management approaches: 1%; 3%? I am afraid that the recent success we academics find so exiting is actually hollow in certain respects and more self-comforting than real"(Skinner, 1992:13).

Skinner (1992) lists three reasons for industries' lack of adoption of what he calls "manufacturing in the corporate strategy". They are listed as: (1) strong instinctive premises and mind-sets cloned into generations of managers, (2) the conventional functional, departmental organisation of business, and (3) missing conceptual links in the theory of manufacturing in corporate strategy (MCS).

He argues that the first two barriers should be accepted as a "given" that one can do nothing about (for the time being), while the third barrier is built by the academics and practitioners. He decomposes the third barrier into four missing links:

1. Leadership which understands and accepts the new concepts.

2. Problems in middle management.

3. Problems with the ideas of manufacturing strategy.

4. Problems of the functional organisation.

Skinner argues that, "many of the manufacturing and corporate leaders have been trained and rewarded, promoted and thoroughly conditioned all through their carriers to think of a factory and its management in terms of efficiency, productivity and costs" (Skinner, 1992).

The problem with middle management, Skinner argues, is the same as with the corporate leaders - influenced by measurements and performance appraisals. The third problem is a combination of trade-offs and 'a serious gap in the syllogism of moving from a specific manufacturing task to making the actual choices of manufacturing policies which form the structure'. Skinner argues that the fourth problem arises from the functional conflicts and internal barriers. 'The problem is that progress has been delayed and frustrated by the functional departments surrounding manufacturing and operations. Managers of the different functions such as engineering, marketing, finance, personnel and accounting are seldom rewarded for progress in manufacturing'.

Terry Hill: 5 Step Model

One of the major problem areas in manufacturing firms is the conflict between the marketing and manufacturing functions. Shapiro (1977) identified eight major specific areas of contention between the marketing and manufacturing functions. He listed capacity planning, production scheduling, delivery and distribution, quality assurance, product line, cost control, new product introduction, and adjunct services such as spare parts inventory support, installation, and repair, as specific conflicts that exists between marketing and manufacturing. These conflicts could be traced back to the problems of business planning.

To solve these problems he proposes a 5 step model.

1. Define corporate objectives.
2. Determine marketing strategies to meet these objectives.
3. Assess how different products qualify in their respective markets and win orders against competitors.
4. Establish the most appropriate process to manufacture these products (process choice).
5. Provide the manufacturing infrastructure to support production.

He argues, "these are, in one sense, classic steps in corporate planning. The problem is that most corporate planners treat the first [three steps (1985:40) or two steps (1994:27)] as interactive with 'feedback loops' and the last two as linear and deterministic. While each step has substance in its own right, each has an impact on the others-hence the involved nature of strategy formulation. This is further exacerbated by the inherent complexity of manufacturing and the general failure to take account of the essential interaction between marketing and manufacturing strategies. What is required, therefore, is an approach that recognises these features and yet provides an ordered and analytical way forward" (Hill, 1994:27).

Corporate Objectives	Marketing Strategy	How Do Products Qualify and Win Orders in the Marketplace?	Manufacturing Strategy	
			Process Choice	Infrastructure
Growth Survival Profit ROI Other financial measures	Product markets and segments Range Mix Volumes Standardization versus customization Level of innovation Leader versus follower alternatives	Price Conformance quality Delivery Speed Reliability Demand increases Color range Design Brand image Technical support After-sales support	Choice of alternative processes Trade-offs embodied in the process choice Role of inventory in the process configuration Make or buy Capacity Size Timing Location	Function support Manufacturing planning and control systems Quality assurance and control Manufacturing systems engineering Clerical procedures Compensation agreements Work structuring Organizational structure

Source: Terry Hill, Manufacturing Strategy: Text & Cases, 2nd Edition, Published by Richard D. Irwin Inc., 1994. p:28

Table 2-4. Terry Hill's 5 step model.

The major difference between the Skinner's and Hill's models, as was mentioned earlier, is the interaction between the functions. While Skinner looked at the manufacturing function in isolation, Hill tried to link marketing with manufacturing.

Hill's manufacturing formulation process starts with the corporate strategy. Like Skinner, the model is based on the classical (i.e., Design-planning) approach to strategy formulation. Hill argues, *the first step:* the corporate strategy, will reflect the nature of the economy, markets, opportunity and preferences of those involved (table 2-4) .

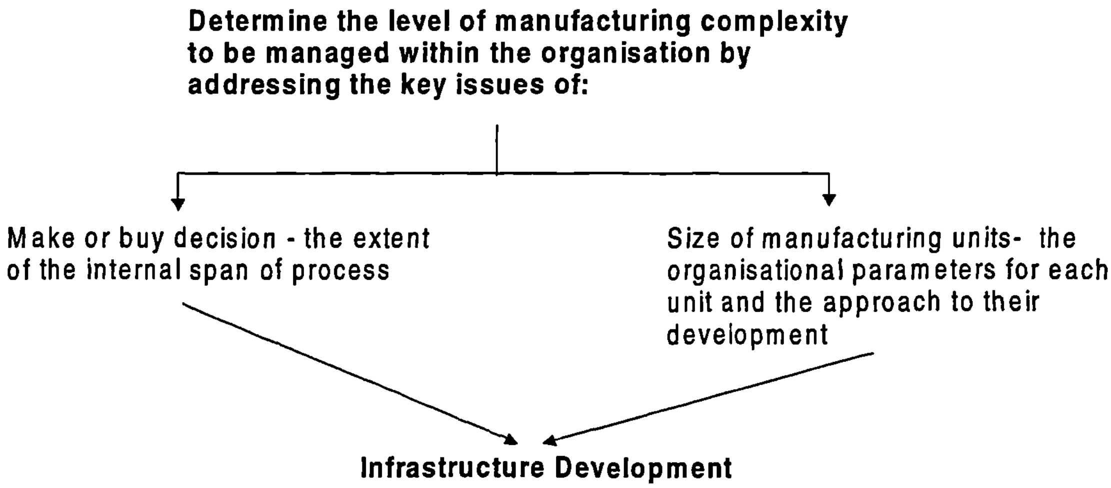
The second step involves the marketing strategy. This step is composed of three stages: (1) establishment of market planning and control units, (2) situational analysis of product markets, and (3) identifying the target markets and agreeing on objectives for each.

The third step is concerned with identification of the qualifying and order-wining criteria. Hill identifies these criteria as: *price, quality, delivery reliability, delivery speed, design, colour, and after-sales service.* Qualifying criteria means that a certain level should be maintained with regards to these criteria for the company to get into and stay in the market. But these alone will not win orders. They merely prevent a company from losing orders to its competitors. Hill argues that, once the qualifying criteria have been achieved, manufacturing then has to turn its attention to the ways in which orders are won and ideally to provide these better than anyone else.

Step three in effect is the link between the marketing strategy and the manufacturing function. Hill argues that:

> "Although the marketing debate is pre-eminent in corporate strategy procedures, the problem is that this is where the debate ends. As a function, marketing will have an important and essential view. But it is not the only view, and in no way should it be allowed to dominate corporate strategy resolution. Functional dominance, no matter of what origin is detrimental to today's business needs and must be avoided. An essential perspective of a firm's markets has to come from manufacturing. This perspective is established by determining those order-winners (and qualifiers) that manufacturing needs to provide. This step, therefore, is the essential link between corporate marketing proposals and commitments and the manufacturing processes and infrastructure necessary to support them" (Hill, 1994:30).

The fourth step, process choice, is made based on the qualifying and order-wining criteria. And finally, the fifth step determines the infrastructure development needed for the manufacturing function to implement a particular strategy.



Source: Hill, Terry (1994). 'Manufacturing Strategy: Texts and Cases', 2nd Ed., Irwin Inc. P. 189

Figure 2-23. Infrastructure development.

Robert H. Hayes & Steven C. Wheelwright: Approach

Hayes & Wheelwrights' approach to manufacturing strategy formulation and implementation is rather different from the Skinner's and Hill's. They follow the classical divisional forms of strategy formulation processes. They make a clear distinction between corporate strategy, (SBU) business strategy, and functional strategy.

According to Hayes & Wheelwright, corporate strategy is to address two issues: what type of businesses the corporation should participate in and the acquisition and deployment of resources. The business-level strategy specifies: (1) the scope of that particular business in a way that links the business strategy to corporate strategy and provides supports for the corporate strategy; and (2) the basis on which that business unit will achieve and maintain a competitive advantage. The functional strategy supports the business strategy through a specific and consistent pattern of decisions, based on the competitive advantage being sought by the business strategy. They argue that, "the primary function of a manufacturing strategy is to guide the business in putting together the set of manufacturing capabilities that will enable it to pursue its chosen competitive strategy over long term" (Hayes, 1984).

One of the main problems with formulating and implementing functional strategies, they argue, has been the disregard for the differences that exist between horizontal and vertical activities. Vertical activities are those activities that relate a single function to the business-level strategy, while horizontal activities are those that cut across multiple functions at fairly low levels. This problem was partially addressed by Terry Hill, when he proposed a horizontal link between the marketing and manufacturing functions.

Hayes & Wheelwright argue that manufacturing strategy is composed of the collective pattern of decisions. These decisions fall into two groups: structural and tactical (table 2-5).

Table 2-5. Manufacturing strategy decision categories.

1. Capacity - amount, timing, specialisation	
2. Technology - size, location, specialisation	**STRUCTURAL**
3. Technology - equipment, automation, linkage	**DECISIONS**
4. Vertical Integration - direction, extent, balance	
5. Workforce - skill level, wage policies, employment security	**TACTICAL**
6. Quality - defect prevention, monitoring, intervention	**DECISIONS**
7. Production planning / materials control - sourcing policies, centralisation, decision rules	
8. Organisation - structure, control / reward systems, role of staff groups.	

Source: Hayes, R. H., and Wheelwright, S. C., Restoring our Competitive Edge: Competing Through Manufacturing, published by John Wiley & Sons Inc., 1984. P: 31

The structural decisions have long-term impact on the business and are difficult to reverse since a substantial capital is required to alter or extend them. They argue that ' this aspect (substantial capital investment) has led many organisations to rely on their capital budgeting process as the primary mechanism for reviewing and screening these structural manufacturing decisions' (Hayes & Wheelwright, 1984:31). The tactical decisions are called tactical because they encompass different ongoing decisions and are linked with specific visible capital investments.

Hayes & Wheelwright state that manufacturing can play four major roles in a firm's competitive strategy. These are: internally neutral, externally neutral, internally supportive, and externally supportive (table 2-6).

Table 2-6. Stages in the evolution of manufacturing's strategic role.

Stage 1** - Minimise Manufacturing's Negative Potential: **"Internally Neutral"
• External experts are used in making decisions about strategic manufacturing issues.
• Internal management control systems are the primary means for monitoring manufacturing performance.
• Manufacturing is kept flexible and reactive.
Stage 2** - Achieve (Neutrality) with Competitors: **"Externally Neutral"
• "Industry Practice" is followed
• The planning horizon for manufacturing investment decisions is extended to incorporate a single business cycle.
• Capital investment is regarded as the primary means for catching up to competition or achieving a competitive edge.
Stage 3** - Provide Credible Support to the Business Strategy: **"Internally Supportive"
• Manufacturing investments are screened for consistency with the business strategy.
• Changes in business strategy are automatically translated into manufacturing implications.
• Longer-term manufacturing developments and trends are systematically addressed.
Stage 4** - Pursue a Manufacturing-Based Competitive Advantage: **"Externally Supportive"
• Efforts are made to anticipate the potential of new manufacturing practices and technologies.
• Manufacturing is centrally involved in major marketing and engineering decisions.
• Long-range programs are pursued in order to acquire capabilities in advance of needs.

Source: Hayes, R. H., and Wheelwright, S. C., Restoring our Competitive Edge: Competing Through Manufacturing, published by John Wiley & Sons Inc., 1984. P: 39

Companies in stage one regard manufacturing as neutral at best and seek to minimise any negative impact that it might have. The manufacturing function is not expected to make any significant positive contribution. Companies in stage two also see a neutral role for the manufacturing function. The difference, however, is that while the stage one was internally neutral, the stage two stage two is externally neutral. This means that the companies in the stage two seek competitive neutrality (parity with major competitors) in the manufacturing dimension. This parity is achieved through following 'industry practice' regarding the workforce, equipment, and capacity additions; the operating planning horizon is extended to include an entire business cycle; and capital investments are used for gaining comparative advantage.

According to Hayes & Wheelwright, most authors including Skinner, imply the third role or internally supportive role for manufacturing. They argue that the process in stage three is: (a) making sure that manufacturing decisions are consistent with business strategy, (2) translate the business strategy into a form that are meaningful to manufacturing, and (3) actively seek to identify long-term developments and trends that may have a significant impact on the success of the manufacturing organisation.

The problem with stage three role is that it only encourages firms to think in terms of regaining competitive parity. Companies that are only aiming for parity are likely to regress to stage two.

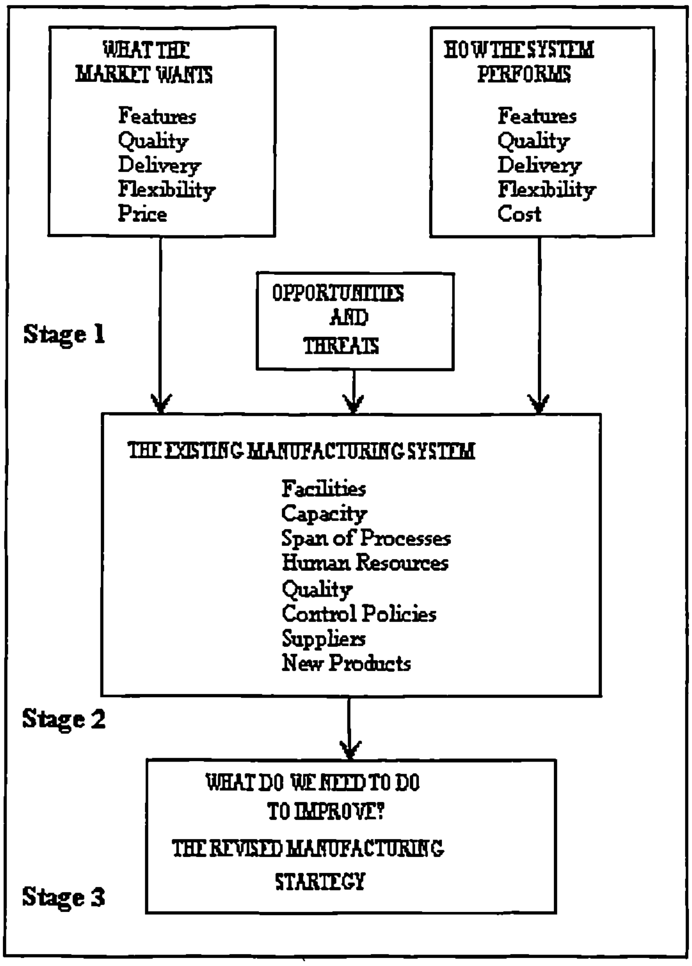
Manufacturing in stage four is externally supportive. Companies in stage four actively seek new manufacturing technologies and practices. Cross functional co-ordination and collaboration make it possible for manufacturing to extract full potential from manufacturing-based opportunities. Companies in this stage also develop long-range business plans in which manufacturing capabilities are expected to play a major role in securing the company's objectives.

W. Platts & M. J. Gregory: Strategy Formulation by Audit

Platts & Gregory's strategy formulation process by audit differs from the previous processes and approaches in that: (a) it is descriptive rather than prescriptive (discussed in chapter three), and (b) it is a stand-alone approach (figure 2-24).

Strategy formulation by audit is basically a set of guidelines and seven worksheets that the company uses to identify manufacturing objectives, measure current manufacturing performance, determine the effects of current manufacturing practices, and identify where changes are required.

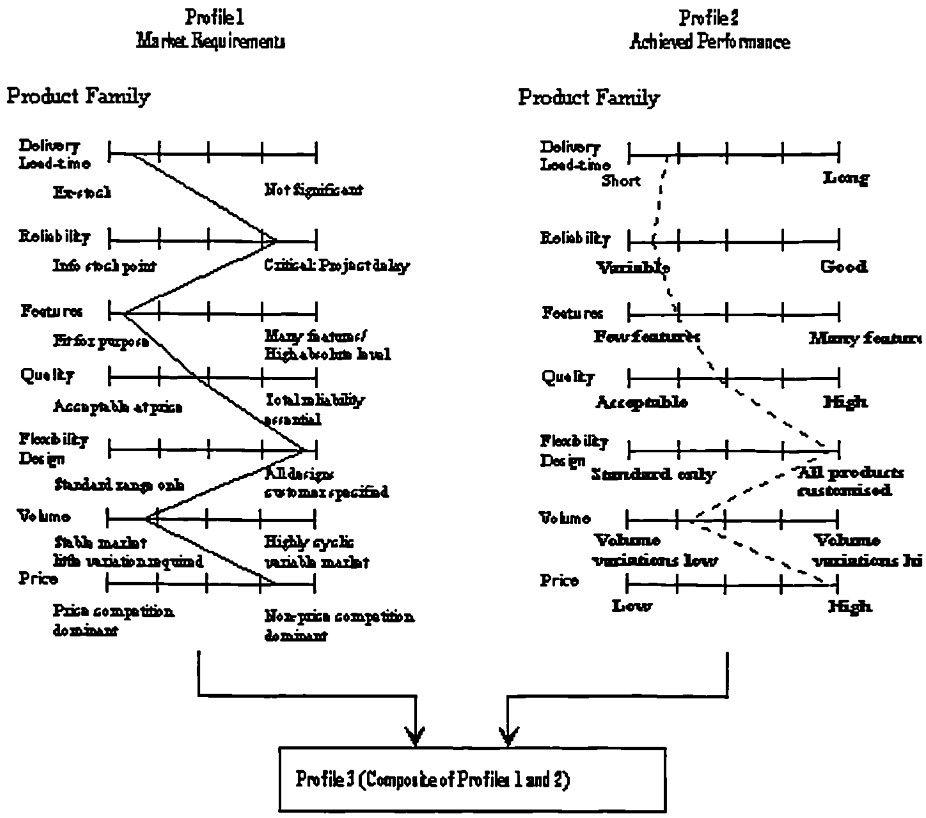
Figure 2-24. A framework for manufacturing audit.



Source: K. W. Platts and M. J. Gregory, 'A manufacturing audit approach to strategy formulation', in Manufacturing Strategy: Process and Con Edited by Christopher A. Voss, Chapman & Hall, 1992. p: 33

The audit is conducted in three stages. Stage one is concerned with determining what the market wants and the position of the company within that market. This stage is composed of five worksheets. When using worksheet one, the user plots the company's position and the market requirements on two separate, but identical scales. They are then merged to visually demonstrate the gap that exists between the market requirements and the company's achieved performance (fig. 2-25).

Figure 2-25. Worksheet 1



Source:K.W. Platts and M.J. Gregory, Competitive Manufacturing: A practical approach to the develoment of a manufacturing strategy, published by the department of Enterprise (dti), IFS Publications. p: 9

Worksheet two records the basic information for each product.

The Company

Worksheet two helps the company in identifying the most important products. By analysing the contribution, the market share, the sales, and the product life-cycle, the company can identify those products that need special attention. Having identified the important product families, the user can use worksheet three to determine the competitive criteria for each product family (tables 2-7, and 2-8).

Table 2-7. Worksheet 2

product family	Sales as % of total sales	Contribution % of total	Market share ranking/ Number of competitors	Growth/ Vulnerability	Market Growth/ Stages of life cycle
Product A					
Product B					

Source: K.W. Platts and M.J. Gregory, Competitive Manufacturing: A practical approach to the development of a manufacturing strategy, published by the department of Enterprise (dti), IFS Publications. P: 19

Table 2-8. Worksheet 3

Competitive Criteria

Product family	Features	Quality	Delivery		Flexibility		Price
			Lead-time	Reliability	Design	Volume	
Product A							
Product B							

Source: K.W. Platts and M.J. Gregory, Competitive Manufacturing: A practical approach to the development of a manufacturing strategy, published by the department of Enterprise (dti), IFS Publications. P: 25

While worksheet three focuses on the competitive criteria, worksheet four assesses the company's current manufacturing performance (table 2-9).

Table 2-9. Worksheet 4.

Current manufacturing performance

Product family	Features	Quality	Delivery		Flexibility		Cost
			Lead-time	Reliability	Design	Volume	
Product A							
Product B							

-2	0	+2
Performance gives strong disadvantages vs. competitors		Performance gives strong advantage vs. competitors

Source: K.W. Platts and M.J. Gregory, Competitive Manufacturing: A practical approach to the development of a manufacturing strategy, published by the department of Enterprise (dti), IFS Publications. P: 25

The final step in stage one of the audit is listing of the perceived opportunities and threats for each product family. This is done in worksheet five (table 2-10).

Table 2-10. Worksheet 5.

Assessing external opportunities and threats

Product family	External opportunities	External Threats
Product A		
Product B		

Source: K.W. Platts and M.J. Gregory, Competitive Manufacturing: A practical approach to the development of a manufacturing strategy, published by the department of Enterprise (dti), IFS Publications. P: 42

Platts and Gregory argue that the first five worksheets construct a detailed picture of the company's products/markets. The next stage is composed of one worksheet that focuses on nine manufacturing policy areas. These are: facilities, capacity, span of process, processes, human resources, quality, control policies, suppliers, and new product introduction.

Table 2-11. Worksheet 6.

Assessing the current manufacturing strategy

Policy area	Current practice	Quality	Delivery		Flexibility		Cost
			Lead-time	Reliability	Design	Volume	
Facilities Capacity Span of process Processes Human resources Quality Control policies Suppliers New products							

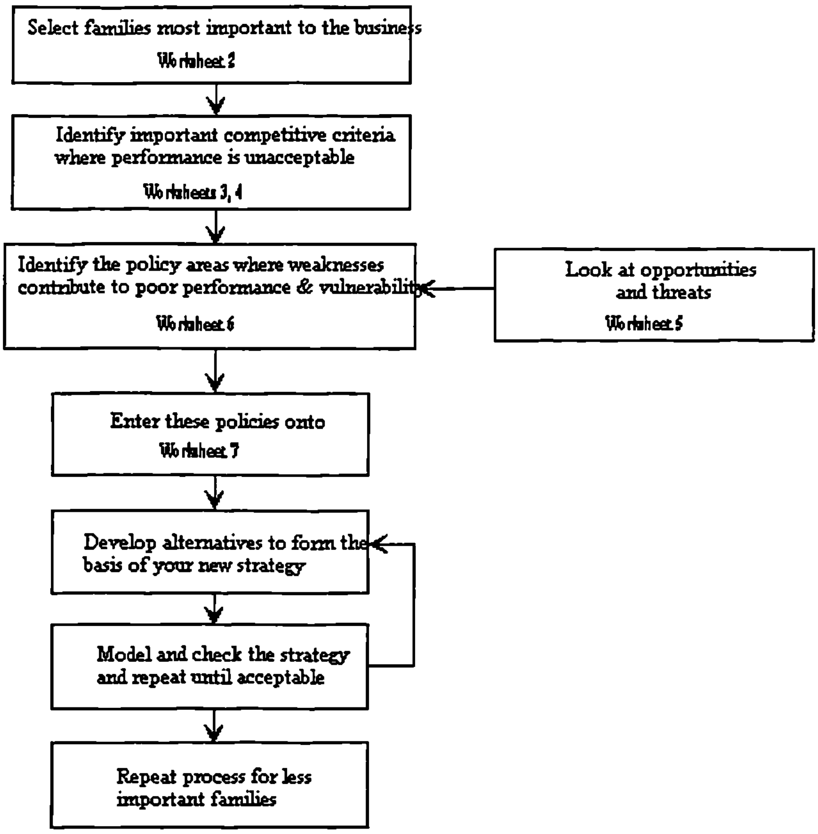
Source: K.W. Platts and M.J. Gregory, Competitive Manufacturing: A practical approach to the development of a manufacturing strategy, published by the department of Enterprise (dti), IFS Publications. P: 42

The purpose of the worksheet six, they argue, is to identify the policy areas where weaknesses contribute to poor performance or vulnerability. The policies and weaknesses observed through stages one and two are then used as input for stage three.

In stage three the user is expected to identify possible actions/strategic choices. They argue that:

> "When you've identified the reasons for your policy weaknesses, you're well on the way to developing your new strategy. After all, problem definition is often the hardest part of problem solving. What you have got to do now is to generate some ideas for actions and strategic choices from which to develop the new strategy" (Platts et al, 1991:60).

Figure 2-26. Developing the new strategy.



Source: K.W. Platts and M.J. Gregory, Competitive Manufacturing: A practical approach to the development o: a manufacturing strategy, published by the department of Enterprise (dti), IFS Publications. P: 61

Manufacturing Strategy Assessment

In this chapter four models and approaches were presented, which this author considers them to be representative of the majority of the models in use in both academia and industry. There are of course a number of other models which are either based on one of these models or a combination of them. However, the actual number of models are very small as compared to those found in the corporate/business strategy literature. Of those who have contributed to this subject, one can name: Skinner, Hill, Hayes & Wheelwright, Platts & Gregory, Buffa (1984), Anderson, Cleveland & Schroader (1989), Swamidass & Newell (1987), Adam & Swamidass (1989), Fine & Hax (1985), Samson (1991), Voss (1986), and Miller (1988).

Skinner, Hill, Platt, Hayes, and others have argued that linking major, long-term decisions in manufacturing - such as the degree of vertical integration, capacity, and facility focus - to business strategy could transform manufacturing from a millstone to a competitive weapon. For firms used to manufacturing as a headache, the notion of 'competing through manufacturing' has been radical and refreshing.

A close review of the manufacturing strategy literature reveals that the authors seldom, if ever, consider the environmental factors. For some, like Skinner, the manufacturing strategy formulation process is so complex that it can easily be mistaken for Andrews' model (figure 2-27).

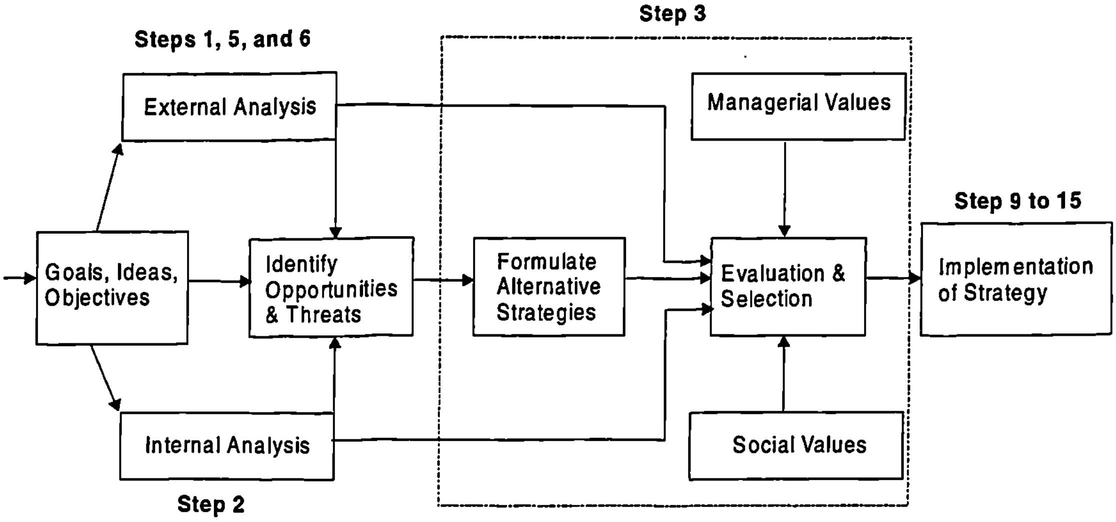


Figure 2-27. Comparison of Andrew's and Skinner's Models.

Others, such as Hill, have tried to address all problems by providing a link with one function, marketing. But marketing and manufacturing functions by themselves do not make a business successful.

We have already seen that the environment plays an important role in business strategy development, and since manufacturing strategy is to be derived from business level strategy, it is possible that environment also directly influences the manufacturing strategy; in which case manufacturing strategy becomes irrelevant since the actual decision regarding the manufacturing method has already been taken at the business level strategic decisions.

This is not as far-fetched as it sounds. If we consider the main components of the manufacturing strategy as presented by the prominent authors in this field, we can see that the central issue always is the type of manufacturing technology employed. For instance, Hayes & Wheelwright call the choice of the production technology 'strategic' and other choices tactical. Skinner also focuses on technology, arguing that:

> "With its rich array of potential contributions it is surprising that production or operations

technology is so little used in strategic management." (Skinner, 1985:182)

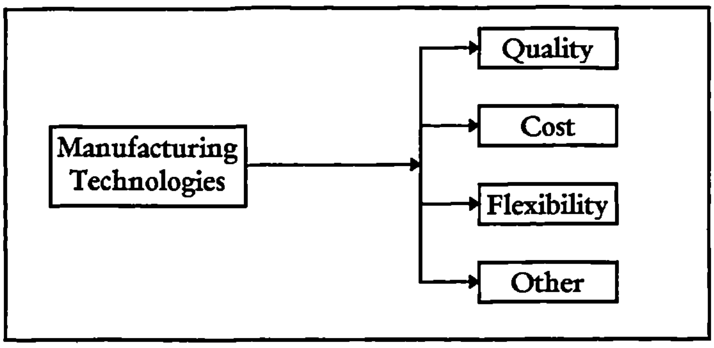


Figure 2-28. Manufacturing technologies.

Some may argue that reducing the manufacturing strategy to a single decision of manufacturing technologies employed would be totally wrong; and they would be correct in saying so, as long as one looks at the manufacturing strategy and business strategy separately and in isolation from one-another.

If one looks at the manufacturing strategy formulation processes presented in this chapter, one can see that many of the steps presented in the manufacturing strategy formulation models are a repetition of business level strategy processes presented previously.

For example, Skinner's model contains many business level strategy formulation components such as internal and external analysis, order-wining criteria, etc.

Hill focuses exclusively on process choice and infrastructure. Similarly Hayes & Wheelwrights's attention is fixed on the structural (i.e., technology) and tactical (i.e., organisational) decisions.

They all focus and address the same thing but in their own way. If one filter all the extras, one is left with **process choice** (technologies) and **policies** regulating their use.

Process choice is one of those decisions that will have a long-run effect on efficiency and production as well as the flexibility, cost, and quality of the goods produced. The payoff from effective process selection prior to initial production is much more fruitful than the same effort expended later trying to improve the wrong process.

The production processes can generally be categorised into three [process, repetitive, and product focus (Heizner, 1993)], four categories [process, product, hybrid, and fixed position (Krajewski, 1993)] or five categories [project, jobbing or one-off, batch, line, and continuous (Hill, 1994)].

Considering the effect of environment on business strategy and the effect of business strategy on manufacturing strategy (i.e., process choice and policies), it is possible for one to argue that environment along with business strategy determine the process choice.

We have argued that manufacturing strategy's core is the process choice. It was also argued and that this choice is directly related to the business level strategy and hence the type of environment that the firm operates in. Based on these arguments, one can propose the following hypotheses (also presented in Figure 2-29):

Hb1: *Small manufacturing firms operating in the stable environment tend to use routine (standardised) manufacturing technologies.*

Hb2: *Small manufacturing firms operating in unstable environments tend to use non-routine (flexible) manufacturing technologies.*

UNSTABLE $\longrightarrow$ STABLE

PROJECT	JOBBING	SMALL BATCH	LARGE BATCH	LINE	CONTINUOUS

NON-ROUTINE $\longrightarrow$ ROUTINE

Figure 2-29. Routine vs. non-routine manufacturing technologies

There is also the matter of strategy-technology connection. Considering our hypotheses that environment influences strategy and production technology choice, we can deduce that there will be a strong correlation between the strategy types and production technologies employed as well. This hypotheses can be formulated as:

Hb3: *Small manufacturing firms that have adopted the emergent approach to strategy formulation tend to use non-routine manufacturing technologies*

Hb4: *Small manufacturing firms that have adopted the planning approach to strategy formulation tend to use routine manufacturing technologies.*

Strategy and Organisational Structure

The theory of the link between strategy and structure was first introduced by Alfred D. Chandler (1962; 1965; 1969) in the 1960s in a series of articles. Although his articles were mainly on the subject of "decentralisation over time as the result of growth"; it, nevertheless, was an important start for establishing the link between strategy and structure of the organisations. Since then there have been many articles published on the subject, with some (Ahroni, Bower, Ackerman, Carter, Allison, Galbraith, Hall) claiming that to a large degree the structure influences and constrains strategy selection in most firms while others including Chandler argue that the structure follows the strategy (Channon, 1973; Newman, 1971).

Chandler, Channon, Woodward, and others argue that there are a number of variables such as nature, and diversity of the products and markets, that directly or indirectly (e.g. technology employed, nature and variations in the environment, size) link the strategy to the structure. It is argued that the structure can and will change according to the strategic requirements.

The former on the other hand argue that, "whereas men may build the structure of an organisation, in practice it is this very structure which later constrains the strategic choices". Hall and Saias (1980), in their seminal article "Strategy Follows Structure", argue that:

> "Structure is more than just planned network. It is also what happens in the network, or the process that takes place within it and between the constituent parts. The result of this process is the organisational culture, which is reflected in the ideas, beliefs, and values of its participant members."

They further argue that,

> "strategists accept this when they take structural phenomena explicitly into account in their internal diagnosis. With the inside/out approach they admit that strategic choices are directly determined by the condition of the structure, and with the outside/in approach that they are influenced by the structural elements of the diagnosis.
>
> Strategic perceptions are conditioned by structure. Once an organisation begins to operate, the nature of its structure limits its perception -- both of itself and its environment. An organisation is designed for action, not for reflection." (Hall and Saias, 1980)

From the discussion above, it becomes clear that although an organisation's strategy does and can require changes in the organisation's structure, it is the structure that to a large extent limits and influences the organisation's strategy. Mintzberg (1989) argues that "*organisations, like species, survive only if they evolve in ways suitable to particular niches in the environment*". He also points out that "*organisations may be drawn toward a particular configuration in order to achieve consistency in their internal characteristics, to create synergy in their working processes, and to establish a fit with their external contexts. Instead of trying to do everything well, the effective organisation may be able to adapt itself by concentrating on a specific theme around which it can configure its attribute*".

The dominant view on the strategy-organisation subject is usually the one proposed by Chandler. The literature acknowledges the importance of matching organisational design to the type of strategy which the organisation is pursuing. It also points out that this is a two way process: organisational configuration also influences preferences for particular types of strategy.

So, different strategies will often require different forms of organisational design. The organisation following a low-price strategy will need to find means of ensuring a cost-efficient operation with an emphasis on cost control; whereas the organisation following differentiation strategy may need higher degrees of creativity and, probably, a rapid response to problems and opportunities. The likelihood is that the low-price strategy will require a more mechanistic system of control, with clear job responsibilities, frequent and detailed reports on organisational efficiency and cost, and a clear delineation of responsibility for budgets and expenditure. The structure following a differentiation strategy, on the other hand, might need to be more organic in nature, with looser controls, a greater encouragement of informality and creativity within a more decentralised structure, and a good deal of co-ordination between its various functions.

Considering the previous hypotheses regarding the types of strategies adopted by firms operating in stable and unstable environments, and the strategy-structure connection, one can propose the following hypotheses:

Hc1: *Small manufacturing firms operating in unstable environment tend to have a more organic*[2] *organisational structure.*

Hc2: *Small manufacturing firms operating in stable environment tend to have a more mechanistic organisational structure.*

There is also the matter of the strategy-organisation connection. Considering our hypotheses that environment influences strategy and organisational structure, one can deduce that there will be a strong correlation between the strategy types and organisational structure types as well. This hypotheses can be formulated as:

---

2 Structures that rely on any form of standardisation for co-ordination may be defined as mechanistic, those that do not as organic.(Mintzberg, 1989)

Hc3: *Small manufacturing firms that use the emergent approach to strategy formulation tend to also have a more organic form of organisational structure,*

Hc4: *Small manufacturing firms that use the planning approach to strategy formulation tend to have a more mechanistic organisational structure..*

Operational Processes and Technology

The nature of the tasks undertaken by the operating core of an organisation has an important influence on the various aspects of organisational design. It is known that there are links between the type of production process and the approach to management (Woodward, 1965).

Mass production systems require standardisation of processes (machine bureaucracy) which result in greater direction and control by senior managers. There is also a tendency towards centralisation. Firms with less standardised manufacturing process are more likely to have more developed and informal decision-making processes than those firms with a more standardised manufacturing processes.

Again considering the effects of environment on strategy and strategy-technology, and strategy-organisational structure connections, one can propose the following hypotheses:

Hd1: *Small manufacturing firms operating in unstable environments with organic organisational structures tend to use a less standardised (i.e., non-routine) manufacturing processes than firms operating stable environments*

Hd2: *Small manufacturing firms operating in stable environments with mechanistic organisational structures tend to use a more standardised (i.e., non-routine) manufacturing processes, than firms operating in unstable environments.*

Conclusion

In this chapter several aspects of management was discussed, namely, the effects of environmental volatility on strategy, technology and organisational structure. The interactions between strategy, technology and organisational structure, were also examined.

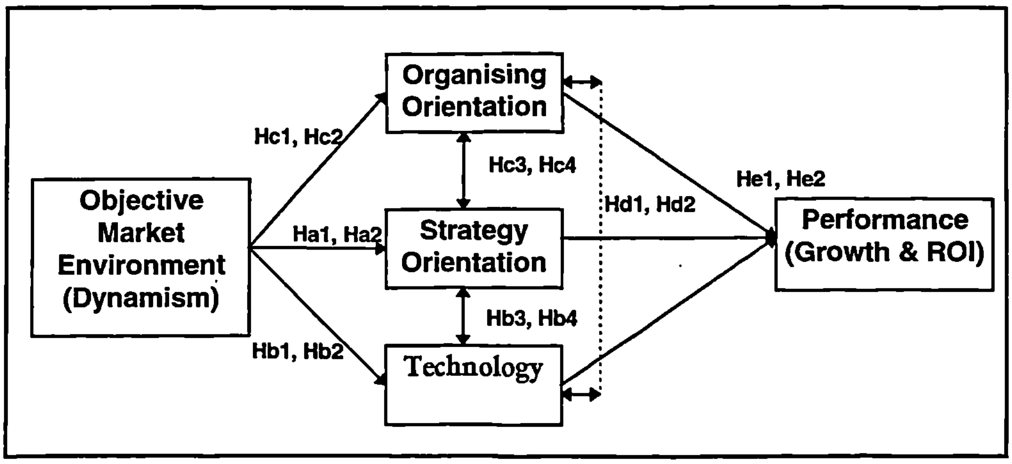
Considering that a firm's performance is directly connected to these dimensions, it would be logical to propose the following hypotheses:

He1:*In unstable environments, emergent strategies, organic structure, and non-routine manufacturing processes are associated with better performance.*

He2:*In stable environments, planned strategies, mechanistic structure, and routine manufacturing processes are associated with better performance..*

The combination of all hypotheses proposed so far can be presented as the following model (figure 2-30).

Figure 2-30. Model to be investigated.



Available literature on small firms in general and small manufacturing firms in particular, have neglected the effect of environment on the firm's strategy, organisational structure, and manufacturing processes. It is hoped that this model will not only redress this neglect, but will also simplify the approach to strategy formulation processes.

As far as manufacturing strategy is concerned, it is argued that for small manufacturing firms, it is only the technology choice and the associated policies regulating its use, that are the main issues.

Finally, all the hypotheses proposed in this chapter are collected and presented below as a complete reference to the above presented model.

Ha1: *Small manufacturing firms operating in unstable environments tend to follow the emergent approach to strategy formulation.*

Ha2:*Small manufacturing firms that operate in stable environments tend to follow the planning approach to strategy formulation.*

Hb1:Small manufacturing firms operating in stable environments tend to use routine (standardised) manufacturing technologies.

Hb2:*Small manufacturing firms operating in unstable environments tend to use non-routine (flexible) manufacturing technologies.*

Hb3:Small manufacturing firms that have adopted the emergent approach to strategy formulation tend to use non-routine manufacturing technologies.

Hb4:*Small manufacturing firms that have adopted the planning approach to strategy formulation tend to use routine manufacturing technologies.*

Hc1:Small Manufacturing firms operating in unstable environment tend to have a more organic organisational structure.

Hc2: *Small Manufacturing firms operating in stable environment tend to have a more mechanistic organisational structure.*

Hc3: Small manufacturing firms that have adopted the emergent approach to strategy formulation tend to also have a more organic form of organisational structure,

Hc4: *Small manufacturing firms that have adopted the planning approach to strategy formulation tend to also have a more mechanistic form of organisational structure.*

Hd1: *Small manufacturing firms operating in unstable environment with organic organisational structures tend to use a less standardised (i.e., non-routine) manufacturing process than firms operating stable environments.*

Hd2: *Small manufacturing firms operating in stable environment with mechanistic organisational structures tend to use a more standardised (i.e., non-routine) manufacturing process, than firms operating in unstable environments.*

He1: *In unstable environments, emergent strategies, organic structure, and non-routine manufacturing process are associated with better performance.*

He2: *In stable environments, planned strategies, mechanistic structure, and routine manufacturing process are associated with better performance..*

In the chapter 'result and findings', the validity of each hypothesis will be closely examined. However prior to these examinations we shall investigate the available methodologies, and select a method that is suitable for evaluation of the proposed hypotheses. These are done in the next chapter: *Some Considerations of Method.*

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Chapter 3

SOME CONSIDERATIONS OF METHOD

Before one can discuss available methods, one has to determine what a method is and what constitute a scientific method. Method as described in Webster's Unabridged Dictionary, is a procedure of doing anything - a system. A method according to Johannessen & Olaisen (1995) (based on Hempel et al. 1962) and Braithwaite (1953)) can be called *scientific* if:

1. it is inter-subjective, that is, it provides nearly the same result for all competent users;
2. it can be controlled by alternative methods; and
3. there exist well-established propositions or theories that can be of help in explaining the results.

The current scientific methodologies in use today are the offspring of two main approaches to scientific research: rationalism and empiricism.

Rationalism vs. Empiricism

The term 'Rationalism' represents the idea that certain knowledge (i.e., true knowledge) can only be obtained through the use of reason. This idea can be traced to Socrates (469-399 BC). There is nothing left of Socrates' writings and what we know of him primarily comes from his disciples Plato (429-347 BC) and Xenophon.

Although as a young man Socrates was interested in speculations about the physical world, he later turned to the investigation of ethics and morality; as Cicero put it, he brought philosophy down from the heavens. He was committed to search for truth and for the knowledge about human affairs that he believed could be discovered by reason.

Plato, the disciple who became greater than his master, was the first systematic philosopher and a writer of genius, leaving behind some twenty-six philosophical discussions. Plato accepted Socrates' doctrine of the identity of virtue and knowledge and made it plain that knowledge was: episteme, science, a body of true and unchanging wisdom open to only a few philosophers, whose training, character, and intellect allowed them to see reality.

Of course, time has had its effect on rationalist ideas. Rationalists now emphasise the power of logic and mathematics in deciding the truth of competing theoretical arguments. However, Socrates' main argument, namely the use of reason still holds its central place. Rationalists today assert that real truths about the world can not be discerned by observation alone, but by reason (Ryan et al. 1992).

Empiricists have a strong commitment to what one may label 'objective' research. By this, one would see research as a process of constructing precise and economical theories validated by well designed tests using large and, as far as possible, unbiased samples. Replicability and critical evaluation of method and results are the hall mark of this type of research.

> "Traditionally, empiricists accepted that:
>
> 1. Certainty of belief in what we know can only be approached through perceived experience.
> 2. Ultimately all knowledge is derived from experience: 'reason' as far as we understand it is learnt, as Locke said: 'We are all born with a blank sheet upon which sense impressions are written.'

> 3. In the realm of discourse statements are either true or false because of the way the world is or because of some formal properties of the language we use.
>
> The influence of empiricism has been extremely pervasive and led to one of the most significant philosophical movements of modern times: positivism." (Ryan, et al. 1992)

Positivism and Anti Positivism

Positivism is also known as *logical positivism* or *logical empiricism.* Although logical positivism has for some times been declared passé by a number of social scientists, it nevertheless still constitutes the "Received View" (it has been quite influential in the recent development of the disciplines of finance, economics and accounting).

Antipositivism encompasses a number of different approaches from popperianism (Popper 1959), which to a causal observer appears to have many features in common with logical empiricism, all the way to hermeneutics in its Frankfueter School (Howard 1982).

> "The borderline between positivistic and hermeneutical research is sometimes perceived to be one of quantitative methods versus qualitative methods. This is a serious misunderstanding. Qualitative methods are used in positivistic research practice when the purpose of the study so requires, usually for exploratory studies of so-called ill-structured problems. Many qualitative methods which are frequently used in management research can not be employed for strict hermeneutical research - the use depends on what branch of hermeneutics is involved - and again, for some branches of hermeneutics, some

quantitative thinking can be utilised. As a matter of fact, there is no clear borderline between quantitative and qualitative methods. Modern methods of multivariate analysis have meant a revolution in the way data can be handled and used to study intricate relationships (see for example Jackson, 1983; Fornell, 1984). Causal modelling, the use of LISREL, and related techniques, have opened up new vistas in the striving for construction of holistic theories (see Bagozzi, 1984). This kind of thinking can be applied also to case studies which are so popular in management research." (Varneryd, 1985)

Research Design & Data Collection Techniques

There are two ways to classify research, through research design, or through the examination of the technique used in the study to collect data.

Research Design

Research can be viewed as a scientific and disciplined inquiry. The plan and structure of the investigation used to obtain evidence to answer research questions is referred to as research design.

The design describes the procedures for conducting the study, including when, from whom, and under what conditions the data will be obtained. In other words, design indicates how the research is set up, what happens to the subjects and what methods of data collection are used. There are four major types of research design. These are experimental, non-experimental, ex post facto, and qualitative.

In an experimental design, the researcher manipulates what the subject will experience. In other words, the researcher has some control over what will happen to the subjects by systematically imposing or withholding specified condition.

In a non-experimental design there is no manipulation of conditions. The researcher makes observations or obtains measures from subjects to describe something that has occurred or examines relationships between things without suggesting direct cause-and-effect relationships.

An ex post facto design is used to explore possible causal relationships among variables that cannot be manipulated by the researcher. The researcher compares two or more samples that are comparable except for a specified factor. The possible causes are studied after they have occurred. Instead of manipulating what *will* happen to subjects, the researcher focuses on what *has happened* differently for comparable groups of subjects, then explores if the subjects in each group are different in some way.

In a qualitative design the specific procedures are identified during the research rather than specified ahead of time. Each step is dependent on prior information. Since qualitative design investigate behaviour as it occurs naturally in non-contrived situations, there is no manipulation of conditions or experience. In this sense qualitative designs are non-experimental.

Deductive vs. Inductive

When one considers the relationship between one's research question and the research design, it leads one to ask this question:

Does one want to test out an idea drawn from existing theory and examine its ultimate impact on practice (theory-driven) or does one want to look at what is going on and try to make sense of that by teasing out themes and patterns and even in a small way begin to develop or question existing explanations (data-driven) ?

In research terms the theory-driven approach is called the deductive approach, while the data-driven approach is referred to as the inductive approach. (Talbot 1994)

Data Collection Techniques: Qualitative vs. Quantitative

The terms quantitative and qualitative refer to research methods of how data are collected and analysed, and the type of generalisations derived from the data.

Qualitative research presents facts in a narration with words. While there are different qualitative techniques that can be used to provide verbal descriptions, the goal of each is to capture the richness and complexity of behaviour that occurs in natural settings from the participant's perspective. Once collected, the data are analysed inductively to generate findings

While qualitative research uses narration with words for presenting the facts, quantitative research presents statistical results represented with numbers. The approach emphasises a priori category to collect data in the form of numbers. The goal is to collect data to provide statistical descriptions, relationships, and explanations. Quantitative techniques are used with experimental, descriptive, and correlational designs as ways to summarise a large number of observations and to indicate numerically the amount of error in collecting and reporting the data.

Brent et al (1986) summarise the differences between the quantitative and qualitative approaches (the following text is the author's translation of their text).

Quantitative

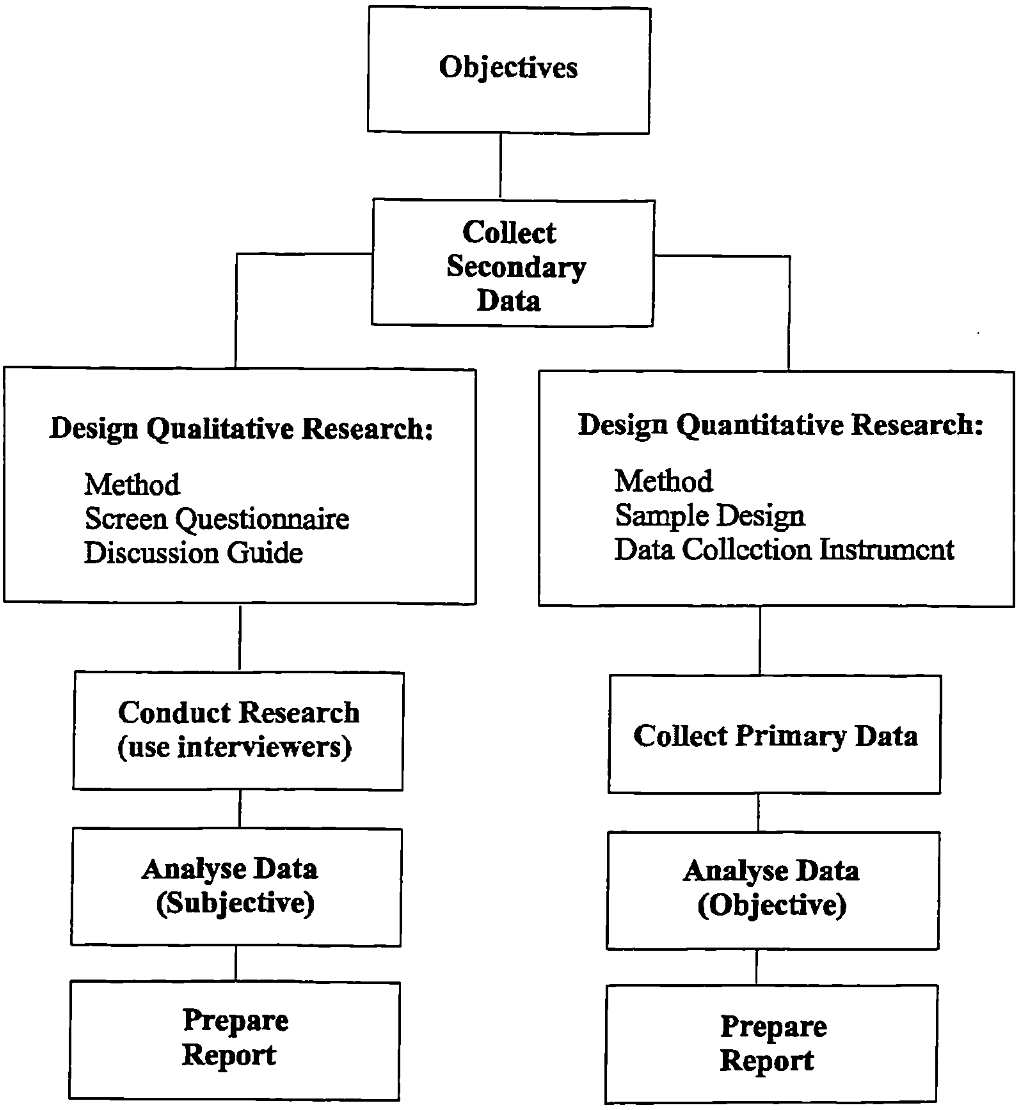
- Precision: researcher strives for a maximum and good reflection of the quantitative variations.
- Get information on many investigation units: goes in the width rather than depth.
- Systematic & structured observations: e.g. use of questionnaire with discrete and fixed answer alternatives.

- Interest for the similar, the average, the representative.
- Detachment: data gathering happens under circumstances that is different from the reality that one is investigating.
- Interested in separate variables.
- Spectator or manipulator: the researcher sees phenomena from outside and strives to be a neutral observer. Variation in certain variables can eventually be brought forth by manipulation.
- I-it relationship between the researcher and research subjects.

Qualitative

- Sensitivity: researcher strives for the best possible representation of the qualitative variations.
- A lot of information about a few research variables: goes in depth.
- More unsystematic & unstructured observations: e.g., intensive interviews, interview guide without fixed questions and answer alternatives.
- Interest for that which is distinctive, unique, or eventually deviate.
- Closeness: data collection takes place under circumstances that is close to the real situation that one wishes to investigate.
- Interest for connectedness, structures.
- production and understanding.
- Participant or prosecutor: researcher sees the phenomenon from inside. He admits that the results are influenced by his being there. He can also participate as one of the actors.
- I-you relationship between the researcher and the research subject.

Figure 3-1. Qualitative vs. quantitative approaches to research.



Selecting a Method

This study is mainly concerned with comparison of manufacturing firms in stable and unstable environments. It is hoped that this comparison will determine whether environmental dynamism has any influence in determining a firm's approach to strategy formulation; and if so, does it directly or indirectly affect financial performance.

From the previous discussion on foundations of available methodologies, several schools of thoughts were examined (rationalism, empiricism, anti positivism, positivism, qualitative, and quantitative). It was seen that empiricism was the foundation of the quantitative method, while rationalism gave birth to the qualitative method. From their foundation one can draw a clear distinction between the two methods (qualitative & quantitative). And despite Varneryd's (1985) misgivings about this kind of classification one can not ignore the fact that these two methods, although clearly distinct and meant for specific situation and problems, are also complementary.

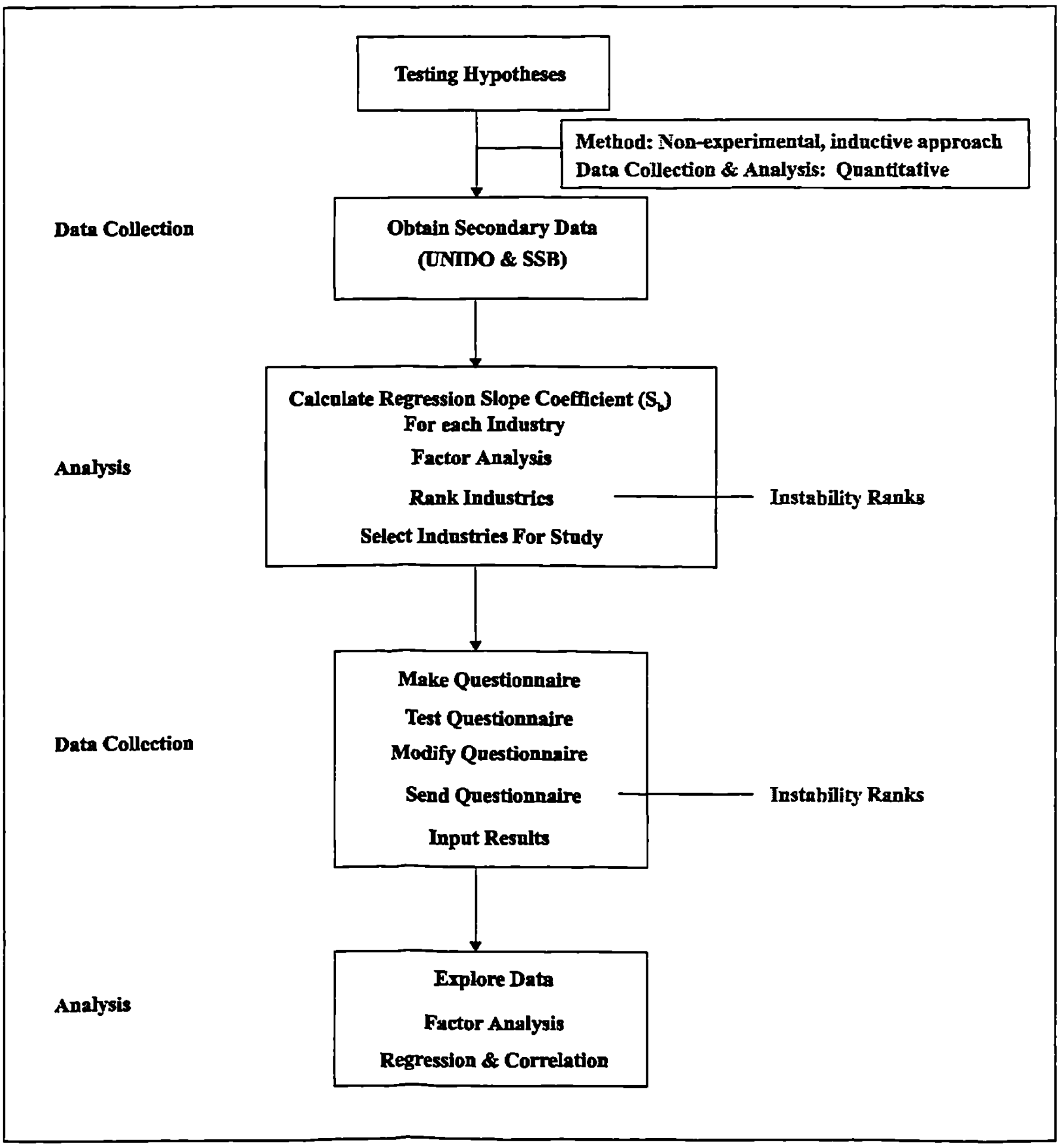
This research clearly deals with comparison, and manipulation of numbers. The term stability itself is relative, and relativity by nature demands comparison. A comparison here, if it is to be of any use for later research and applicability within its context, has to be objective. This author also relies heavily on secondary data for determining an objective measurement of environmental stability/instability. In comparing different aspects of organisations' strategies/technologies used and performance, analysis of descriptive information is needed. All these requirements point clearly to the quantitative approach to data collection-analysis and reporting.

Shiffman and Kanuk (1994) argue that whenever descriptive information is needed, one should consider using a quantitative approach to quantitative data collection.

> "The design of the research study is based on the purpose of the study: if descriptive information is needed, then a quantitative study is likely to be undertaken; if the purpose is to get new ideas then a qualitative study may be in order." (Schiffman and Kanuk 1994)

This author has chosen an inductive, non-experimental approach along with quantitative techniques for data collection for designing this research.

Figure 3-2. Selected model for this research.



Data Collection

There are two types of data collection: primary and secondary.

Primary Data

By primary data, it is meant, data collected directly by the researcher from the subjects. This can be laboratory measurements, field observations, questionnaires, and interviews.

Secondary Data

By secondary data is meant data collected by others that are published in some form which is fairly readily accessible. Thus, by these terms, company accounts that are published by law are secondary data.

Part 1: Instability Indices

The Collins English Dictionary defines the word environment as: "external conditions or surroundings", or in Ecology as "the external surroundings in which plant or animal lives, which tend to influence its development and behaviour." (Collins 1986)

Similarly, the business environment can be defined as the *external* factors that tend to influence the development and behaviour of an organisation.

The external environment and its influence on the development and behaviour of a business is well documented. Strategy literature in particular, has focused on the behaviour of firms and their subsequent development in a given environment. A survey of strategy literature by Chaffee and Chaffee (1985) identifies three distinct groups: Linear, Adaptive, and Interpretive, where each model of strategy defines its own focus.

In the **linear model**, the external environment was seen as uni-dimensional, composed mainly of competitors. Chaffee and Chaffee, based on Ansoff and Hayes (1976), argue that in mid-1970s, the emphasis moved away from the linear model to adaptive model as the strategic problem came to be seen as much more complex, involving several dimensions of the managerial problem and the process, including technical, economical, informational, psychological, and political variables.

The **adaptive model** assumes that the environment and the organisation are dynamic and susceptible to change. Since it is difficult to change the environment, the adaptive model tries to change the organisation to coallign itself with the environment.

Although Chaffee and Chaffee also list the Interpretative model, it is of no particular interest here, since it is rather symbolic and outside the strategy literature. What one is concerned with, however, is the environmental stability-instability, since as was mentioned above, the adaptive model (the current practice) tries to change the organisation to coallign itself with the environment.

According to Ansoff (1987), the rules for developing the firm's relationship with its external environment, *what* product technology the firm will develop, *where* and to *whom* the products are to be sold, and *how* will the firm gain advantage over competitors, is referred to as the business strategy.

Ansoff argues that it is the nature of change (stability-instability) that will determine the main mode of strategy formulation. If the change is familiar change, then an incremental approach (strategy formation) is the suitable form. However, if the change is unfamiliar, then a planning approach (strategy formulation) is called for.

Defining Stability-Instability

As the number of possible environmental factors can be large, and some having substantially more influence on a given business than others, it is necessary to identify those factors that: a) have the most influence on the business performance, and b) can be readily measured. The problem of identifying these factors has been addressed by a number of researchers.

Industry as a useful aggregate of organisations has been subjected to various critical reviews (Nightingale 1978; Scherer 1980), and has been generally supported as a suitable aggregate for studying competition among organisations.

Dess and Beard (1984), using industry as the basis of their analysis, have proposed three dimensions of organisational task environment, namely: *munificence* (capacity), *dynamism* (stability-instability, turbulence), and *complexity* (homogeneity-heterogeneity, concentration-dispersion) These dimensions, while conceptually similar to those proposed by Jurkovich (1974) and Mintzberg (1979), are almost identical to the important environmental conditions identified by John Child (1972).

According to McArthur and Nystrom (1991) these three environmental dimensions significantly interact with strategies to affect performance. The degree of this interaction, however, is not equal among the three dimensions. Based on their analysis of data on 109 large firms in 35 manufacturing industries, they found that although each of the three major environmental dimensions moderated the form of strategy-performance relationship, *it was only dynamism that exhibited both a direct and moderator effect on performance*.

McArthur and Nystrom propose the following variables for measuring of *Dynamism*: Sales, Price-Cost Margin, Employment, and Value added by manufacture.

> "Environmental dynamism included measures of instability over 10 years concerning 4 industry variables: sales, price-cost margin, employment, and value added by manufacture. For instance, instability of total sales refers

to the value of shipments expressed as the standard deviation of the regression slope divided by the mean value for the period 1968-1977. That is environmental dynamism refers to variability in growth rates over 10 years." (McArthur and Nystrom 1991)

Measuring Market Instability

McArthur and Nystrom based their calculations on the statistical model provided by Dess and Beard who operationalised the Aldrich's six environmental dimensions. Dess and Beard looked at the extent of dispersion about the trend line - controlled for absolute industry size. They did this by regressing each variable over time, and dividing the standard error of the regression slope coefficient by the mean value ($S_b/\bar{Y}$).

This approach they argued is superior to other approaches such as the one used by Snyder and Glueck's (1982). They criticised Snyder and Glueck's (1982) approach (coefficient of variation $[(\sigma/\mu)*100]$) as not being suitable, since this measure does not distinguish between the ordering of data points, and measures only their dispersion or variation from the mean. It is therefore unable to detect variation from a trend line.

Sample and Population

One of the first steps in designing quantitative research is to choose the subjects. The subjects are the individuals or, in this case industries who participate in the study; it is from them that data are collected. As a group, the subjects are usually referred to as 'the sample'. The sample consists of individual subjects selected from a larger group, called the population. In this study, the sample and the population are nearly the same. The population for this research consists of all manufacturing industries in Norway. The source of data is archival.

> " Archival data offer important advantages for some research questions. The use of archive is often economical, for the researcher is spared the time and cost involved in data collection and recording. This advantage may be offset, though, by the effort involved in finding the relevant information as well as the search for materials that would allow us to rule out alternative interpretations. Another advantage is that much information is collected by governments and other organisations as part of their everyday operations, and it is often collected repeatedly. This helps to avoid the difficulties associated with people's awareness of being subjects in research (reactivity) and often makes possible the analysis of trends over time. Finally, archival data are particularly well suited to the investigation of large-scale or widespread social or natural phenomena that are not amenable to study in other ways."
> (Judd, et al. 1991)

The data for this population was obtained from the United Nations Industrial Organisation (UNIDO). There were 79 manufacturing industries sorted according to their 4-digit ISIC code. However, because of insufficient data in 5 industries, the number was reduced to 72. The data covered a 10 year period from 1982 to 1992. All monetary units were based on the local currency.

Secondary Data

Source of Secondary Data	United Nations Industrial Development Organization (UNIDO)
Type of Companies	Data on all Manufacturing Firms
From - To	!982 - 1992
Variables	Input Value Operating Results Auxiliary Materials etc., Used in Direct Input Goods Sold in the Same Condition as Purchased Sales Value Goods Produced at Own Account Value Added at Market Prices Cost of Goods and Services Consumed Gross Value of Production Compensation of Employees Persons Engaged Number of Establishments
Code Used	International Standard Industrial Classification (ISIC)
Number of Digits in ISIC Code	4

Figure 3-3. Source and description of secondary data.

Manufacturing Industries Considered

ISIC	Industry Name
3111	Slaughtering, preparing and preserving meat.
3112	Manufacture of dairy products
3113	Canning & preserving of fruits & vegetables
3114	Canning & preserving and processing of fish
3115	Manufacture of oils and fat
3116	Manufacture of grain mill products
3117	Manufacture of bakery products
3119	Manufacture of cocoa, choclate and suger confectionery
3121	Manufacture of food products not elswhere classified
3122	Manufacture of prepared animal feeds
3133	Manufacture of malt liquors
3134	Manufacture of soft drinks and carbonated water
3140	Manufacture of tobacco products
3211	Spinning, weaving & finishing of textiles
3212	Manufacture of fabrics, except narrow fabrics
3213	Manufacture of narrow fabrics & elastic fabrics
3214	Manufacture of carpets & rugs
3215	Manufacture of cordage, ropes and nets
3219	Manufacture of textiles not elswhere classified
3221	Manufacture of outer garments of textiles and plastics
3229	Manufacture of wearing apparel not elswhere classified
3231	Manufacture of leather
3232	Fur dressing and dyeing
3233	Manufacture of luggage, bags, etc.
3240	Manufacture of footware
3311	Manufacture of lumber and other building materials of
3312	Manufacture of wooden containers
3319	Manufacture of wood products not elsewhere classified
3321	Manufacture of furniture
3322	Manufacture of fixtures

ISIC	Manufacturing Industries Considered Industry Name
3411	Manufacture of pulp, paper and paperboard
3412	Manufacture of containers & boxes of paper and
3419	Manufacture of paper & paperboard articles not
3421	Printing & bookbinding
3422	Publishing
3511	Manufacture of basic industrial chemicals, except
3521	Manufacture of paints, varnishes and lacquers
3522	Manufacture of drugs and medicines
3523	Manufacture of soap and cleaning preparations, perfumes, cosmetics & other toilet preperations
3529	Manufacture of chemical products not elsewhere
3530	Petroleum refining
3540	Manufacture of products of petroleum and coal
3550	Manufacture & repair of rubber products
3560	Manufacture of plastic products
3610	Manufacture of ceramics
3620	Manufacture of glass & glass products
3691	Manufacture of structural clay products
3692	Manufacture of cement & lime
3699	Manufacture of stoneware & earthenware not elsewhere
3710	Manufacture of iron & steel
3720	Manufacture of non-ferrous metals
3811	Manufacture of cutlery, hand tools & general hardware
3812	Manufacture of furniture & fixtures of metal
3813	Manufacture of structural metal products
3819	Manufacture of metal products not elsewhere classified
3822	Manufacture of agricultural machinery
3823	Manufacture of metal & wood working machinery
3824	Manufacture of industrial machinery not elsewhere
3825	Manufacture of office machinery

ISIC	Manufacturing Industries Considered Industry Name
3831	Manufacture of electric motors & equipment for electricity
3832	Manufacture of radio, television and communication
3833	Manufacture of electrical household appliances
3839	Manufacture of electrical apparatus & equipment not
3841	Building of ships & boats
3842	Manufacture & repair of railway and tramway equipment
3843	Manufacture of motor vehicles
3845	Manufacture of aircraft
3849	Manufacture of other transport equipment
3851	Manufacture of profasional & scientific instruments not
3852	Manufacture of photographic & optical goods
3901	Manufacture of jewellery & related goods
3902	Manufacture of musical instruments
3903	Manufacture of sporting & athletic goods
3909	Manufacturing industries not elsewhere classified

Statistical Procedures in Analysis of Environmental Dynamism & Munificence.

When ranking industries according to their stability/instability factor, the following formula was used: standard error of regression slope divided by mean value ($S_b/\bar{Y}$) . The variables used included: *Sales, Price-Cost Margin, Employment, and Value added by manufacture.*

Reliability analysis:

Before using the above mentioned variables, a reliability analysis was carried-out to determine the consistency of measurements.

Reliability refers to the consistency of measurement, the extent to which the results are similar over different forms of the same instrument or occasions of data collection.

> "One of the most commonly used reliability coefficient is Cronbach's alpha. Alpha (or α) is based on the "internal consistency" of a test. That is, it is based on the average correlation of items within a test; if the items are standardised to a standard deviation of 1; or on the average covariance among items on a scale, if the items were not standardised. Since α can be interpreted as a correlation coefficient, it ranges in value from 0 to 1." (Norousiss 1994)

When calculating α , it is possible to increase its value by removing items from the test and conduct the test again. This is referred to as "Alpha if Item Deleted".

Calculating Environmental Dynamism (Stability/Instability)

The following formulae were provided by Dess and Beard (1984) to calculate the environmental stability/instability.

- Instability in Total Sales: Value of shipments; standard error of regression slope coefficient (S_b) divided by mean value ($\bar{Y}$) .
- Instability in Price-Cost Margin: Value added by manufacture minus total wages; same procedure as above.
- Instability in Total Employment: Total employment; same procedure as above.
- Instability in Value-added: Value added by manufacture; same procedure as above.

Standard Error of Regression Slope Coefficient (S_b)

Regression in statistics is a term used to describe the process of estimating the relationship between two variables. The relationship is estimated by fitting a straight line through the historical data.

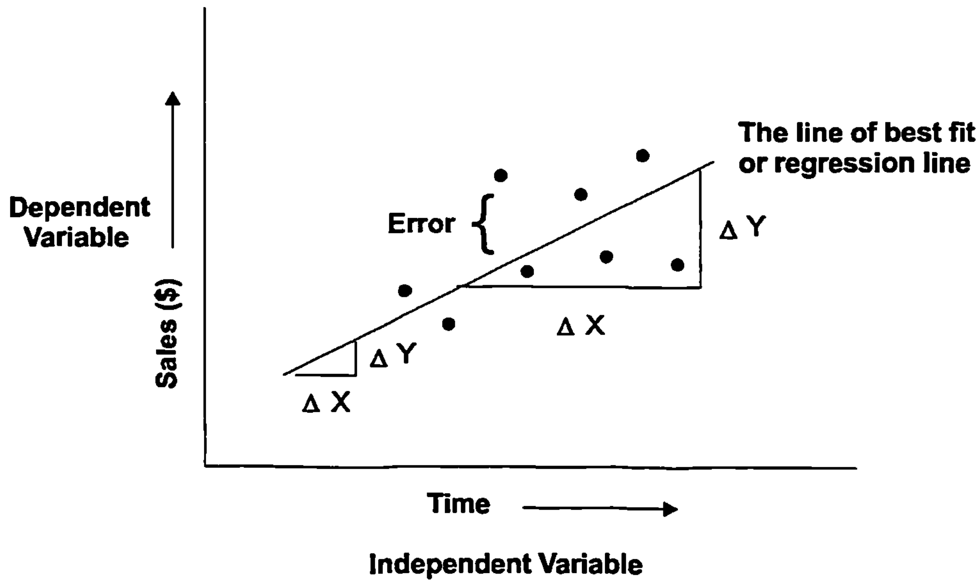


Figure 3-4. Magnitudes of errors and the regression line.

The best-fitting line could be eyeballed. However, it can be found more precisely with an equation which yields a line that *minimises the sum of the* *square of the errors* between the estimated points on the line and the actual dependent variable. The further a point is from the trend line, the more serious is the error. To penalise the large errors, the errors are squared. This method of fitting a trend line is often called the *least-square* method.

The regression line has a *slope 'b'.* By definition, the slope of a line is the change in height Y, when we move to the right by one unit in the X direction. The coefficients in a linear regression model have a very simple but important interpretation.

When **Ý = a + bX,** (equation for straight line) then **'a'** is the intercept and the coefficient **'b'** is the slope: $\frac{\Delta Y}{\Delta X} = \mathbf{b}$. This equation is of course an *estimated regression line.* The *true regression line* may be different. The true regression line is presented by **Y =** α **+** β**X,** where α is the intercept and β is the true regression line slope. The question that arises from the comparison of true regression line and the estimated regression line is: how much error exist between the two lines? More specifically, how is the slope estimate 'b' distributed around its target β . Statisticians have devised a formula to answer this question. This formula is

Standard Error of $b = \frac{\sigma}{\sqrt{\Sigma x^2}}$

Here σ represents the standard deviation of **'Y'** observation about the population line, and each small **'x'** represents the deviation of **'X'** from the mean $\bar{X}$.

The above formula is altered to reduce the standard error of **'b'** . The following formula is the result of this modification.

S_b = Standard Error of $b = \frac{\sigma}{\sqrt{\Sigma n}} \bullet \frac{1}{S_x}$ (Here S represents standard deviation)

Using the formula **(S_b/Ý)** one can calculate a coefficient for each of the four variables. The result of these calculations are presented in Appendix A.

Calculating Environmental Munificence (Capacity)

Although the author was primarily concerned with environmental dynamism, nevertheless, munificence coefficients were also calculated. This was done primarily because the data was available and the results could be useful for further comparison later in this research.

The following formulae were provided by Dess and Beard (1984) to calculate the environmental munificence.

- **Growth in Total Sales :** Value of shipments: Regression slope coefficient β divided by mean value **Ý** .
- **Growth in Price-cost Margin**: Value added by manufacture minus total wages; same measurement as procedure above.
- **Growth in Total Employment:** Total employment; same measurement procedure as above.
- **Growth in the Number of Manufacturing Establishments:** Number of manufacturing establishments, average annual percentage change.

Formula used for growth in total sales, growth in price-cost margin, and growth in total employment: $\mathbf{Y = \alpha + \beta X}$ where β= **$(Y- \alpha)/X$** (α and β are estimated from sample information)

The results are presented in Appendix A.

Primary Data Collection Instrument: The Questionnaire

The questionnaire that was used to collect the primary data, was based on the work of Konogo, et al. (1985). Their study was concerned with the comparison of the management approaches of major US and Japanese firms. Their questionnaire was deemed appropriate for this study and with some modification was adapted for use.

The original questionnaire was composed of 14 main sections, covering over 200 variables, with nominal and ordinal scaling systems. The original questionnaire, as was mentioned previously, was intended to be administered to very large multi-national corporations. This clearly made some variables and sections inappropriate for use in this research. Of the 14 sections only 9 sections were used, and of these 9 sections some were modified and others were simplified and shortened to make the questionnaire suitable for small firms.

The draft questionnaire was presented to two supervisors for review. A number of modifications were suggested and carried out. The final draft was then sent to two small manufacturing firms for testing. The comments were recorded and the questionnaire was revised accordingly. The final product was then sent to selected companies.

The questionnaire was divided into four main sections: A,B, C, and D, with sections C and D being divided into subsections with focus on different aspects of strategy and organisation.

Section A

A1: Market homogeneity/Heterogeneity

A2-A3: Geographical spread of the company's activities

A4-A5-A6-A7-A8: Perceived environmental stability/instability

A9-A10-A11: Growth

Section B

Section B was only concerned with the type of technology used by the companies, and contained 5 questions covering everything from custom technology (job-shop) to process technologies.

B1: Job-shop

B2: Small Batch

B3: Large Batch

B4: Line

B5: Process

Section C

Section C was divided into 5 subsections: C1, C2, C3, C4, and C5. This section was primarily concerned with the goals/objectives and strategic orientation of the firm.

C1: Strategic emphasis

C2: Formal strategies, if any

C3: Objectives

C4: Power of departments in decision making

C5: Power of departments in acquiring new technologies or developing new products.

Section D

This section was divided into two subsections: D1 and D2. D1 measured the degree of standardisation of the firm, while subsection D2 was concerned with general attitude of the managers and their approach to planning.

D1-1 to D1-28: Standardisation

D2-1 to D2-18: Communication and style of management of the managers

Sample & Population

To define what constitutes a small business in Norway is not an easy task. There are two official and many unofficial definitions. The first official definition of a small firm, as defined in 1977 by the Norwegian Parliament (Stortinget), is that of a business employing 19 persons or less (Opstad 1986). The second official definition of small business is provided by the Norwegian centre for statistics. It defines a small business establishment as having an annual average of less than five employees, with the rest classified as large. (Statistisksentralbyrå 1994)

The unofficial definitions are many. Some Norwegian authors such as Spilling (1980) use the definition set by the parliament and refer to small businesses as those with less than 20 employees, while others define a small firm as a business enterprise that has 5 to 30/40 employees (Opstad 1986), or from 2 to 30 employees (Schelderup 1980).

As can be seen, there is some confusion on what actually constitutes a small business in Norway. The problem is especially difficult, since the definition of a small business differs according to the type of activity that the business is engaged in. The businesses are generally divided into three categories: service, trading, and manufacturing. Paul Burns and Jim Dewhurst highlighted the problem in their article on small firms in the U.K:

> "Even the Bolton Committee, back in 1971, realised that it could not adequately be defined in terms of employment, turnover, output or capital. They drew on a definition that recognised:
>
> 1. A small firm has a relatively small market share and cannot affect the market.

> 2. The firm is managed in a personalised way by its owner or its part-owner.
>
> 3. It is independent and does not form part of a larger company.
>
> However, they did recognise that turnover was a useful size criteria for retailing, wholesaling and motor traders, employment was better for manufacturing, construction, mining and querying. It finally recommended eight different definitions for varying industry groups. These ranged from under *200 employees for manufacturing* to under £50000 turnover for retailing, and under six vehicles for road transport....
>
> Clearly there is no easy answer to what constitute a small firm. Not only are there conceptual problems, but there are also practical problems of data availability which makes conclusion about characteristics of small, vis-à-vis large businesses difficult to make." (Burns and Dewhurst 1986)

It is indeed difficult to define clearly what constitutes a small business in general, and a small manufacturing firm in particular. However, regardless of the confusion, a point of reference for the formal comparative analysis is needed. *For the purpose of this study, This author shall "select" a definition of a small manufacturing firm as one which employs from 5 to 49 people.* The companies with employees 50-99 and 100 + are respectively designated as medium and large firms, while the companies with less than 5 employees are classified as micro firms.

Table 3-2. Manufacturing establishment classification

	Micro	**Small**	Medium	Large
	1-4	**5-49**	50-99	100 +

Number of Employees	Manufacturing Establishments	
-4	4568	
5 - 9	2369	Population = 5346
10 - 19	1608	
20 - 49	1369	
50 - 99	539	
100 - 199	306	
200+	198	

The following statistical data presented here is from 1994, and is collected from the NewBiz statistical data base. This database contains the financial records of all Norwegian firms registered in Norway. However, since in 1993 Norway changed its industrial standard codes from **ISIC** to **SIC 94** (Norwegian Standard Industrial Classification) which is based on **NACE** (European Industrial classification), all ISIC codes had to be converted to NACE. The NewBiz database using the NACE code allowed the expansion of codes from 4 digits to 5 digits. The following table presents the conversion codes from ISIC to NACE.

ISIC	NACE	ISIC	NACE
3112	15:510-520-980	3540	26:820 23:100-200
3113	15:31-32-33	3550	19:300 25:110-130 35:116-120 36:500
3114	15:200	3560	19:300 25:210-220-230-240 35:116 36:110-120-130-140-150-400-500-630
3115	15: 41 -42-43	3610	260:210-220-230-240-250-260
3116	15:610	3620	26:110-120-130-140-150- 31:500
3117	15: 81- 82- 85	3691	26:260-300-400
3119	15: 84-89	3692	26:510-520-530-640
3121	15:31- 62-86- 87-88- 89	3699	26:700-630-610-640-650-620-660-810-820
3122	15: 710-720	3710	27:100-210-220-310-320-330-350-510-520 24:139 28:520-750-520 29:229 34:300
3134	15:980	3720	27:421-410-430-440-450-422-530-540 28:400-520-750 29:140 34-300
3211	17: 11-12-13-14-15-16-17-21-22-23-24-25-30	3811	28:610-620-630-750
3212	17:400	3812	36:110-120-130-140
3213	17: 60-71-72	3813	28:110-120-210-220-300
3214	17:51 20:52	3819	28:710-720-730-740-220-510 27:340 210-220 29:130-210-720 31:500-610
3215	17:520	3822	29:310-320
3219	17: 53- 54- 36:63	3823	28:400-510-560
3221	18:21 25:13 25:24 18:22-24	3824	25:114-115 45:212 29:210-240-400-520-530-540-550-560
3229	18: 24-10-30-23-24	3825	29:240 30:010-020 32:100
3231	19:100	3829	29:540-710-120-130-140-210-229-230-240-530-540-600 36:500
3232	18:300	3831	31:100-200-610-620
3233	19:200	3832	31:620 32:100-200-300 33:100-200
3240	19:300	3833	29:710
3311	20:101-200 -301-302-102	3839	31:300-200-400-500-610-620
3312	20:40-52	3841	35:111-112-113-116-117-120 29:111 221
3319	19:30 20:101-302-400-510-520 31:500	3842	35:201-202
3321	32:30 36:11-12-13-14-15	3843	29:229 34:100-200-300 35:430 51:570
3322	36: 12-13-14	3845	35:300
3411	21:111-112-120 20:200	3849	35:430-500-630
3412	21:210-250	3851	29:560 31:620 33:100-200-300-500
3419	21:220-230-240-250	3852	30:010 33:400
3421	22:210-220-230-240-250	3901	36:210-220
3422	22:110-130-150	3902	36:300
3511	24:-110-120-131-139-140-150 23:300	3903	36:400
3521	24:301-302	3909	21:230
3522	24:410-420		
3523	24-510-520		
3529	24:160-302-510-600-610-620-630-640-650-660		
3530	23:200		

Table 3-3. Conversion of ISIC codes to NACE codes.

This research was based on the assumption that environmental dynamism played an important role in determining a firm's strategy, type of technology used, and organisational structure. To carry-out the necessary statistics, the industries were ranked according to their stability/instability factors.

To carry-out the analysis firms from two extremes of stability/instability continuum had to be included. In order to determine the number of firms willing to participate in this study a telephone survey was conducted. Starting with firms in industry with the instability rank of 1, all registered firms were contacted. When the number was not sufficient, the firms in the industry with the instability rank of 2 were contacted. This procedure was repeated until a sufficient number of firms had agreed to participate in the study. Having finished with the unstable industries, the procedure was repeated for firms in the most stable industry in the list. The following table lists the industries included in the study.

Industry	ISIC	NACE	Rank	
Fur dressing & dyeing	**3232**	18:300	**1**	**Highly Unstable**
Manufacture of musical instruments	**3902**	36:300	**2**	
Manufacture of office machinary	**3825**	29:240 30:010-020 32:100	**3**	
Asphalting	**3530**	23:200	**4**	
Manufacture of sporting and athletic goods	**3903**	36:400	**5**	
Manufacture of containers & boxes of paper & paperboards	**3412**	21:210-250	**72**	**Highly Stable**

Table 3-4. Industries selected for analysis.

As a result of the telephone survey, a total of 270 firms did agree to participate in the study. Of these 270 firms, 140 firms were from highly stable industry (ranking 72), and the remaining 130 firms were from the five unstable industries (ranking 1 to 5).

The questionnaire was mailed to the above mentioned firms. The response rate didn't meet the expectation. To remedy this problem, all the non-respondents were contacted by phone again. Some firms did have the questionnaire but hadn't filled them out. After some persuasion some were willing to read the responses over the phone. This brought the response rate up to **39%** or **102** manufacturing firms with the number of employees between 5 and 49. Of these 102 firms, 60 firms belonged to the most stable industry, and 42 firms were from unstable industries ranked on their instability factor from 1 to 5.

Statistical Procedures Used to Analyse the Questionnaires

Exploring Data

The first step of data analysis should always be a detailed examination of the data. Whether the problem is simple or complex, or whether one is planning to do a "t" test or multivariate repeated measures analysis of variance, one should first take a careful look at the data.

Steps Taken

There were several important steps taken in examining the data before the main analyses.

IDENTIFY MISTAKES

Check the data for normal observation, collection, and registration. Here several mistakes in registration were found and corrected.

DESCRIPTIVE STATISTICS

After completing data acquisition, entry, and checking, the data was examined systematically using descriptive statistics.

TEST FOR NORMALITY

Looking at the distribution of the values is important for evaluating the appropriateness of the statistical techniques one plans to use for hypothesis testing or model building. Perhaps the data must be transformed so that the distribution is approximately normal, or so that the variances in the groups are similar; or perhaps nonparametric technique is needed.

NORMAL DISTRIBUTION

The normal distribution played an important role in the statistical analyses used in this study. That is why it was important to check for the normality of distribution.

> " In a normal probability plot, each observed value is paired with its expected value from the normal distribution. (The expected value from the normal distribution is based on the number of cases in the sample and the rank order of the case in the sample.) If the sample is from a normal distribution, we expect that the points will fall more or less on a straight line." (Norousis 1993)

In this study the test for normality was conducted using **P-P plot**. P-P plot is based on the cumulative probability distribution of the observed data and the normal distribution. The values of the variables were plotted using the Tukey's formula (r-(1/3))/(n+(1/3)). The plots demonstrated that indeed the sample had a normal distribution. A sample of P-P plot for variable A1 is shown below. All plots are presented in Appendix C.

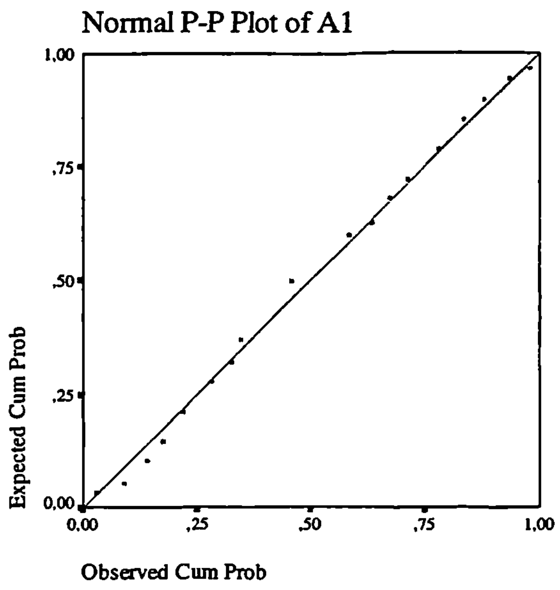


Figure 3-6. P-P plot of A1 variable

MEASURE OF SHAPE (FREQUENCY DISTRIBUTION)

A distribution that is not symmetrical but has more cases (more of a 'tail') toward one end of the distribution than the other, is said to be *SKEWED.* If the tail is toward larger values, the distribution is positively skewed, or skewed to the right. If the tail is toward smaller values, the distribution is negatively skewed, or skewed to the left.

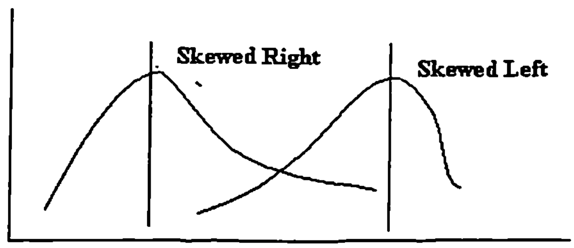
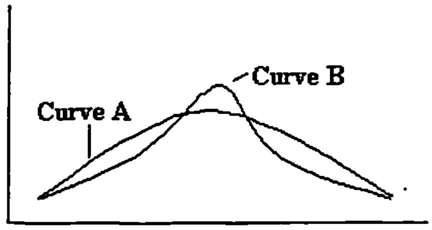


Figure 3-7. Skewness

Another characteristic of the form of a distribution is called *KURTOIS* - the extent to which, for any given standard deviation, observations cluster around a central point. If cases within a distribution cluster more than those in the normal distribution (that is, the distribution is more peaked), the distribution is called *leptokurtic.* A leptokurtic distribution also tends to have more observations straggling into the extreme tails than does a normal distribution. If cases cluster less than the normal distribution (that is, it is flatter), the distribution is termed *Platykurtic.*

Figure 3-8. Kurtosis



Two curves with the same central location but different kurtosis

Values for skewness and kurtosis are **'0'** if the observed distribution is *exactly normal.* Positive values for skewness indicate a positive skew, while a positive value for kurtosis indicate a distribution that is more peaked than normal. For example, from a normal distribution, measures of skewness and kurtosis typically will not be exactly 0 but will fluctuate around **'0'** because of sampling variation.(Norousis 1993)

Data Reduction: Factor Analysis

Factor analysis is a statistical procedure that derives a relatively small number of factors (i.e., new variables) from a greater number of variables. A factor is not a single measurable entity but a construct that is derived from the measurement of other, directly observable variables. One way of achieving this is to examine the presence of correlation between variables. If a certain degree of correlation exists between a certain number of variables, then it would be possible to represent those relationships parsimoniously. That is, to explain the observed correlation using a few factors.

There are four steps (Norousis 1994) involved in factor analysis, and they are:

1. Computing a correlation matrix for all variables involved

Since one of the goals of factor analysis is to obtain factors that help explain these correlations, the variables must be related to each other for the factor model to be appropriate. If the correlation between variables are small, it is unlikely that they share a common factor.

Bartlett's test of sphericity is used to test the hypothesis that the correlation matrix is an identity matrix; that is, all diagonal terms are '1' and all off-diagonal terms are '0'. The test requires that data be a sample from a multivariate normal population.

2. Factor extraction

The goal of factor extraction is to determine the factors. One of the methods used to obtain estimates of the initial factors is the *Principal component analysis.* In Principal component analysis, linear combinations of the observed variables are formed. The first Principal component is the combination that accounts for the largest amount of the observed variance in the sample. The second Principal component accounts for the next largest amount of variance and is un-correlated with the first. Successive components explain progressively smaller portions of the total sample variance, and are un-correlated with each other.

To obtain the number of factors needed to represent the data, one examines the percentage of total variance explained by each (total variance is the sum of the variance of each variable). The total variance explained by each factor is called *Eigenvalue.*

Several procedures have been proposed for determining the number of factors to be used in a model. One of the most widely used procedures suggests that only factors that account for variances greater than 1 (eigenvalue > 1) should be included. In this study, the factor extraction method used was the Principal component analysis. The factor selection criterion was that of eigenvalue being greater than 1.

3. Rotation

The rotation phase of factor analysis attempts to transform the initial matrix into one that is easier to interpret. The purpose of rotation is to achieve a simple structure. This means that one would like to have non-zero loading only on some of the variables. This helps one to interpret the factors. Rotation does not affect the goodness of fit of a factor solution. That is, although the factor matrix changes, the communalities and the percentage of total variance explained do not change. Rotation redistributes the explained variance for the individual factors.

One of the most commonly used methods of rotation is the *varimax* method. The varimax method attempts to minimise the number of variables that have high loading on a factor. This enhances the interpretability of the factor. In this study, and in all factor analyses, varimax method was used.

4. Calculating scores for each factor.

There are several methods in estimating factor score coefficients. Each has different properties and result in different factor scores. The three methods available in SPSS Factor Analysis procedure are: Anderson-Rubin, Bartlett, and regression. When using the Principal component extraction method, all three methods result in the same factor scores, which are no longer estimated but are exact. Since I had used Principal component analysis, the default method, the regression method was used. Regression factor scores have a variance equal to the square multiple correlation between the estimated factor scores an the true factor values.

The four steps are naturally difficult to carry-out manually; hence one always uses a computer. The statistical package used throughout this study was the SPSS version 6.1. The complete procedure for factor analysis used for this study was: ***Principal component analysis*** *with* ***varimax method of rotation*** *and* ***regression method*** *of obtaining factor scores.*

Bivariate Correlation Analysis

Correlation is an indication of the degree of association between two or more variables. More accurately it is the amount of reduction in error in predicting values of one variable from the other. In particular, the product moment correlation coefficient, **r** (or simply the correlation coefficient), measures the degree of linear association between two variables. When **r** is positive, the variables tend to increase together or decrease together, i.e., they are directly or positively correlated. When **r** is negative, as one variable increases the other decreases, i.e., they are indirectly or negatively correlated. The strength of association increases by the value of **r**, as r approaches +1 or -1. An **r** with a value of zero is said to indicate that the variables are uncorrelated, i.e., no linear relationship exists.

Independent-Samples T Test

This procedure tests the null hypothesis that data are a sample from a population in which the mean of a test variable is equal in two independent groups of cases. It is similar to the analysis of variance (ANOVA) procedures, but is restricted to a comparison of 2 groups.

In this study the Independent-Samples T Test has been used to test the hypothesis that the stable and unstable groups have the same mean. This was done to identify in which areas the two group significantly differ. The following is an explanation of the procedure used to identify which test was best suitable for this purpose.

Hypothesis Testing

Hypothesis testing begins with an assumption (called hypothesis), that we make about a population parameter. Then we collect sample data, produce sample statistics, and use this information to decide how likely it is that our hypothesised population parameter is correct.

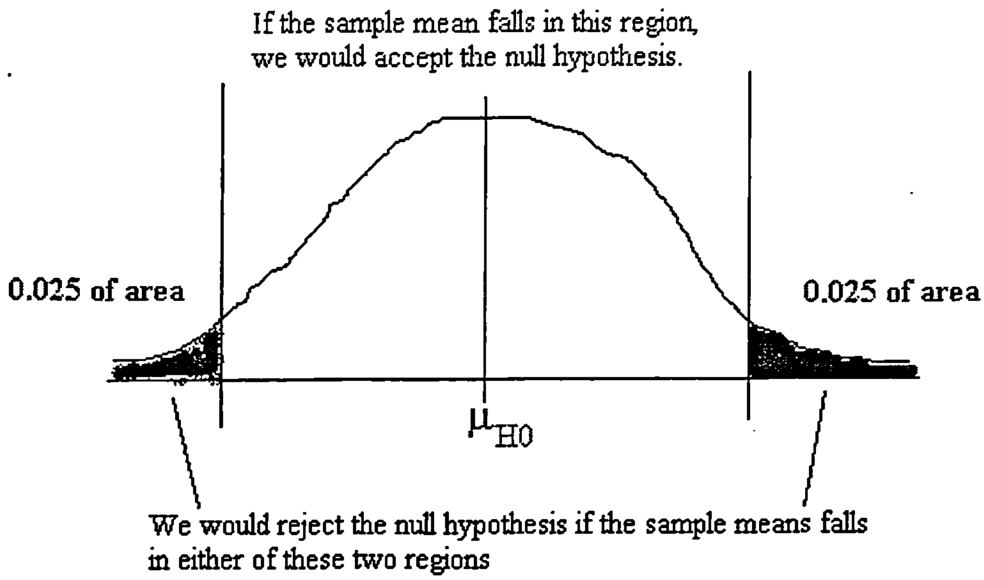
To test the validity of our assumption, we gather sample data and determine the difference between the hypothesised value and the actual value of the sample mean. Then we judge whether the difference is significant. The smaller the difference, the greater the likelihood that our hypothesised value of the mean is correct. The larger the difference, the smaller the likelihood.

In hypothesis testing, we must state the assumed or hypothesised value of the population parameter *before* we begin sampling. The assumption we wish to test is called the *null hypothesis* and is symbolised by H_0. Whenever we reject the null hypothesis, the conclusion that we do accept is called the *alternative hypothesis* or H_1.

Here the hypotheses is that $H_{0:}\ \mu = \mu_{H0}$ and $H_{1:}\ \mu \neq \mu_{H0}$.

From the hypotheses it is clear that one is not interested in direction of difference between the means. This means that difference can lay in either tail of the population distribution curve. This indifference to the direction of the difference between means dictate that a *Two-Tailed test* should be used.

Figure 3-9. Two-tailed test



A tow-tailed test of a hypothesis will reject the null hypothesis if the sample mean is significantly higher than or lower than the hypothesised population mean.

Having determined the area of interest, we are left with the second problem, namely: we do not know the population mean or μ .

SAMPLE MEANS & CONFIDENCE INTERVALS

The sample mean for a group provides the single best guess for the unknown population mean μ . However, it is unlikely that the value of the sample mean is exactly equal to the population value. Instead, it is probably not too different. *Based on the sample mean, one can calculate a range of values that, with a designated likelihood, includes the population value. Such a range is called a* ***Confidence Interval*** *(CI).*

Group	Count	Mean	Standard Deviation	Standard Error	Minimum	Maximum	95 Pct Conf Int for Mean		
Stable	60	2,5500	1,3583	,1754	1,0000	5,0000	2,1991	TO	2,9009
Unstable	42	3,0476	1,3960	,2154	1,0000	5,0000	2,6126	TO	3,4827
Total	102	2,7549	1,3890	,1375	1,0000	5,0000	2,4821	TO	3,0277

POPULATION STANDARD DEVIATION "σ " & SAMPLE SIZE "N"

Another point to consider when testing hypothesis is that of population standard deviation and sample size. The difference in size between large and small samples is important when the population standard deviation "σ " is unknown and must be estimated from the sample standard deviation. *If the sample size "n" is 30 or less and "σ" is not known, we should use the "t" distribution . When the sample size is greater than 30, we should use the normal distribution, and the "Z" table (Levin, 1987). However, one can use "t" distribution in situation when "n" is bigger than 30, if one uses the Levene's Test for Equality of Variances . This test is included in the SPSS Independent-Sample t Test.*

	When the population standard deviation is known	**When the population standard deviation is NOT known**
Sample size "n" > 30	Normal distribution, "Z" table	Normal distribution, "Z" table
Sample size "n" =< 30 and we assume the population is normal or approximately so.	Normal distribution, "Z" table	"t" distribution, "t" table

Table 3-4. Conditions for using normal and "t" distribution in testing hypothesis about means.

Levene Test: To test the null hypothesis that the groups come from populations with the same variance, one may use the Levene test, which can be obtained with the one-way ANOVA procedure. If the observed significance level is small, one can reject the null hypothesis that all variances are equal.

The larger the "F" ratio (much greater than 1) the less will be the credibility of the null hypothesis that the populations' variances are identical. The smaller the "F" value the more credible is the H_0.

Figure 3-10: How to interpret 't' test results from SPSS

If the F is small (less than 0.1, or 0,05), the hypothesis that the population variances are equal is more credible and the EQUAL row should be used. If F is large, the UNEQUAL raw should be used.

P = P-level significant probability.
P-level over 0.25 means that probably the two population variances are equal.

Levene's test for Equality of Variance F = 0.043 P = 0.836

Since the values -1.046 and 0.051 cover the "0" value, the chances that H0 is credible is great

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-1,80	100	,075	,276	(-1,046; ,051)
Unequal	-1,79	86,84	,077	,278	(-1,050; ,055)

Observed significant level:

Based on the sampling distribution , one can calculate the probability that a difference at least as large as the one observed would occur if the two population means (μ_1, and μ_2) are equal. This probability is called the
observed significant level.
If the observed significant level is small enough (usually less than 0.05, or 0.01), the hypothesis that the population means are equal is rejected. ($\mu = X \pm$ sampling error)
In this case, the observed significant level is above the 0.05 (1 - 0.95), and therefore it is not possible to reject the hypothesis that population means are equal.

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Chapter 4

RESULTS AND FINDINGS

A starting point for this research project was the contingency theory of organisation. Contingency theory was proposed in the early 1960's by British researchers (Burns and Stalker, 1961; Woodward, 1965) and more fully developed by American researchers (Lawrence and Lorsch, 1967; Perrow, 1967; Thompson, 1967). The three fundamental ideas of it can be summarised as follows.

The environment surrounding an organisation is always changing. Changes in industry structure, customers' preferences, technology, competitors' behaviour, legislation, societal norms, and expectations generate a variety of opportunities and threats. This is called environmental variety. The word variety is defined in cybernetics as the number of distinct elements relevant to the choice of action or response (Ashby, 1956:126).

An increase in environmental variety imposes information and decision burdens on firms. How effectively a firm copes with these information and decision burdens determines its degree of goal accomplishment, i.e., company performance. A firm must use a variety of resources (people, material, money, and knowledge) to deal with opportunities and threats. This is termed organisational variety. *The pattern of matching resources with opportunities and threats over time represents the firm's strategy. To implement a chosen strategy, people's activities must be organised. Patterns of people's interaction within the firm comprise organisation.* Strategy and organisation are constrained by the resources available. What constitutes requisite variety in strategy and structure depends on the nature and magnitude of environmental change. When good matching is achieved, firms can cope effectively with opportunities and threats, and attain high performance. Although reasonably good performance can be achieved with a misfit between environmental and organisational variety in the short run, a good fit is necessary for sustained high performance.

Contingency theory is used as a starting point in this study for the following reasons:

1. Contingency theory was developed through comparative empirical research. Consequently it is an appropriate framework for an industry wide comparative study.

2. The theory is a comprehensive framework which can account for interdependent relationships among an extensive variety of organisational phenomena.

3. Contingency theory has provided measuring instruments for operational indicators of managerial phenomena.

Method of Comparative Analysis

The method of comparative study often used in contingency theory are of two kinds: survey method, using large samples, and intensive case study of a few firms.

These two methods have complementary advantages and disadvantages. Survey method has the *advantages* of enabling us to:

1. identify general population characteristics and formulate hypotheses from large-sample data, and
2. test hypotheses applying statistical analysis.

It has the *disadvantages* of making it difficult to analyse dynamic phenomena.

The *intensive case study method* has the *advantages* of:

1. making possible more in-depth analysis of a few cases,
2. more easily discerning causal relationships, and
3. better analysis of dynamic phenomena.

Its *disadvantages* include:

1. uncertainty in the generalisability of propositions and hypotheses derived, and
2. the greater likelihood of introducing researchers' selective perceptions and biases.

Survey method is in general appropriate for hypothesis testing, while intensive case method is more useful for hypothesis generation.

In this study, survey method is used.

Environmental Analyses: Stable vs. Unstable

The foundation of this research rests on the classification of industries according to their market stability/instability. Here instability was measured by examining the changes in sales, price-cost margin, employment, and value added by manufacture, over an 11 year period. The following procedure was used.

1. Each dependent variable was regressed on time over the period 82-92 (11 years); this was done by finding the Standard Error of the Regression Coefficient (S_b) divided by mean value (Y).

2. The data were analysed in two major steps: first by interim analysis and, second, by factor analysis.

3. The interim analysis assessed the internal consistency among multiple items used to measure two dimensions (munificence & stability) of organisational task environments. The purification step made it possible

to delete internally inconsistent variables and thereby minimise the chance that theoretically meaningless factors would emerge in subsequent factor analysis.

4. The factor analysis was done on the reduced data matrix remaining after the interim analysis. The factors were assumed to be orthogonal. A principal components analysis followed by varimax rotation was used.

5. The standardised alpha was 0.85.

6. The industries were then ranked according to their standardised factor scores.

The following scores (table 4-1, 9 pages) were obtained.

Industry Name	ISIC	NACE	Industrinavn	Munificence Factor Score	Munificence Rank	Stability-Instability Factor Score	Stability-Instability Rank
Fur dressing and dyeing	3232	18:300	Bredning av pelsskinn, og produksjon av pelsevare	-2,5765326	72	4,8576777	1
Manufacture of musical instruments	3902	36:300	Produksjon av musikinstrumenter	-0,7889955	57	3,8466579	2
Manufacture of office machinery	3825	29:240 30:010-020 32:100	Produksjon av kontormaskiner (ink. datamaskiner)	-0,3585843	45	2,6037443	3
Asphalting of Roads	3530	23:200	Asphalting of Roads	2,4035274	2	2,2792815	4
Manufacture of sporting & athletic goods	3903	36:400	Produksjon av sportartikler	2,0045728	4	1,7195656	5
Manufacture of industrial machinery not elsewhere classified	3824	25:114-115 45:212 29:210-240-400-520-530-540-550-560	Produksjon av oljerigger og andre konstraksjoner og andre industrimaskiner	1,6396863	5	1,5906512	6
Manufacture of non-ferrous metals	3720	27:421-410-430-440-450-422-530-540 28:400-520-750 29:140 34-300	Produksjon av primær aluminium, andre ikke-jernholdige metaller, og valsing av ikke-jernholdige metaller	0,4489938	22	0,8470815	7
Manufacture of grain mill products	3116	15:610	Produksjon av kornvarer	1,0580385	9	0,7256927	8
Manufacture of carpets & rugs	3214	17:51 20:52	Produksjon av golvtepper, -matter og -ryer	-1,5532198	68	0,6980353	9

Industry Name	ISIC	NACE	Industrinavn	Munificence Factor Score	Munificence Rank	Stability-Instability Factor Score	Stability-Instability Rank
Building of ships & boats	3841	35:111-112-113-116-117-120 29:111-221	Bygging av skip, båter, og båtmotorer og spesialdeler	-0,6002756	53	0,6526781	10
Manufacture of furniture & fixtures of metal	3812	36:110-120-130-140	Produksjon av møbler av metall	0,5433381	20	0,5998322	11
Manufacture of photographic & optical goods	3862	30:010 33:400	Produksjon av fotoartikler og optiske artikler	0,8194020	13	0,4361735	12
Manufacture of metal & wood working machinery	3823	28:400-510-560	Produksjon av maskiner for tre og metallbearbeiding	-0,8619727	61	0,2740800	13
Manufacture of aircraft	3845	35:300	Produksjon og reparasjon av fly og romskip	1,0093085	11	0,2400958	14
Manufacture & repair of rubber products	3550	19:300 25:110-130 35:116-120 36:500	Produksjon av gummiprodukter	-0,4561994	49	0,2249852	15
Manufacturing industries not elsewhere classified	3909	21:230	Annen industriproduksjon	1,1687731	8	0,1497117	16
Manufacture of stoneware & earthenware not elsewhere classified	3699	26:700-630-610-640-650-620-660-810-820	Produksjon av betong, betong varer, annen jord-og stinvarer og steinbearbeiding	-0,0630274	39	0,1225665	17
Manufacture of profasional & scientific instruments not elsewhere classified	3851	29:560 31:620 33:100-200-300-500	Produksjon av tekniske og vitenskapelige instrumenter ikke nevnt ellers	2,4316111	1	0,0759874	18

Industry Name	ISIC	NACE	Industrinavn	Munificence Factor Score	Munificence Rank	Stability-Instability Factor Score	Stability-Instability Rank
Manufacture of iron & steel	3710	27:100-210-220-310-320-330-350-510-520 24:139 28:520-750-520 29:229 34:300	Produksjon av jern og stål, ferrolegering, og støpling av jern og stål	-0,5067728	51	0,0588183	19
Manufacture & repair of railway and tramway equipment	3842	35:201-202	Produksjon av jernebane og sporvognmateriell	0,0417417	32	0,0285485	20
Manufacture of drugs and medicines	3522	24:410-420	Produksjon av farmasøytiske produkter	2,2197430	3	0,0138298	21
Manufacture of wearing apparel not elswhere classified	3229	18: 24-10-30-23-24	Produksjon av: hodeplagg, klær av lær og skinn, klær av pelsskinn, anre klær(undertøy, og tilbehør)	-1,8745675	71	0,0097511	22
Manufacture of leather	3231	19:100	Produksjon av lær	0,7504558	14	-0,0483599	23
Manufacture of electrical household appliances	3833	29:710	Produksjon av elektriske husholdningsapparater	-0,8248911	60	-0,0496273	24
Manufacture of metal products not elsewhere classified	3819	28:710-720-730-740-220-510 27:340-210-220 29:130-210-720 31:500-610	Produksjon av metallemballasje, metallduk, tråd, spiker, skruer, belysningsutstyr, rørarmatur, andre metallvarer	-0,0443807	37	-0,0513426	25

Industry Name	ISIC	NACE	Industrinavn	Munificence Factor Score	Munificence Rank	Stability-Instability Factor Score	Stability-Instability Rank
Manufacture of basic industrial chemicals, except fertilizers	3511	24:-110-120-131-139-140-150 23:300	Produksjon av karbider	0,6274985	17	-0,0761583	26
Manufacture of radio, television and communication apparatus	3832	31:620 32:100-200-300 33:100-200	Produksjon av signal, radio og annet telemateriell	-0,3755286	46	-0,1184402	27
Manufacture of products of petroleum and coal	3540	26:820 23:100-200	Produksjon av tjære-og asfaltpapp og annen jordolje- og kullprodukter	-0,8648346	62	-0,1187420	28
Manufacture of soft drinks and carbonated water	3134	15:980	Produksjon av mineralvann	0,9875770	12	-0,1901315	29
Manufacture of other transport equipment	3849	35:430-500-630	Produksjon av transportmidler ellers	1,1801174	7	-0,1959107	30
Manufacture of fabrics, except narrow fabrics	3212	17:400	Søm av utstyrsvarer	-0,2220136	44	-0,2085285	31
Manufacture of pulp, paper and paperboard	3411	21:111-112-120 20:200	Produksjon av tremasse	0,1046372	31	-0,2330977	32
Manufacture of cordage, ropes and nets	3215	17:520	Produksjon av tauverk og nett	0,7082951	16	-0,2499775	33
Manufacture of textiles not elswhere classified	3219	17: 53- 54- 36:63	Produksjon av tekstilvarer ellers	-0,7551566	56	-0,2645614	34

Industry Name	ISIC	NACE	Industrinavn	Munificence Factor Score	Munificence Rank	Stability-Instability Factor Score	Stability-Instability Rank
Manufacture of cement & lime	3692	26:510-520-530-640	Produksjon av sement og kalk	-0,5183359	52	-0,2800649	35
Manufacture of structural clay products	3691	26:260-300-400	Produksjon av teglvarer	-0,7984816	58	-0,2840876	36
Manufacture of fixtures	3322	36: 12-13-14	Produksjon av inredninger	-0,1463619	42	-0,2971693	37
Manufacture of agricultural machinery	3822	29:310-320	Produksjon av jordbruksmaskiner	-0,0441500	36	-0,3041864	38
Manufacture of electrical apparatus & equipment not elsewhere classified	3839	31:300-200-400-500-610-620	Produksjon av elektrisk kabel, ledning og andre elekteriske apparater og materiell	0,0204073	33	-0,3066503	39
Manufacture of wood products not elsewhere classified	3319	19:30 20:101-302-400-510-520 31:500	Produksjon av trevarer ellers	-0,0154932	34	-0,3415505	40
Manufacture of prepared animal feeds	3122	15: 710-720	Produksjon av dyrefør	1,0319985	10	-0,3522367	41
Manufacture of motor vehicles	3843	29:229 34:100-200-300 35:430 51:570	Produksjon av motorkjøretøyer, untatt motorsykler	0,3625285	27	-0,3549161	42
Manufacture of food products not elswhere classified	3121	15:31- 62-86- 87-88- 89	Produksjon av næringsmidler ellers	1,5222716	6	-0,3961646	43

Industry Name	ISIC	NACE	Industrinavn	Munificence Factor Score	Munificence Rank	Stability-Instability Factor Score	Stability-Instability Rank
Manufacture of glass & glass products	3620	26:110-120-130-140-150- 31:500	Produksjon av glass og glassvarer	-0,0362981	35	-0,4080767	44
Manufacture of wooden containers	3312	20:40-52	Produksjon av treemballasje	-1,2612930	65	-0,4286543	45
Manufacture of machinery not elsewhere classified	3829	29:540-710-120-130-140-210-229-230-240-530-540-600 36:500	Produksjon av husholdningsmaskiner og andre maskiner	0,1622323	30	-0,4297421	46
Manufacture of electric motors & equipment for electricity production	3831	31:100-200-610-620	Produksjon av el-motorer og materiell for el-produksjon	0,3279706	28	-0,4338206	47
Manufacture of lumber and other building materials of wood	3311	20:101-200-301-302-102	Sagin og høvling	-0,4538678	48	-0,4385614	48
Production of milk products and Ice-cream	3112	15:510-520-980	Meierivarer og iskrem	-0,0524546	38	-0,4400878	49
Manufacture of chemical products not elsewhere classified	3529	24:160-302-510-600-610-620-630-640-650-660	Produksjon av sprengestoff og ammunisjon og andre kjemisk-tekniske produkter	-1,1902919	63	-0,4720401	50
Manufacture of paints, varnishes and lacquers	3521	24:301-302	Produksjon av maling og lakk	-0,0665415	40	-0,4832302	51

Industry Name	ISIC	NACE	Industrinavn	Munificence Factor Score	Munificence Rank	Stability-Instability Factor Score	Stability-Instability Rank
Printing & bookbinding	3421	22:210-220-230-240-250	Trykning av bøker, ukeblader og tidsskrifter	0,5506374	19	-0,5067717	52
Manufacture of bakery products	3117	15: 81- 82- 85	Produksjon av brød- og konditorvarer	0,5679741	18	-0,5329334	53
Manufacture of structural metal products	3813	28:110-120-210-220-300	Produksjon av metallkonstruksjoner	0,3912512	26	-0,5367921	54
Manufacture of furniture	3321	32:30 36:11-12-13-14-15	Produksjon av møbler	-0,2197209	43	-0,5508988	55
Manufacture of oils and fat	3115	15: 41 -42-43	Produksjon av oljer og fett	-1,3141220	67	-0,5579999	56
Manufacture of outer garments of textiles and plastics	3221	18:21 25:13 25:24 18:22-24	Produksjon av arbeids- og beskyttelsesklær og yettertøy	-1,6932096	70	-0,5690814	57
Manufacture of cutlery, hand tools & general hardware	3811	28:610-620-630-750	Produksjon av husholningsartikler og håndsverktøy, låser, og beslag	0,4201107	24	-0,5797490	58
Manufacture of footware	3240	19:300	Produksjon av skotøy	-1,5631913	69	-0,5809210	59

Industry Name	ISIC	NACE	Industrinavn	Munificence Factor Score	Munificence Rank	Stability-Instability Factor Score	Stability-Instability Rank
Manufacture of plastic products	3560	19:300 25:210-220-230-240 35:116 36:110-120-130-140-150-400-500-630	Produksjon av plast-halvfabrikata, plastemballasje, og annen plastvarer	0,3995362	25	-0,5842440	60
Manufacture of luggage, bags, etc.	3233	19:200	Produksjon av reiseeffekter og salmartikler	-1,2617092	66	-0,6165984	61
Manufacture of jewellery & related goods	3901	36:210-220	Produksjon av gull og solvvarer	0,2356971	29	-0,6198702	62
Manufacture of paper & paperboard articles not elsewhere classified	3419	21:220-230-240-250	Produksjon av papir- og pappvarer ellers	-0,6639511	54	-0,6556399	63
Spinning, weaving & finishing of textiles	3211	17: 11-12-13-14-15-16-17-21-22-23-24-25-30	Produksjon av garn, vevander	-0,7375677	55	-0,6623383	64
Manufacture of ceramics	3610	260:210-220-230 240-250-260	Produksjon av keramiske produkter	-0,4313051	47	-0,6647326	65
Canning & preserving of fruits & vegetables	3113	15:31-32-33	Bearbeiding og konservering av frukt og grønnsaker	-0,4755770	50	-0,7009455	66

Industry Name	ISIC	NACE	Industrinavn	Munificence Factor Score	Munificence Rank	Stability-Instability Factor Score	Stability-Instability Rank
Canning & preserving and processing of fish	3114	15:200	Bearbeiding og konservering av fisk og fiskvare	-0,1256350	41	-0,7488327	67
Publishing	3422	22:110-130-150	Forlegging av bøker	0,7355645	15	-0,7604666	68
Manufacture of cocoa, choclate and suger confectionery	3119	15: 84-89	Produksjon av sjokolade og sukkervarer	0,4393337	23	-0,7635400	69
Manufacture of narrow fabrics & elastic fabrics	3213	17: 60-71-72	Produksjon av stoffer og klær av trikotasje	-1,1905792	64	-0,8618130	70
Manufacture of soap and cleaning preparations, perfumes, cosmetics & other toilet preperations	3523	24-510-520	Produksjon av vaskemidler og toalettpreparater	-0,8037464	59	-0,8630416	71
Manufacture of containers & boxes of paper and paperboard	3412	21:210-250	Produksjon av papir- og pappemballasje	0,4760057	21	-0,8821179	72

Table 4-1. Companies ranked according to dynamism

The results were used to select companies for further analysis. The next step in the procedure was to convert the four digit ISIC code to Norwegian NACE code. These codes were subsequently used to select companies for analysis.

Survey Analysis

In order to carry out the analysis, firms from two extremes of stability/instability continuum were chosen. The minimum number of participants required was set to 100 firms. The preliminary contact was made by phone. Starting with the firms in the industry with the instability rank of one, each firm was contacted and asked to participate in the study. The interested firms were registered and subsequently were mailed a questionnaire. The procedure was repeated for firms in industries with instability ranks of 1 to 5. A total of 130 firms agreed to participate in the study.

Similar procedure was followed with companies in the most stable industry. 140 firms in the most stable industry (rank 72) agreed to participate in the study.

In total 270 firms responded positively to the request for participation. Of the 270 firms, 102 returned the questionnaires, resulting in a 39% response rate.

The questionnaire is made of 4 parts, labelled A,B,C, and D, examining environment, technologies employed, strategic orientation and organisation respectively.

The questionnaire was analysed in several steps. These steps were as follows:

1. A comparative analysis to see if there were major or statistically significant differences between the firms operating in stable/unstable environments.

2. Factor analysis of the variables to identify factors for technologies employed, strategic orientation, organisation and perception of the environment.

3. Determining the correlation, if any, that may exist between the objective environment and the above mentioned factors.

4. Determining the correlation, if any, that may exist between technologies employed, strategic orientation, the perception of the environment and emphasis on planning.

5. Determining the determinant(s) of performance.

Comparative Analysis

In this section firms are grouped according to their dynamism factors: stable and unstable. The method of *independent t-test of means* was selected for the test. The t-test was selected because when the sample is small and the true value of the population standard deviation is not known, one can not simply substitute the sample standard distribution for the population standard distribution. If one does so, one will introduce additional uncertainty into the result.

This additional uncertainty stems from the fact that when one takes a sample from a population to calculate the sample mean, it is very unlikely that the sample mean will be the same as the population mean. The same is true for the sample variance. If one takes a sample from a population and calculate the variance, it is very unlikely that the sample variance will be the same as the population variance. Sample variances, just like sample means, have sampling distribution. If one takes repeated samples of the same sample size from a population and calculate their variances, these variances will spread out into a distribution. If one uses the sample standard distribution instead of the standard score, one introduces uncertainty into the results. If for instance, our sample standard deviation is smaller than the population value, the resulting standard score will be too large. If the observed sample standard deviation is too large, the standard score will be too small. That is why when one does not know the population standard deviation but estimate it from the sample, the distribution of the standard score is no longer normal. Instead it follows the *t distribution*. The t distribution takes into account the fact that, by using the sample standard deviation instead of the population standard deviation, one is introducing error into the computation of the standard score (Norousis, 1994). One can use the t-distribution to test hypothesis about the equality of population means between two *independent samples*. Samples from different groups are called independent if there is no relationship between the groups, which is the case here.

An independent t-test of means were carried out for two groups of firms operating in stable and unstable environments (objective environment). The following section will present the result and finding of these tests.

Environment

Environment was covered by 11 questions A1 to A11. The aim of this section was to highlight three dimensions: Geographical dispersion of activities, subjective dynamism, and growth. Geographical dispersion covered areas such as market homogeneity/heterogeneity, production and marketing concentration/dispersion, and geographical promotional focus. Subjective dynamism was concerned with the manager's understanding or perceived environmental stability/instability, and covered such areas as sales, demand, value-adding, and technology. The last dimension, growth, was concerned with the management's view of their performance in the areas of sales, demand, value-adding, and employment.

An independent t-test of means indicated that there is a statistically significant differences between the two groups in the area of subjective dynamism. It seems that technical innovation, demand, and sales are fairly stable for the firms operating in the stable environment, while highly unstable for firms operating in the unstable environment. This result is not unexpected since the overall sample was grouped according to their objective dynamism score. Another major difference is the change in the number of employees. Firms in unstable environments seem to hire and fire employees more readily than their counterparts in stable environment. Results are presented in the table 4-2.

Section A	Question	From - To	Grading	Mean: Stable	Mean: Unstable	Significance
A-1	The Market that you Serve are	Very homogeneous to Ver Hetrogeneous	1 to 5	2,95	3,21	
A-2	The production and marketing operations of your company are geographically:	Very concentrated to Very widely dispersed	1 to 5	3,38	3,33	
A-3	The promotional strategy your company utilizes is generally	Very limited to Very diverse	1 to 5	2,85	3,07	
A-4	In the market that you serve, new products and technichal innovation are introduced	Very seldom to Often	1 to 5	2,2	3,47	***
A-5	In the market that you serve,unexpected changes in demand takes placed	Very seldom to Often	1 to 5	2,03	3,88	***
A-6	In the market that you serve, unexpected changes in sales takes place:	Very seldom to Often	1 to 5	2,11	3,66	***
A-7	In the market that you serve, unexpected changes in value-adding in manufacturing takes place:	Very seldom to Often	1 to 5	2,31	2,57	
A-8	In the market that you serve, unexpected changes in the number of employees takes place:	Very seldom to Often	1 to 5	1,53	2,07	***
A-9	In the past 5 years your company's sales has:	Strongly decreased to Strongly increased	1 to 5	3,31	3,57	
A-10	In the past 5 years your company's number of employees has:	Strongly decreased to Strongly increased	1 to 5	3,03	3,23	
A-11	In the past 5 years your company's value-adding in production has:	Strongly decreased to Strongly increased	1 to 5	3,23	3,38	
	* Significant at .05 level by t-test of means ** Significant at .01 level by t-test of means *** Significant at .001 level by t-test of means					

Table 4-2. Results from section A

The results indicate that managers are well aware of their environment stability/instability. The main question is how close their understanding is to objective values. This will be examined later by using the factor analysis, correlation and regression analysis.

Production Technologies Employed

Technology is viewed here as a mediating variable between an organisation and its environment (Woodword, 1965; Perrow, 1967; Thompson, 1967). The market environment of an organisation determines what type of technologies are feasible, and in turn constrains organisational structure and process.

Production technologies were categorised from custom technology to continuous process. These technologies have been classified according to their routineness. That is to say, the level of repetitive work involved in each new job. For example, there is considerably less repetitive work in small batch than it is in mass production.

Section B	Question	From - To	Grading	Mean: Stable	Mean: Unstable	Significance
B-1	Custom	Is not used to Used Frequently	1 to 5	2,18	3,3	***
B-2	Small batch	Is not used to Used Frequently	1 to 5	2,74	3,23	
B-3	Large Batch	Is not used to Used Frequently	1 to 5	3,29	2,33	***
B-4	Mass Production	Is not used to Used Frequently	1 to 5	3,13	1,88	***
B-5	Continous Process	Is not used to Used Frequently	1 to 5	2,03	1,76	
* Significant at .05 level by t-test of means ** Significant at .01 level by t-test of means *** Significant at .001 level by t-test of means						

Table 4-3. Results from Section B (Technology)

As can be seen from table 4-3, there are significant differences between the two groups in their use of production technologies. Here we see that firms in stable market environment tend to employ technologies with larger level of routineness than firms in unstable market environments.

A less routine technology is more flexible and is more suited to deal with variable environment, while a more routine technology is less flexible and is more suited to deal with an environment where demand is more or less stable. This reflect the hypotheses Hb1 and Hb2, which stated that small manufacturing firms operating in the stable environment tended to select routine (standardised) manufacturing technologies and small manufacturing firms operating in unstable environments tended to select non-routine (flexible) manufacturing technologies.

Strategic Orientation

Strategic orientation was covered by section C1. This section determines the 'type' of approach, while the actual competitive strategy is covered by section C2. By type it is meant the planners and non-planners, or, to use the Miles and Snow's types, 'prospectors' and 'defenders'.

Considering that this study is concerned with the manufacturing firms, instead of using the above mentioned type names, one shall refer to the two types as 'product oriented' and 'operations oriented' respectively. One should bear in mind that although the types mentioned will include the types of technologies used and organisational orientation, their types were identified first, to show their overall approach to strategy formulation.

The independent t-test of means analysis of this section of the questionnaire revealed several notable differences concerning strategic orientation. These differences are presented in the table 4-4.

First, the results show that firms in unstable environments, on average, are more oriented toward a wider scope of activities, especially in terms of orientation towards internationalisation than the firms in stable market environment (this of course can be a local phenomena).

Second, firms in unstable environments are more flexible in their strategic deployment of resources and short-term resource utilisation than firms in stable market environment. This clearly corresponds with the choice of production technologies discussed earlier.

Third, firms in unstable market environment tend to concentrate more on differentiation strategy than low-cost/price leadership. This again corresponds with the type of production technologies employed. As the production technologies move from lower-cost general purpose equipment to a more expensive specialised machinery, the need to keep machines working at full capacity becomes stronger. This in turn necessitates the use of larger batches, which correspondingly reduces the cost of each unit. Hence the relationship between the type of technology employed and strategy.

Fourth, firms in stable environment tend to strive for increasing their market-share, with emphasis on low prices, while their counterparts in unstable environments emphasise quality, innovation, and mobility of resources.

Section C1	Question	From - To	Grading	Mean: Stable	Mean: Unstable	Significance
C1-1	Your company consistantly seeks high market share and tries to take advantage of cost efficiencies in every market.	Definitely Incorrect to Definitely True	1 to 5	3,88	2,85	***
C1-2	Your company exploits the advantage of being a "follower" and tries to reduce risks on the development of new products and or markets.	Definitely Incorrect to Definitely True	1 to 5	3,16	1,92	***
C1-3	Your company concentrates resources in a few strategic market segments.	Definitely Incorrect to Definitely True	1 to 5	3,76	2,88	***
C1-4	The pursuit of stockholder benefits is thought to be the most important social responsibility of your company.	Definitely Incorrect to Definitely True	1 to 5	2,37	1,92	
C1-5	Your company competes head-on with competitors.	Definitely Incorrect to Definitely True	1 to 5	4,63	4,61	
C1-6	Your company does not hesitate to divest from questionable business.	Definitely Incorrect to Definitely True	1 to 5	4,5	4,3	
C1-7	The diversification targets are restricted to those product lines which have close commonality with the existing technological base.	Definitely Incorrect to Definitely True	1 to 5	4,06	2,92	***
C1-8	Your company selects the market segments in which it has advantages and pursues coexistance with competitors.	Definitely Incorrect to Definitely True	1 to 5	3,21	3,35	
C1-9	Your company has been actively developing foreign markets.	Definitely Incorrect to Definitely True	1 to 5	2,46	3,19	*
C1-10	Strategy formulation in your company is based upon systematic research data and sophisticated analytical methods.	Definitely Incorrect to Definitely True	1 to 5	2,18	2,09	
C1-11	Your company is always an innovator which actively takes risks on the development of new product and /or market.	Definitely Incorrect to Definitely True	1 to 5	2,48	3,8	***
C1-12	Your company has actively acquired new businesses.	Definitely Incorrect to Definitely True	1 to 5	3,95	4,04	
C1-13	The recruitment of managerial personnel and technological experts are based upon long-range personnel planning rather than immediate needs.	Definitely Incorrect to Definitely True	1 to 5	3,4	2,16	***
C1-14	The diversification targets are restricted to those product lines in which existing strengths in marketing can be applied.	Definitely Incorrect to Definitely True	1 to 5	3,27	3,09	
C1-15	Information is sought extensively even on markets unrelated to present business.	Definitely Incorrect to Definitely True	1 to 5	2,75	2,69	
C1-16	Your company aims to produce high quality products with high value added and to rely on non-price marketing strategies.	Definitely Incorrect to Definitely True	1 to 5	2,83	4,33	***
C1-17	Your company emphasises accumulating diverse base of know-how more than making better use of existing know-how.	Definitely Incorrect to Definitely True	1 to 5	2,55	3,07	**
C1-19	The fulfilment of various social responsibilities is clearly built into corporate strategy of your company.	Definitely Incorrect to Definitely True	1 to 5	4,13	3,92	
* Significant at .05 level ** Significant at .01 level *** Significant at .001 level by t-test of means						

Table 4-4. Results for section C1

If one uses the types of technologies employed along with the strategic orientation adopted by the two group (stable and unstable), one can see the emerging of the two types, namely the product oriented and operation oriented. So far it is possible to see (table 4-5) that on average the firms in stable environment tend to be:

- planners who seek high market share
- focus their activities on a limited geographical area,
- have low levels of innovation
- use routine manufacturing technologies.

In contrast firms in unstable environments tend to be:

- non-planners (i.e., emergent)
- innovators,
- emphasise non-price (i.e., differentiation) competition, and
- use non-routine manufacturing technologies.

	Operations Oriented	**Product Oriented**
Environment	Stable	Unstable
Approach to Strategy Formulation	Planning	Emergent
Approach to Innovation	Follower	Innovator
Business-level Strategy	Price/Cost Leadership	Differentiation
Production Technology	Routine	Non-routine

Table 4-5. Strategy, technology and dynamism

To get a better picture of the actual competitive strategies adopted, an analysis of section C2 shall be conducted.

Competitive Strategies

Section C2 tries to determine which functional strategies have the greatest impact (as far as the respondent is concerned) on the implementation of the business-level strategies. Here respondents were given the choice of 5 functional area strategies:

1. Product strategy: product planning, market research for new products, R&D, and any other activity or strategy that is mainly concerned with products.
2. Promotional strategy: sales management, advertising, and other marketing activities and strategies.
3. Distribution strategy: choice of distribution channel, distribution and inventory programs.
4. Pricing strategy: price policy, pricing distribution.
5. Production strategy: economy of scale, cost reduction, flexibility of production systems, etc.

The respondents were asked to rank each according to its importance in relation to the main product of the company. The results are presented in the table 4-6.

Section C 2	Question	From - To	Grading	Mean: Stable	Mean: Unstable	Significance
C2-1	Product Stratgey	Least important to Most important	1 to 5	3,01(5)	2,88 (5)	
C2-2	Promotional Strategy	Least important to Most important	1 to 5	**3,85(3)**	**4,11(2)**	
C2-3	Distribution Strategy	Least important to Most important	1 to 5	3,31(4)	**4,19 (1)**	***
C2-4	Pricing Strategy	Least important to Most important	1 to 5	**4(2)**	**3,83 (3)**	
C2-5	Production Strategy	Least important to Most important	1 to 5	**4,2 (1)**	3,07(4)	***
* Significant at .05 level ** Significant at .01 level *** Significant at .001 level by t-test of means						

Table 4-6. Results from section C2

Nearly all manufacturing strategy literature state that one of the most important aspect of running a manufacturing organisation is the formulation and implementation of a sound production strategy. This according to the data presented in table 4-6, seems to apply only to those firms that operate in a stable market environment.

The results show that for firms operating in unstable environments, the concern with distribution supersede all other concerns. Here one must consider that stable environments (stable: sales and demand) result in a stable distribution channel; while an unstable market environment will also create an unstable distribution channel. This explains the concern of the small manufacturing firms in the unstable group with the distribution strategy.

Another explanation may lie in the products that these companies produce. It is a fact that technology and the product life cycle interact to determine the importance of strategies. Products in the mature phase of the product life cycle are produced in large batches or in line, with demand being fairly stable. Products such as cars, televisions, paper and food products (all in stable market environment) have to be produced at large quantities in order to be affordable and competitive (pricing).

In contrast, products in the unstable market environments are usually to be found either at the emerging phase or the declining phase of the product life cycle. This is also true of products that are modified, new technologies introduced, or otherwise enhanced in such a way that temporarily places them in the emerging phase. Of products in the declining phase one could name fur coats. The fur industry is ranked as the most unstable industry, followed closely by manufacturing of the musical instruments (rapid introduction of computing technologies placing it at the emerging phase), and office machinery (rapid introduction of computing technologies placing it at the emerging phase).

To sum up, the comparison indicates that while firms in stable market environment emphasise production and pricing strategies (low-cost leadership), the firms in unstable market environment opt for distribution and promotional strategies (differentiation). One can now add to the characteristics of the operations and product oriented types by including the subject of focus in the table 4-7.

	Operations Oriented	**Product-Oriented**
Environment	Stable	Unstable
Approach to Strategy Formulation	Planning	Emergent
Approach to Innovation	Follower	Innovator
Business-level Strategy	Price/Cost Leadership	Differentiation
Production Technology	Routine	Non-routine
Focus	Production & Pricing	Distribution & Promotion

Table 4-7. Focus and dynamism

Goals & Objectives

A firm must set objectives; the priorities of which are dependent on the opportunities provided and constraints imposed on it by the market environment. In this section (C3), the firms were asked to indicate the importance of 7 goals for their companies.

Section C3	Question	From - To	Grading	Mean: Stable	Mean: Unstable	Significance
C3-1	Return on investment	Little or no influence to Very strong influence	1 to 5	3,98 (4)	3,04 (7)	***
C3-2	Increase in market share	Little or no influence to Very strong influence	1 to 5	3,88(6)	3,02(8)	***
C3-3	New product ratio	Little or no influence to Very strong influence	1 to 5	2,6 (9)	3,7 (4)	***
C3-4	Capital gain for stockholders	Little or no influence to Very strong influence	1 to 5	2,98 (8)	**4,07 (3)**	***
C3-5	Efficiency of production and physical distribution	Little or no influence to Very strong influence	1 to 5	**4,55 (1)**	3,35(5)	***
C3-6	Equity/debt ratio	Little or no influence to Very strong influence	1 to 5	**4,05 (2)**	2,65 (9)	***
C3-7	Improvement of product portfolio	Little or no influence to Very strong influence	1 to 5	3,96 (5)	3,05 (6)	***
C3-8	Improvement in quality of working conditions	Little or no influence to Very strong influence	1 to 5	**4 (3)**	**4,29 (1)**	
C3-9	Improvement in public image of the company	Little or no influence to Very strong influence	1 to 5	3,76 (7)	**4,15 (2)**	
* Significant at .05 level ** Significant at .01 level *** Significant at .001 level by t-test of means						

Table 4-8. Results from section C3.

Table 4-8 shows many important differences. The first is the difference in the relative importance of efficiency of production. This is the most important goal of firms in stable market environment while it is ranked fifth for firms in the unstable market environment. This corresponds clearly with sections B, C1, and C2. Firms in stable market environment, using large batch or line production technologies have to pay particular attention to the efficiency of the production facilities, while firms in unstable market environment, using a more-or-less general equipment for job-shop or small batch production, are more concerned with the quality of the working conditions. This is because workers using general purpose machinery producing customised or semi-customised products tend to have a higher level of skill and therefore more difficult to find, expensive to train, and retain.

The importance of company image is another important difference. Improving public image is ranked second by the firms in unstable market environment, while it is ranked seventh by the firms in the stable market environment. This again can be related to the product life-cycle. Companies with products in the emerging phase/growth of the product life-cycle try much harder to establish brand loyalty and give a good image of themselves than companies with fairly well established products in the marketplace. Similarly, image also plays an important role in the declining phase of the product life-cycle. In this phase brand loyalty and image of the company plays an important role in a shrinking market.

There is also a striking difference between the two groups with regard to the importance of capital gain for stockholders (i.e. share prices). This objective was ranked eighth by the firms in stable market environment, while being ranked third by the firms in unstable market environment. It is unclear why this difference exists, since very few if any of the firms are listed on the Oslo Stock Exchange. It may be that companies in unstable markets frequently have to use their shares as collateral for raising loans for financing of new projects or products. This can also be seen from the importance given to the new product ratio by the firms in the unstable market environment.

One can now add to the characteristics of the operations and product oriented types, by including the subject of company goal and objectives. (table 4-9)

	Operations Oriented	Product Oriented
Environment	Stable	Unstable
Approach to Strategy Formulation	Planning	Emergent
Approach to Innovation	Follower	Innovator
Business-level Strategy	Price/Cost Leadership	Differentiation
Production Technology	Routine	Non-routine
Focus	Production + Pricing	Distribution + Promotion
Goals & Objectives	Production Efficiency	Improving Image (internal & External)

Table 4-9. Goals, objectives and dynamism

Organisational Structure

An organisation's structure can be described by dimensions measuring the pattern of division of labour, vertical and horizontal distribution of power, and influence within the organisation (Hage, 1967b; Hall, 1977; Pugh, 1968). The following three dimensions were used here: interdepartmental distribution of influence, degree of standardisation, and degree of formalisation.

Importance of Departments

The relative importance of departments are directly related to their influence on the company's decisions. This influence, one can say, is connected to the position of the products of the company in the product life-cycle.

When a product emerges, the operations department is still refining production efforts, which at best can be characterised as fluid and evolving. Marketing efforts may be starting or be at their peak. At the growth stage, the mandate for operations is to somehow keep up with demand, efficiency being less of a concern. In maturity, sales level off and profits begin to decline. New competitors create pressure to cut costs and slow the squeeze on unit profit margins. Here operations become extremely important, since it must stress efficiency. However, marketing does not lose its prominent place since it can ease the pressure by intensifying efforts to differentiate the product or service.

As can be seen, marketing department is important in nearly all stages of the product life-cycle, and this is also reflected in the responses of both groups in stable and unstable market environments.

Section C4	Question	From - To	Grading	Mean: Stable	Mean: Unstable	Significance
C4-1	Sales and Marketing	Little or no influence to Very strong influence	1 to 5	**3,66(3)**	**4,23 (1)**	**
C4-2	R&D	Little or no influence to Very strong influence	1 to 5	2,06(6)	**3,9(3)**	***
C4-3	Production	Little or no influence to Very strong influence	1 to 5	**4,13(1)**	2,73(7)	***
C4-4	Control and Finance	Little or no influence to Very strong influence	1 to 5	3,83 (2)	3,87(4)	
C4-5	Personnel, labour relations	Little or no influence to Very strong influence	1 to 5	3,64(4)	3,28(5)	
C4-6	Planning staff	Little or no influence to Very strong influence	1 to 5	3,54(5)	3,17(6	
C4-7	Purchasing, procurement	Little or no influence to Very strong influence	1 to 5	**3,83(2)**	**4,05(2)**	
* Significant at .05 level ** Significant at .01 level *** Significant at .001 level						

Table 4-10. Results from section C4

As can be seen from table 4-10, the unstable group ranks the sales and marketing department as having the most influence on the company's decision making process, while production department is ranked as the most influential department in the stable group.

It seems that, as was mentioned earlier, the stable group is mainly involved with mature products while the unstable group concentrates on emerging/growth/decline phase of the product life-cycle, with emerging phase being the prominent phase.

This can also be seen with relative difference of research and development (R&D) between the two groups. There is a significant difference between the two groups, with stable group stating that R&D department has little or no influence, while unstable group indicating the relative importance of this department by ranking it the third most important department in the company.

These findings are also consistent with the basic premise of strategic contingency theory that the power of a department is proportional to its importance in dealing with environmental contingencies threatening the attainment of organisational objectives (Hickson, 1971).

One can now add to characteristics of the operations and product oriented types by including the subject of importance of departments in the table 4-11.

	Operations Oriented	**Product Oriented**
Environment	Stable	Unstable
Approach to Strategy Formulation	Planning	Emergent
Approach to Innovation	Follower	Innovator
Business-level Strategy	Price/Cost Leadership	Differentiation
Production Technology	Routine	Non-routine
Focus	Production + Pricing	Distribution + Promotion
Goals & Objectives	Production Efficiency	Improving Image (internal & External)
Importance of Departments	Production + Purchasing	Sales & Marketing + Purchasing

Table 4-11. Importance of departments and dynamism.

Standardisation, Formalisation

Standardisation of procedures and routines is directly connected with the routineness of activities and similarity of the products of a company. A company that produces mature products at very large volumes tends to be much more standardised in its procedures than a company that keeps churning out new products. For example, routines and activities of a car manufacturing company such as Ford is much more standardised than the activities and routines of Nava Metric (Swedish electronics circuit consultant and prototype manufacturer).

Similarly, it is expected that those firms operating in an stable market environment would be more formalised, with clear job description and areas of responsibility than firms operating in an unstable market environment.

To check these points the participants were asked to identify the formal procedures and the type of systems used in their companies. The results are presented in the table 4-12.

Section D1	Question	From - To	Grading	Mean: Stable	Mean: Unstable	Significance
Sum D1-D28	**Standardisation** Questions D1 to D28	Yes - No	1 - 0	12,13	10,23	*
	Formalisation					
D2-1	The authority and responsibility of every executive or manager is clearly and concretely defined in your company.	Definitely incorrect to Definitely true	1 to 5	4,4	1,76	***
D2-8	The job descriptions for executives and managers are general and therefore applied very flexibly.	Definitely incorrect to Definitely true	1 to 5	2,26	3,19	***
* Significant at .05 level ** Significant at .01 level *** Significant at .001 level						

Table 4-12. Formalisation, standardisation and dynamism

As was expected, there were significant differences in standardisation and formalisation of routines between the two groups. High scores in standardisation and clear job definition/description, with low scores on flexibility, indicate an orientation towards planning, while the reverse indicate an emergent type of orientation. The result here corroborate earlier indications that firms in stable environment take a planning approach to strategy formulation while firms operating in unstable environment tend to adopt an emergent approach to strategy formulation. The results also show that firms in stable environment, because of their standardisation and formalisation are organisationally less flexible than their counterparts operating in unstable environment.

One can now add to the characteristics of the operations and product oriented types by including the subject of standardisation and formalisation in our table 4-13.

	Operations Oriented	**Product Oriented**
Environment	***Stable***	***Unstable***
Approach to Strategy Formulation	Planning	Emergent
Approach to Innovation	Follower	Innovator
Business-level Strategy	Price/Cost Leadership	Differentiation
Production Technology	Routine	Non-routine
Focus	Production + Pricing	Distribution + Promotion
Goals & Objectives	Production Efficiency	Improving Image (internal & External)
Importance of Departments	Production + Purchasing	Sales & Marketing + Purchasing
Organisational Flexibility	Less Flexible	More Flexible

Table 4-13. Organisational flexibility and dynamism.

Organisational Processes

The survey considered several aspects of organisational processes, such as leadership behaviour (Fleishman, 1962 ; Selznick, 1957), conflict resolution

(Lawrence, 1967) within the organisation, and decision making. The leadership behaviour dimension was excluded from the analysis because of the unreliability of some of the variables. This unreliability was the result of high number of missing values. Similarly the section for conflict resolution was supposed to have three variables representing forcing, smoothing and confrontation. The confrontation variable was also excluded because of the large number of missing values.

Conflict Resolution

Two models of conflict resolution within the organisation, forcing and smoothing, were compared. The comparative results, as shown in the table 4-14, indicate that firms in stable group put more emphasis on forcing a resolution as the mean to resolve conflict rather than compromise. This is in-line with the structure of the stable group identified earlier.

Section D2	Question	From - To	Grading	Mean: Stable	Mean: Unstable	Significance
D2-7	**Forcing (conflict Resolution)** The conflict among executives and managers are promptly resolved based upon superiors' authority.	Definitely incorrect to Definitely true	1 to 5	3,45	2,54	***
D2-11	**Smoothing (conflict Resolution)** When there is a difference in opinion and judgement among executives and managers, they always seek to find a temporary compromise rather than to impose a final decision.	Definitely incorrect to Definitely true	1 to 5	3,33	3,26	
	* Significant at .05 level ** Significant at .01 level *** Significant at .001 level					

Table 4-14. Conflict resolution and dynamism.

Decision Making & Communication

The comparative analysis results, as shown in table 4-15, shows that three significant differences exist between the two groups. First, in unstable group, individual's initiatives is valued more than in stable group. Second, information exchange is more formalised in stable group than in unstable group. And finally, consensus (conflict avoidance) is more heavily emphasised in stable group than in unstable group.

Section D2	Question	From - To	Grading	Mean: Stable	Mean: Unstable	Significance
	Decision Making & Communication					
D2-4	In your company individual managers' initiative is valued more than harmony of human relations.	Definitely incorrect to Definitely true	1 to 5	2,68	3,77	***
D2-10	Important information is usually exchanged informally among executives and managers.	Definitely incorrect to Definitely true	1 to 5	4,35	3,8	***
D2-6	Consensus is heavily emphasised in the decisions and actions of each unit.	Definitely incorrect to Definitely true	1 to 5	3,5	2,69	**

* Significant at .05 level ** Significant at .01 level *** Significant at .001 level

Table 4-15. Decision making and communication.

Finally one can add the organisational process indicators to other characteristics of the operations oriented and product oriented types. The final results are presented in table 4-16.

	Operations Oriented	**Product Oriented**
Environment	Stable	Unstable
Approach to Strategy Formulation	Planning	Emergent
Approach to Innovation	Follower	Innovator
Business-level Strategy	Price/Cost Leadership	Differentiation
Production Technology	Routine	Non-routine
Focus	Production + Pricing	Distribution + Promotion
Goals & Objectives	Production Efficiency	Improving Image (internal & External)
Importance of Departments	Production + Purchasing	Sales & Marketing + Purchasing
Organisational Flexibility	Less Flexible	More Flexible
Conflict Resolution	Forcing	--------------
Information Exchange	Formal	Informal
Emphasis on Decisions and Actions	Consensus	------------

Table 4-16. Operations oriented and product oriented types defined.

Comparative Analysis: Summary

The comparative analysis of the two groups revealed that there are significant differences between the firms that operate in stable market environment and those that operate in an unstable environment. The differences, as shown in *table* 4-17, range from differences in unexpected fluctuation in demand and sales to the type of production technologies employed.

Section A	Question	From - To	Grading	Mean: Stable	Mean: Unstable	Significance
A-4	In the market that you serve, new products and technichal innovation are introduced	Very seldom to Often	1 to 5	2,2	3,47	***
A-5	In the market that you serve,unexpected changes in demand takes placed	Very seldom to Often	1 to 5	2,03	3,88	***
A-6	In the market that you serve, unexpected changes in sales takes place:	Very seldom to Often	1 to 5	2,11	3,66	***
A-8	In the market that you serve, unexpected changes in the number of employees takes place:	Very seldom to Often	1 to 5	1,53	2,07	***
B-1	Custom	Is not used to Used Frequently	1 to 5	2,18	3,3	***
B-3	Large Batch	Is not used to Used Frequently	1 to 5	3,29	2,33	***
B-4	Mass Production	Is not used to Used Frequently	1 to 5	3,13	1,88	***
C1-1	Your company consistantly seeks high market share and tries to take advantage of cost efficiencies in every market.	Definitely Incorrect to Definitely True	1 to 5	3,88	2,85	***
C1-2	Your company exploits the advantage of being a "follower" and tries to reduce risks on the development of new products and or markets.	Definitely Incorrect to Definitely True	1 to 5	3,16	1,92	***
C1-3	Your company concentrates resources in a few strategic market segments.	Definitely Incorrect to Definitely True	1 to 5	3,76	2,88	***
C1-7	The diversification targets are restricted to those product lines which have close commonality with the existing technological base.	Definitely Incorrect to Definitely True	1 to 5	4,06	2,92	***
C1-9	Your company has been actively developing foreign markets.	Definitely Incorrect to Definitely True	1 to 5	2,46	3,19	*
C1-11	Your company is always an innovator which actively takes risks on the development of new product and /or market.	Definitely Incorrect to Definitely True	1 to 5	2,48	3,8	***
C1-13	The recruitment of managerial personnel and technological experts are based upon long-range personnel planning rather than immediate needs.	Definitely Incorrect to Definitely True	1 to 5	3,4	2,16	***
C1-16	Your company aims to produce high quality products with high value added and to rely on non-price marketing strategies.	Definitely Incorrect to Definitely True	1 to 5	2,83	4,33	***
C1-17	Your company emphasises accumulating diverse base of know-how more than making better use of existing know-how.	Definitely Incorrect to Definitely True	1 to 5	2,55	3,07	**
C2-3	Distribution Strategy	Least important to Most important	1 to 5	3,31	4,19	***
C2-5	Production Strategy	Least important to Most important	1 to 5	4,2	3,07	***
C3-1	Return on investment	Little or no influence to Very strong influence	1 to 5	3,98 (4)	3,04 (8)	***
C3-2	Increase in market share	Little or no influence to Very strong influence	1 to 5	3,88	3,02	***
C3-3	New product ratio	Little or no influence to Very strong influence	1 to 5	2,6 (9)	3,7 (5)	***
C3-4	Capital gain for stockholders	Little or no influence to Very strong influence	1 to 5	2,98 (8)	**4,07 (3)**	***
C3-5	Efficiency of production and physical distribution	Little or no influence to Very strong influence	1 to 5	**4,55**	3,35	***
C3-6	Equity/debt ratio	Little or no influence to Very strong influence	1 to 5	**4,05 (2)**	2,65 (9)	***
C3-7	Improvement of product portfolio	Little or no influence to Very strong influence	1 to 5	3,96 (5)	3,05 (7)	***
C4-1	Sales and Marketing	Little or no influence to Very strong influence	1 to 5	**3,66**	**4,23**	**
C4-2	R&D	Little or no influence to Very strong influence	1 to 5	2,06	3,9	***
C4-3	Production	Little or no influence to Very strong influence	1 to 5	**4,13**	2,73	***
C5-4	General Manager (Director)	Little or no influence to Very strong influence	1 to 5	4,38	3,7	***
C5-6	Committees in functional departments	Little or no influence to Very strong influence	1 to 5	2,01	3,58	***
Sum D1-D28	Questions D1 to D28	Yes - No	1 - 0	12,13	10,23	*
D2-1	Authority and responsibility of every manager are clearly defined	Definitely incorrect to Definitely true	1 to 5	4,4	1,76	***

The results contrasted the environments, objectives, strategies, types of technologies employed, leaderships' influence, standardisation, formalisation and control of the firm's operations in stable and unstable market environments. The differences were perceived to be logically consistent with the contingency theory of the organisation. Hence it can be concluded that both groups, on average, create consistent patterns which fit the organisation to its environment. The patterns are summarised in the table 4-18.

	Firms in Stable Environment	Firms in Unstable Environment
Env. Demand & Sales	Stable	Volatile
Objectives	Efficiency of production and physical distribution	Improvement in quality of working conditions, and image of the company
Strategic Orientation	Follower, seeking high market-share, stressing cost/price leadership	Innovator and risk taker, stressing differentiation, with willingness to diversify
Technology	Routine: Large batch, mass production technologies	Non-routine: Custom, small batch production technologies
Organisational Structure	Somewhat-mechanistic structure (Formalised, standardised routines); strong power of production department followed by control and finance department.	Somewhat-organic structure (low formalisation, somewhat standardised routines); strong power of sales & marketing department followed closely by purchasing and procurement department.
Organisational Process	Task-oriented leadership, conflict resolution by forcing, formal information exchange routines.	Information-oriented leadership, informal information exchange.

Table 4-18. Consistent patterns of adaptation.

In most discussions, the environment is assumed to be the causal factor in the organisation-environment relationship, and this is not more true than in the case of small firms.

As can be seen, there emerges two different mode of adaptation: operations oriented and product oriented. Neither modes of adaptation, in itself, is superior or inferior to the other (as will be demonstrated later in this chapter). For instance, the type of technologies used by firms in stable environment clearly supports their strategy of cost/price leadership, while using general purpose machines is much more suitable for customised production of firms operating in unstable environments.

The independent t-test analysis of means has been useful in highlighting important differences that exist between the two groups. It also has indicated, that direct relationships may exist between environment and strategic orientation, choice of technology, and the organisational orientation. The next section will closely examine these assumptions.

Measurement: A Multivariate Approach

There are three principal dimensions of organisations: (1) their dominant strategic orientation – (2) whether operations or product oriented, and their dominant organising principle – (3) whether dependent more on group or bureaucratic dynamics, and technologies employed.

Indicators for the first and third dimensions will be derived from factor analysis of the appropriate variables, while indicators for the second dimension will be derived from the original variables using the pre-defined formulae that were built into the questionnaire for this purpose.

The first major dimension, operation vs. product orientation describes the dominant strategy orientation of the firm. The operations-oriented strategy focuses upon continuous, incremental improvement of operations, production processes, and existing products; and it places much emphasis on accumulating intra-company capability and "know-how" for future contingencies.

The product-oriented strategy, on the other hand, places greater emphasis upon new product development and diversification, relying heavily on the flexible deployment of resources, for example, diversification through acquisition and active divestiture of unprofitable businesses.

The second dimension, group vs. bureaucratic dynamics, describes the dominant organising orientation of the firm. The *group dynamics-oriented organisation* emphasises an organic mode of management (decentralised, informal, and unsophisticated structures) which relies on shared values and information, frequent interaction, loosely-coupled groups, and actions which are emergent from the bottom up. The bureaucratic dynamics organisation relies on a mechanistic structure (centralised, formalised, and sophisticated structures), hierarchical co-ordination, tightly-coupled units, and actions initiated from the top-down.

The dominant organising mode is measured by the four indicators presented in the table 4-19.

Indicators of the Organising Orientation		
Dimensions and Indicators	**Conceptual Definitions**	**Questionnaire Items**
Structuring of organisation (OSTR)	The degree of soffistication and standardisation of managerial system	Question D1 (total score)
Formalisation (OFORM)	The degree of formalisation of organisational rules and procedures.	Question D2 (1-8)
Institutionalisation of Values (Ovalues)	The degree to which values and beliefs are embedded in systems and strategies.	Question C1 (18)+ Qiestion D2 (4)
Human resource emphasis (OHR)	The degree to which long-term evaluations, personnel planning and job rotations are employed.	Question C1 (13) + Question D2 (2+9)

Table 4-19. Organising mode's indicators

High scores on the first two indicators, structuring of organisation and formalisation, characterise bureaucratic dynamics. High scores on the next two indicators, institutionalisation of values, and human resource emphasis, characterise group dynamics.

The third dimension, technologies employed, will cover two factors: routine and non-routine technologies.

Part 1: Correlation and Regression Analysis

This section is composed of two parts (figure 4-1). Part one will examine the relationship that may exist between the objective environmental dynamism, organising orientation, strategic orientation, and technologies employed. The second part will look at influences of strategies, organising orientation, and technologies employed on company performance.

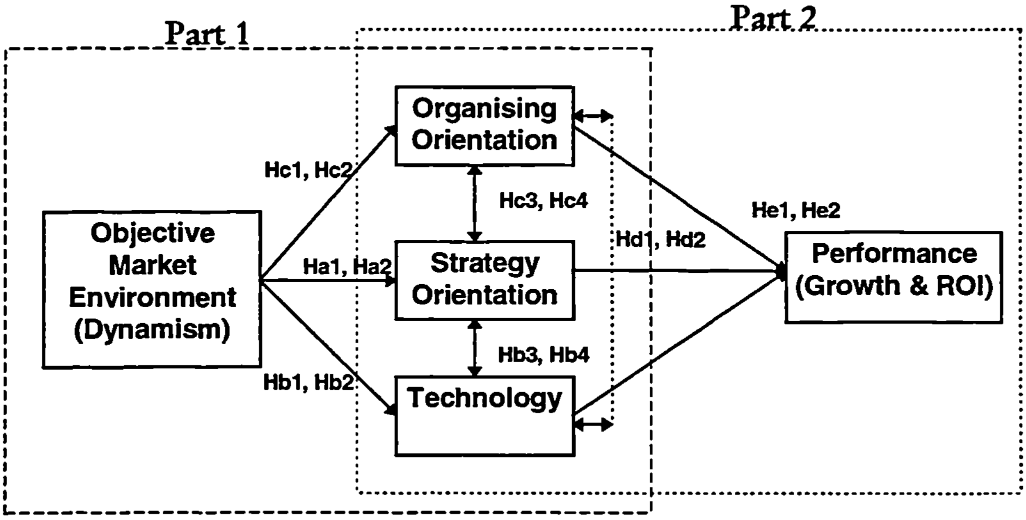


Figure 4-1. Model under investigation

Data Reduction : Factor Analysis

In order to examine the existing relationship further, we shall reduce the number of variables by using the factor analysis. This procedure is used to identify underlying factors that explain the correlation among a set of variables. Its purpose is often to summarise a large number of variables with a smaller number of factors.

Because of the exploratory nature of the research and the need for simplifying assumptions, the hypothesised factors were assumed to be orthogonal. Although the effects of some of the dimensions might have been similar, there was no priori theoretical rationale for the assumption of the independence of the factors; therefore, a Principal components analysis followed by varimax rotation was used.

The decision rules used regarding the minimum number of variables required for each factor followed Kim's et al. (1978:77) suggestions. They argue that:

> "Thurstone suggests at least three variables for each factor, but this requirement need not be met if confirmatory factor analysis is used. In general, researchers seem to agree that one should have at least twice as many variables as factors."

First, at least two variables were required to load at a level greater than or equal to 0.4 on each priori factor. Second, the eigenvalue of any common factor was required to be equal or greater than one. This criterion required that each significant factor had to explain a proportion of the total variance that was greater than or equal to the average percentage of the total variance of a single variable.

Results

Although earlier it was mentioned that one was concerned with the interaction of the three dimensions of organisation, in the factor analysis part, the perceived environment was included as the fourth dimension. This dimension was included to examine the similarity-dissimilarity of the perceived environmental dynamism with the objective environmental dynamism which was calculated from independent industry specific information. The standardised alphas for the scale corresponding to the three hypothesised environmental factors were growth (α=0.6541), variability (α=0.6275), and diversity (α=0.8823).

This analysis was followed by factor analysis of strategic orientation and technologies employed. Strategic orientation was composed of 14 variables, which produced 2 factors: product oriented strategy factor (α=0.7853) and operation orientated strategy factor (α=0.7399). Similarly, a factor analysis of the 5 technology variables produced 2 factors: non-routine manufacturing technologies (α=0.5968), and routine manufacturing technologies (α=0.6413).

All the alphas , except non-routine manufacturing technologies factor, exceeded the value, α= 0.6, which Nunnally (1978) suggested as appropriate for exploratory research. The non-routine production technologies (CustF) factor with α=0.5968 was included, since the result was so close to the lower limit of 0.6.The following table(4-20*)* illustrates the findings along with their alphas.

	Variables		Factors	Description
Environment	A2, A3	α=0.6275	EVarf	Environmental Volatility
	A5, A6	α=0.8823	EDivf	Environmental Growth
Performance	A9, A10, A11	α=0.6541	Growth	Performance
	ROI		Rentabil	Performance
Strategy	Emphasis on Operations	α=0.7853	OperatF	Operations Oriented Strategy
	Emphasis on Products	α=0.7399	ProductF	Product Oriented Strategy Factor
Technology	B1,B2	α=0.5968	CustF	Non-routine manufacturing
	B3,B4, B5	α=0. 6413	MassTec	Routine manufacturing

Table 4-20. Indicators and their alphas.

Having identified the factors representing the four dimensions one can proceed to the next step in the analysis.

Non-Interactive Analysis

Correlation analysis test the association between variables. It answers the question: *'in what way are the variables related, and how strongly?'* There are several methods available for examination of association between variables. Two of the most commonly used methods are the Pearson and Spearman correlation analyses.

In both methods, the correlation coefficients (absolute measure that does not depend on the unit of measurement) range from -1 to +1. The Pearson correlation coefficient is calculated using actual data values, while the Spearman correlation coefficient, a nonparametric alternative to Pearson correlation coefficient, replaces the actual data with ranks. The Pearson correlation coefficient is appropriate for variables measured at the interval level, while the Kendall and Spearman coefficients assume only an ordinal level of measurement.

Considering that the scale used is continuous, we shall use the Spearman method for measuring the degree of association between our objective measure of market stability and the subjective market environmental factors. The result of the correlation analyses is presented in table 4-21.

Correlations: Dynamism and Other Indicators

Environment		
Environmental Variability (percieved)	*Evar*	*0,7058****
Organising Oriantation		
Degree of Formalisation	*OFORM*	*-0,7498****
Emphasis on Human Resources	OHR	-0,3471***
Relative Power of Purchasing Dept.	OPPUR	-0,2135*
Degree of Standardisation	OSTR	-0,1253*
Institutionalisation of Values	*OVALUES*	*0,1865**
Strategic Oriantation		
Product Oriented (Emergent)	*SPE*	*0,4171****
Operations Oriented (Planning)	*SERIO*	*-0,7295****
Technology		
Custom Technology	*TCT*	0.4171***
Mass Production Technology	*TMASS*	-0,7295***
* P< 0,05 ** P< 0,01 *** P< 0,001		

Table 4-21. Correlation results.

To double check our analysis we shall also use the curve estimation-linear regression analysis. The equation used in linear model of regression analysis is: $\mathbf{Y = b_0 + b_1X}$, where **Y** is the dependent variable, $\mathbf{b_0}$ is a constant, $\mathbf{b_1}$ is the regression coefficient, and **X** is the independent variable.

In our regression analyses, dynamism is the X and other dependent indicators are Ys. It should be noted that in this equation Beta coefficient can have values greater than one, since it only represents the angle of the line, and is also un-standardised. It is the Rsqr and the sign of beta coefficient that is important. The result of the regression analyses is presented in the table 4-22.

Curve Estimation-Linear Regression Analysis

Independent: Objective Dynamism	Dependent	Rsq	Beta
Organisation			
Formalisation	OFORM	0,562***	-1,0195
Human Resource Emphasis	OHR	0,120***	-0,4086
Standardisation	OSTR	0,046*	-0,5964
Sharing of Values	OVALUES	0,035	0,1513
Strategy			
Operations Oriented Strategy	OPERATF	0,532***	-0,4282
Product Oriented Strategy	PRODUCTF	0,174***	0,2248
Technology			
Mass Production Technology	MASSTECF	0,137***	-0,2179
Customised Production Technology	CUSTTECF	0,078**	0,1651
* P<0.05 ** P<01 *** P<001			

Table 4-22. Regression analysis.

As can be seen from table 4-22, there is a strong correlation between the objective and subjective environmental dynamism (0.705). This means that the managers of the firms in our survey had a very good understanding of the volatility of their market environment. This close correlation also is a good indicator of the validity of our objective environmental dynamism values.

Figure 4-2 presents the signs of dynamism values. It is important for the reader to note that dynamism's value moves from highly stable environment (*negative value*) to highly unstable environment (*positive value*).

Dynamism

Negative value ⟶ **Positive value**

STABLE ⟶ **UNSTABLE**

Figure 4-2. Values of dynamism.

The correlation results also show that there is a strong and inverse association between the dynamism and strategic orientation. Considering the sign of the environmental dynamism and the existing inverse relationships, we can state the following:

- There is evidence of correlation between environmental instability and product oriented strategy .

- There is evidence of correlation between environmental stability and operations oriented strategy.

It is evident that there is a strong correlation between the type of strategy adopted and the environmental dynamism. This correlation is particularly strong with regard to operations oriented strategy (0.7295, table 4-21). As we have seen dynamism goes from negative to positive; that is to say from stable to unstable. The correlation between operations strategy and dynamism is **-0,7295**. The negative sign means that there is a correlation between stability and operations oriented strategy. Since operations oriented strategy is a planning approach, we can say that our hypothesis

Ha2: *Small manufacturing companies that operate in an stable environment tend to follow the planning approach to strategy formulation*, is strongly supported.

Similarly, we can state that the hypotheses

Ha1: *Small manufacturing firms operating in an unstable environment tend to follow the emergent approach to strategy formulation,* is also strongly supported.

The sign for the correlation is positive (+0,4171, table 4-21), meaning that there is a positive association between dynamism and product oriented strategy. Since product oriented strategy is a form of emergent approach to strategy formulation, we can state that there is a good correlation between the emergent strategy formulation and dynamism (environmental instability) .

Table 4-23

Correlation: Dynamism & Organising Orientation

		Dynamism
Degree of Formalisation	OFORM	-0,7498***
Emphasis on Human Resources	OHR	-0,3471***
Degree of Standardisation	OSTR	-0,2135**
Institutionalisation of Values	OVALUES	0,1865*
* P< 0,05 ** P< 0,01 *** P< 0,001		

Table 4-23 also shows a significant correlation between formalisation and dynamism (-0,7498). Mintzberg argues that, "formalisation refers to the standardisation of work procedures by the imposition of operating instructions, job descriptions, regulations and the like. Structures that rely on any form of standardisation for co-ordination may be defined as bureaucratic, those that do not as organic" (Mintzberg, 1989). He also argues that the more dynamic an organisation's environment becomes, the more organic its structure will be. This point ,being similar to the hypotheses Hc1 and Hc2, is strongly corrected. Our two hypotheses concerning strategy-organisation relationship were:

Hc1. *Small Manufacturing firms operating in unstable environment tend to have a more organic structure.*

Hc2. *Small Manufacturing firms operating in stable environment tend to have a more mechanistic organisational structure.*

It was shown that there exists a strong association (Table 4-21) between dynamism and strategy. A correlation and regression analysis of strategy factors and organisational indicators (tables 4-24, and 4-25) also show a strong association between these two groups.

Table 4-24

Correlation: Strategy & Organising Orientation

		Operations Oriented	Product Oriented
		OperatF	ProductF
Degree of Formalisation	OFORM	0,6336***	-0.3717***
Emphasis on Human Resources	OHR	0,3120**	-0,0596
Degree of Standardisation	OSTR	0.2437*	-0.0409
Institutionalisation of Values	OVALUES	-0.1218	0.2965**
* P< 0,05 ** P< 0,01 *** P< 0,001			

		Organisation							
		OFORM		OHR		OSTR		OVALUES	
Strategy Indicators	Dependent	Rsq	Beta	Rsq	Beta	Rsq	Beta	Rsq	Beta
Operations Oriented Strategy	OPERATF	0,401***	0,2676	0,097**	0,1629	0,059**	0,0518	0,015	-0,0911
Product Oriented Strategy	PRODUCTF	0,138***	-0,157	0,004	-0,0311	0,002	0,0087	0,088**	0,2219
* P<0.05 ** P<01 *** P<001									

Table 4-25. Regression analysis: strategy and organisational indicators.

We know that both strategy and organisational structure are associated with dynamism. We have also shown the strategy and organisational structure are correlated with each other. Based on these findings we can state that our hypotheses Hc3 and Hc4 are supporter.

Hc3: *Small manufacturing firms that have adopted the emergent approach to strategy formulation tend to also use a more organic form of organisational structure.*

Hc4: *Small manufacturing firms that have adopted the planning approach to strategy formulation tend to also use a more mechanistic form of organisational structure.*

We have seen that manufacturing firms operating in stable environment adopted a planning approach, while those operating in unstable environment adopted an emergent approach to strategy formulation. Similarly we saw that the same groups also had mechanistic (bureaucratic) and organic structures. It would then be correct to state that manufacturing firms operating in stable environment tend to adopt a planning approach to strategy formulation and have a mechanistic organisational structure while manufacturing firms operating in unstable environment tend to adopt an emergent approach to strategy formulation and have an organic organisational structure.

These findings support the hypotheses Hc1, Hc2, Ha1, Ha2, Hb1, and Hb2. The other hypotheses such as Hc3, Hc4, Hb3, Hb4, and Hd1, Hd2 were also investigated, using the correlation and regression analysis. The results are presented in *tables 4-26 to 4-29.*

Table 4-26

Correlation: Organising Orientation and Technology

		Routine Production Technologies	Non-routine Production Technologies
		MasstecF	CusttecF
Degree of Formalisation	OFORM	0,2543**	-0,1772
Emphasis on Human Resources	OHR	0,1953*	-0,0273
Degree of Standardisation	OSTR	0,2570**	-0.0262
Institutionalisation of Values	OVALUES	-0,0004	0.2225*
* P< 0,05 ** P< 0,01 *** P< 0,001			

Table 4-27

Correlation: Strategic Orientation and Technology

		Routine Production Technologies	Non-routine Production Technologies
		MasstecF	CusttecF
Product Orientation	ProductF	-0,0290	0.2128*
Operations Orientation	OprtatF	0,3866***	-0,1932
* P< 0,05 ** P< 0,01 *** P< 0,001			

Table 4-28

		Strategy Factors			
		ProductF		OperatF	
Technology Indicators	Dependent	Rsq	Beta	Rsq	Beta
Mass Production Technology	MASSTECF	0,001	-0,0293	0,149***	0,3919
Customised Production Technology	CUSTTECF	0,045*	0,2137	0,037	-0,1946
* P<0.05 ** P<01 *** P<001					

Table 4-29

		Technology Factors			
		CusttecF		MasstecF	
Strategy Indicators	Dependent	Rsq	Beta	Rsq	Beta
Operations Oriented Strategy	OPERATF	0,037	-0,1918	0,149***	0,3813
Product Oriented Strategy	PRODUCTF	0,045*	0,2119	0,001	-0,0287
* P<0.05 ** P<01 *** P<001					

The results confirm our hypotheses mentioned earlier. It shows that there is a positive correlation between standardisation-formalisation and operations strategy, while being negative for product oriented strategy. The results show specifically that there is a strong association between operations strategy and formalisation. The results also show a positive association between operations strategy and mass production technologies and a positive association between formalisation and mass production technologies.

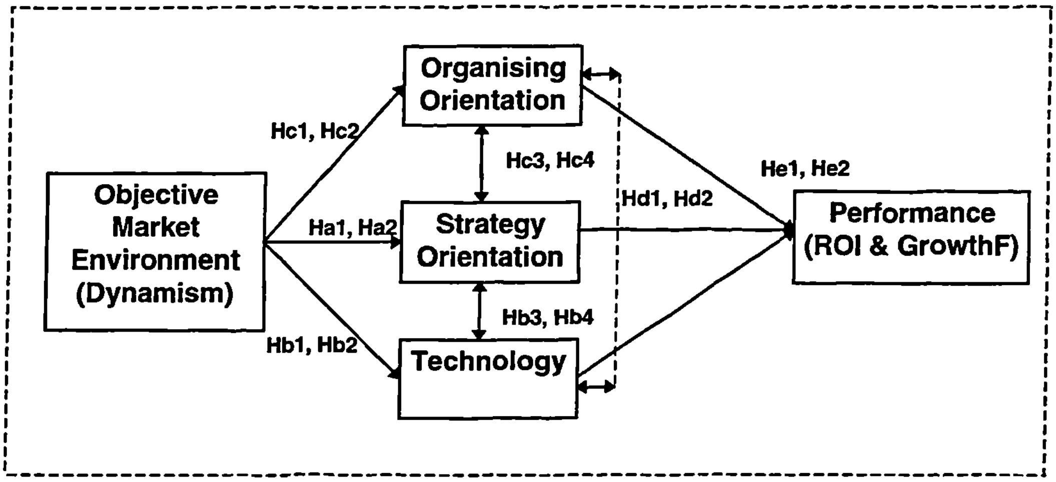
We can summarise the results by stating that there is a positive association between operation strategy and formalisation and mass production technologies. Stated differently, we can state that, manufacturing firms that adopt operations oriented strategy tend to be more formalised and employ mass-production technologies, while manufacturing firms adopting the product-oriented approach tend to be less formalised, emphasising sharing of values, and employing general purpose manufacturing technologies.

And since there are associations between dynamism and other factors, we can summarise the results according to the environmental stability/instability. The result is presented in the table 4-30.

		Environment	
Strategies Adopted		**Stable**	**Unstable**
Product Oriented	*PRODUCTF*	**Low**	**High**
Operations Oriented	*OperatF*	***High***	**Low**
Organisational Structure			
Degree of Formalisation	*OFORM*	***High***	**Low**
Emphasis on Human Resources	OHR	**High**	**Low**
Degree of Standardisation	OSTR		
Institutionalisation of Values	*OVALUES*	***Low***	**High**
Technologies Employed			
Non-routine Technology	*CUSTF*	***Less***	**High**
Routine Technology	*MASSTECF*	***High***	**Low**

Table 4-30. Findings from part one

Part 2- Interaction and Linear Regression Analysis: Determinants of Performance



The relationship between strategy and performance has received considerable attention in literature over the years. The literature has been mainly concerned either with the company orientation to markets: how they are perceived and acted upon via investment decisions and product development (Porter, 1980), or with the arrangements of organisations and their effect on performance (Burns and Stalker, 1961; Lawrence and Lorsch, 1967; Mintzberg, 1979). This section will test both propositions.

Interactive Analysis Defined

In the general form of the linear regression model, the dependent variable, 'Y', is assumed to be a function of a set of 'k' independent variables - X_1, X_2, X_3,...,X_k - in a population. To express the model in equation form, we use X_{ij} to denote the value of the J^{th} observation of the variable X_i . The linear regression model assumes that for each set of values for the 'k' independent variables (X_{1j}, X_{2j},..., X_{kj}), there is a distribution of Y_j values, such that the mean of the distribution is on the surface represented by the equation

$$E(Y) = \beta_0 + \beta_1 X_{1j} + \beta_2 X_{2j} + \dots + \beta_k X_{kj}$$

where the letter E denotes the expectation operation, β_0 is the intercept and β_k the partial slope coefficient (slope of the relationship between the independent variable X_i and the dependent variable Y).

Here we expect Y to increase by β_1 per unit increase in X_1, with X_2 held fixed. What if the marginal rate of increase of E(Y) is different for high values of X_2 when compared to low values of X_2? One way to model this simply is to create an interaction variable $X_3 = X_1 X_2$ and consider the model

$$\mathbf{E(Y) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3}$$

with this model, the change in the expected Y per unit change in X_1 now depends on X_2.

"More generally, an interaction term is a variable that is created as a non-linear function of two or more explanatory variables. These special terms, even though permitting us to explore a rich family of non-linear functions, can be cast as special cases of the linear regression model. To do this, we simply create the variable of interest and treat this newly created term as another explanatory variable" (Frees 1996:170)

The following interaction variables were computed in order to examine dynamism-strategy/organisation/technology-performance relationships.

Figure 4-4. New variables

Dependent Variables: Rentabilitet , GrowthF

Dynamism

Strategy

OperatF
ProductF

Organisation

Oform
OHR
OSTR
Ovalues

Technology

CusttecF
MasstecF

Interaction (New Variables)

IntOpera	=	OperatF	x	Dynamism
IntProdu	=	ProductF	x	Dynamism
IntOform	=	Oform	x	Dynamism
IntOHR	=	OHR	x	Dynamism
IntOSTR	=	OSTR	x	Dynamism
IntOvalue	=	Ovalues	x	Dynamism
IntCustt	=	CusttecF	x	Dynamism
IntMasst	=	MasstecF	x	Dynamism

Enter Method of Regression Algorithm

One procedure for bringing explanatory variables into our model is the Enter method of regression analysis. The enter method forces the entry, that is, the variables in the block are entered in a single step. Using this method of regression analysis we get the following results.

		Sample Beta Coefficients		
Description	**Indicator**	**Growth**	**ROI**	**Tolerance**
Dynamism	Dynamism	-0,2835	-0,1848	**0,0536**
Operations Oriented Strategy	OPERATF	-0,0187	-0,2740	0,2200
Product Oriented Strategy	PRODUCTF	0,0964	0,0742	0,4722
Formalisation	OFORM	-0,0907	0,1318	0,3123
Human Resource Emphasis	OHR	0,0128	-0,0531	0,6656
Standardisation	OSTR	0,1049	-0,0687	0,6189
Sharing of Values	OVALUES	-0,0534	0,1162	0,5086
Customised Production Technology	CUSTECF	0,0356	0,0248	0,7310
Mass Production Technology	MASSTECF	0,1636	-0,0637	0,7303
Operations Oriented Strategy X Dynamism	INTOPERA	**0,4400 ***	-0,3450	0,2440
Product Oriented Strategy X Dynamism	INTPRODU	0,0469	**0,3000 ***	0,5479
Formalisation X Dynamism	INTOFORM	0,1255	0,0997	0,6290
Human Resource Emphasis X Dynamism	INTOHR	0,0952	-0,0213	**0,0714**
Standardisation X Dynamism	INTOSTR	0,0791	-0,2016	0,1122
Sharing of Values X Dynamism	INTVALUE	0,2923	-0,1031	0,1117
Customised Production Technology X Dynamism	INTCUSTT	0,2259	0,0583	0,5573
Mass Production Technology X Dynamism	INTMASST	-0,2214	0,1112	0,4267
*** P<0.05 ** P<01 *** P<001**	**Rsqr**	**0,2543**	**0,1410**	

Figure 4-5. Regression Analysis

Before we make any statement regarding our findings, we shall check the assumptions needed for testing of the hypotheses. The first step is to check for collinearity.

Collinearity refers to the situation in which there is a high multiple correlation when one of the independent variables is regressed on the others (that is, when there is a high correlation between independent variables). The problem with collinear variables is that they provide very similar information, and it is difficult to separate out the effects of individual variables.

To test for collinearity, we can use several tests, of which tolerance of a variable is the most commonly used. The tolerance of a variable "i" is defined as $1\text{-}R_i^2$, where R_i is the multiple correlation coefficient when i^{th}

independent variable is predicted from other independent variables. If any tolerances are small (less than 0.1) multicollinearity may be a problem. In our results (presented in figure 4-5), two variables appear with tolerances bellow 0.1. These variables are Dynamism and INTOHR.

What should be done with the existing collinearity? Frees (1996:273) answer this question by arguing that:

1. the fact that there is high correlation (among independent variables) neither precludes us from getting good fits nor from making predictions of new observations, and

2. estimates of error variances and, therefore, tests of model adequacy, are still reliable.

Frees (1196:276) suggests another option. He argues that " another option is to simply not explicitly account for collinearity in the analysis but to discuss some of its implications when interpreting the results of the regression analysis. This approach is probably the most commonly adopted one. It is the fact of life that, when dealing with business and economic data, collinearity does tend to exist among variables."

Another answer to the problem of existing collinearity is proposed by Norousis (1993:485). He argues that in cases where collinearity exist, one can identify the variables that are almost linear combination of each other and remove some of them from the model. To test out this solution, we have removed the sources of collinearity and conducted the analysis again. The results are presented in figure 4-6 below.

Description	Indicator	Sample Beta Coefficients Growth	ROI	Tolerance
Operations Oriented Strategy	OPERATF	-0,0073	-0,2799	0,2360
Product Oriented Strategy	PRODUCTF	0,0808	0,0659	0,4879
Formalisation	OFORM	-0,0592	0,1638	0,3514
Human Resource Emphasis	OHR	0,0329	-0,0424	0,7189
Standardisation	OSTR	0,1199	-0,0509	0,6708
Sharing of Values	OVALUES	-0,0275	0,1338	0,5515
Customised Production Technology	CUSTECF	0,0252	0,0144	0,7514
Mass Production Technology	MASSTECF	0,1613	-0,0606	0,7495
Operations Oriented Strategy X Dynamism	INTOPERA	**0,4481** **	-0,3137	0,2799
Product Oriented Strategy X Dynamism	INTPRODU	0,0308	**0,2854** *	0,5708
Formalisation X Dynamism	INTOFORM	0,1121	0,0974	0,6811
Standardisation X Dynamism	INTOSTR	0,0294	-0,2726	0,1543
Sharing of Values X Dynamism	INTVALUE	0,2341	-0,1732	0,1434
Customised Production Technology X Dynamism	INTCUSTT	0,2399	0,0605	0,6029
Mass Production Technology X Dynamism	INTMASST	-0,1914	0,1394	0,4825
* P<0.05 ** P<01 *** P<001	Rsqr	0,2499	0,1381	

Figure 4-6 Regression Analysis Results with Normal Tolerances

As can be seen the removal of the two variables had almost no impact on the model. We shall continue our tests for violation of assumption by examining the residuals.

Residuals

In model building a residual is what is left after the model is fit. It is the difference between an observed value and the value predicted by the model. One way of checking assumptions is to plot the residuals to check for normalcy. The following is the histogram of standardised residuals.

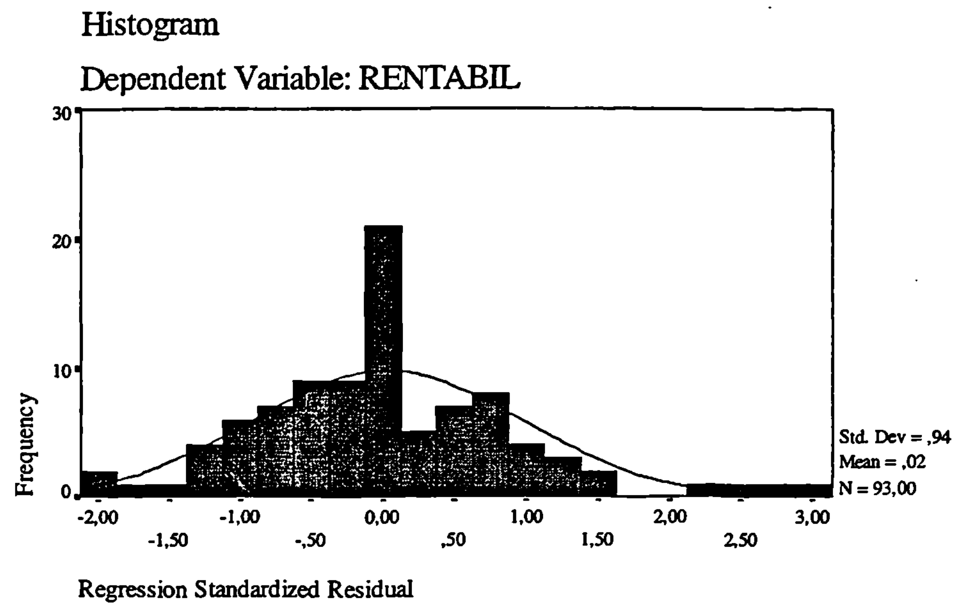


Figure 4-7. Residual distribution 1

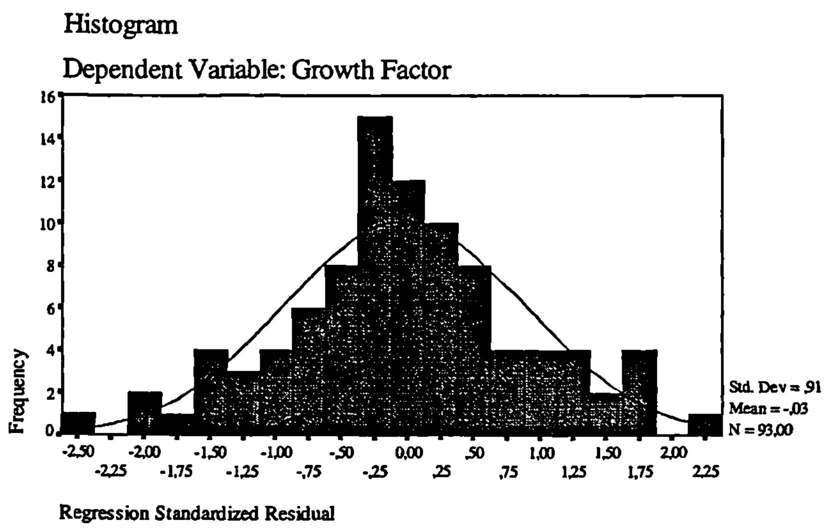


Figure 4-8. Residual distribution 2

In figures 4-7 and 4-8, a normal distribution is superimposed on the histogram of our observed frequencies. The distributions appear close to normal. Although we would like to see an exact match between the residual distribution and the normal distribution, it is not simply possible. "It is unreasonable to expect the observed residuals to be exactly normal - some deviation is expected because of sampling variation. Even if the errors are normally distributed in the population, sample residuals are only approximately normal." (Norousis 1993:329)

Another way to check for normality is to use a (P-P) plot. The following figures (4-9 and 4-10) illustrates the test of normality of the regression assumptions. As can be seen, the distribution of residuals are close to normal, indicating that there is no violation of regression assumptions.

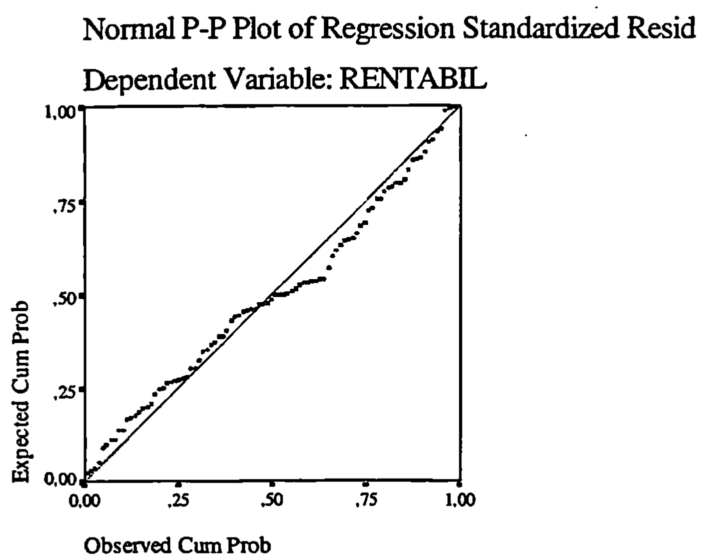


Figure 4-9. Testing Normalcy of Residuals

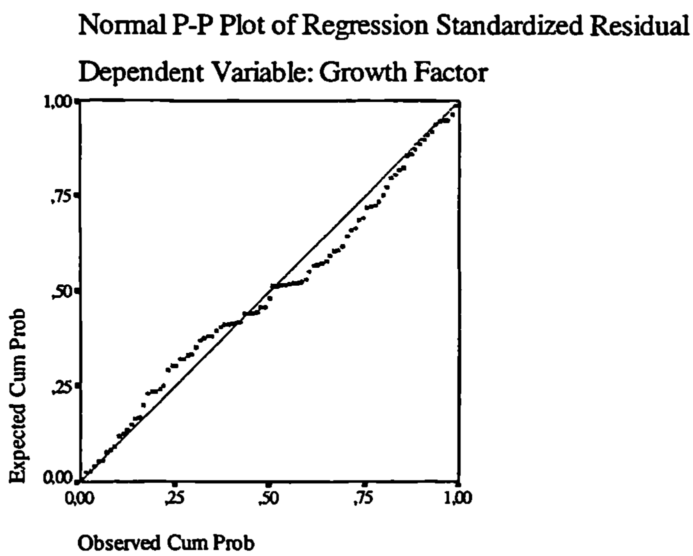


Figure 4-10. Testing Normalcy of Residuals

Having tested our model for violation of assumption and being satisfied that all assumptions are being met, we can finally draw some conclusions from our findings. Based on the results we can state that dynamism interacts with strategy to determine performance. These results strongly support hypotheses He_1 and He_2 .

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Chapter 5

DISCUSSION AND CONCLUSIONS

The importance of manufacturing strategy for achieving an overall competitive advantage has received much attention in recent years as managers attempt to understand and deal with both rapidly changing market environment and international pressures from Southeast Asia and other emerging manufacturing blocks (Clark, Hayes, and Lorenz 1985; Hayes and Wheelwright 1979; Skinner 1985).

In the framework developed by Skinner and his colleagues, decisions in manufacturing play a critical, strategic role in the business. There may be routines and pressures in the manufacturing operation, but those operations provide capabilities critical to the business's competitive success. This perspective on manufacturing and the framework that flows from it are based on six central propositions:

1. *There are many ways to compete.* Even within the same industry, firms may choose cost-leadership, differentiation, or a combination of both. Whatever mode of competition the firm selects, and no matter what its business strategy, manufacturing has a role to play in supporting that strategy. Manufacturing can do much more than simply "run efficiently"

2. *Firms can not be all things to all people.* In every business, firms must meet minimum standards on all dimensions of customer choice in order to participate effectively. But firms that try to do everything exceptionally well and fail to develop competitive priorities will end up second-best compared to those firms which concentrate their efforts.

3. *There are trade-offs in manufacturing decisions about structure and infrastructure.* Like any complex technical system, a manufacturing

operation confronts limits on its ability to perform in any specific dimension. Depending on the way in which the system is designed, it can increase its performance on a dimension such as speed, but may have to compromise its performance on other, possibly conflicting, dimensions such as cost. Such compromises or trade-offs are the essence of engineering design and apply equally well to manufacturing systems. In effect, "you can't have it both ways."

4. *Manufacturing strategy is defined by the pattern of decisions across many categories of structure and infrastructure.* Manufacturing strategy is not limited to a few key decisions about technology, capacity, or other dimensions of manufacturing system; it is defined by the total pattern of decisions across the full range of manufacturing system - including not only the brick and mortar, but the systems and policies that define the business's infrastructure. In each category, the firm faces a number of alternative decisions; different patterns deliver different performance in manufacturing.

5. *A manufacturing strategy's success is determined by the coherence of the pattern across decision categories and by the match between the strategy, other functions, and the overall business.* Where effective, manufacturing strategy weaves together the pattern of decisions so that actions in one area reinforce and support actions in all the others. The specific pattern developed must also match the requirements of the business strategy and the requirements and opportunities in other functions within the business.

6. *Over the longer term, a manufacturing strategy succeeds as it guides the business in building capabilities essential to achieve the firm's chosen competitive advantage.* It is not enough in manufacturing to establish an effective pattern of decisions at only a given point in time. Nor is it sufficient over the long term to simply react to the initiatives created by

other functions or by the strategy of the business. Manufacturing must proactively build capabilities that create advantage in the market place for the firm.

Over the years these propositions have assumed a central position in the thinking of the practitioners and researchers in the field of manufacturing strategy. The manufacturing strategy literature emphasise the importance of manufacturing strategy formulation and its role in the success of manufacturing companies. It is argued over and over again that a manufacturing firm without proper manufacturing strategies will be in a difficult position to succeed. This attitude- the central role of manufacturing strategy - has been supported by a large number of research carried out in the past three decades. However, the manufacturing strategy literature, by and large, have neglected the role of environment as one of the most influential factors in determining the firms' strategic positioning. There also has been a tremendous discussion regarding the merits of planning approach to strategy formulation, of which all manufacturing strategy formulation processes are derived. And finally, the largest part of these studies have been focused on large corporations. The findings of these studies and the proposed solutions have been tailored for large manufacturing firms. One must remember that small firms are not smaller versions of large companies. They are inherently different and should be considered separately from their larger counterparts (Opstad 1991).

To address these problems and to investigate the strategic orientation of small manufacturing firms in different environmental conditions, 102 small manufacturing firms from five industries were surveyed. By using the method provided by Dess & Beard (1984), it has been possible to categorise small manufacturing firms according to the environmental dynamism they face in their industry. By using this classification I have shown that environmental dynamism is a major factor in determining the approach to strategy formulation, organising orientation, and the type of technologies employed by small manufacturing firms.

These findings contradict both Ansoff's and Mintzberg's propositions. Ansoff argues that planning approach to strategy formulation process is best suited in environments where changes are unfamiliar, while Mintzberg argues that emergent approach is "THE" approach under any circumstances. The findings here have shown that in a stable environment small firms tend to adopt planning approach, while in unstable environments they choose the emergent approach to strategy formulation.

The findings have also shown that Porter's (1980) generic business strategies are adopted according to the environmental stability, with cost-leadership being the most dominant business strategy adopted by manufacturing firms in stable environments, while differentiation being adopted by those firms operating in the unstable environments.

It has been also shown that there is a direct relationship between strategy, organisational orientation, and production technologies employed. These relationships suggest that if business strategies are of two generic types (cost-leadership and differentiation), and each type being directly associated with certain production technology and organisational orientation, then there is a good possibility that there are two modes of adaptation to the environment as well. A close study of the small manufacturing firms in this study revealed the existence of two generic adaptation approaches: operations-oriented and product-oriented.

	Operations Oriented	Product Oriented
Environment	Stable	Unstable
Approach to Strategy Formulation	Planning	Emergent
Approach to Innovation	Follower	Innovator
Business-level Strategy	Price/Cost Leadership	Differentiation
Production Technology	Routine	None-routine
Focus	Production + Pricing	Distribution + Promotion
Goals & Objectives	Production Efficiency	Improving Image (internal & External)
Importance of Departments	Production + Purchasing	Sales & Marketing + Purchasing
Organisational Flexibility	Less Flexible	More Flexible
Conflict Resolution	Forcing	---------------
Information Exchange	Formal	Informal
Emphasis on Decisions and Actions	Consensus	------------

Table 5-1. Operations oriented and product oriented modes of adaptation

As table 5-1 shows, firms adopting the operations-oriented approach tend to plan their strategies, with a tendency to strive for cost leadership through employing specialised production technologies used for large batches or mass production. This is in contrast to firms adopting product-oriented approach. These companies tend to use a trial and error approach to strategy formulation, using general purpose production technologies, and emphasising differentiation strategies. These companies also seem to be much more flexible than their counterparts in terms of technologies employed, organisational flexibility, and information exchange within the organisation.

The results have also shown that small manufacturing firms in stable environments, in general, tend to adopt an operations oriented approach while small manufacturing firms operating in unstable environments tend to choose a product-oriented approach.

The results tend to support the findings of Aldrich and Reiss (1976) and Nielsen and Hannan (1977) that showed that organisational populations change in characteristics as resources and other elements of their environment change. However, strategy choice remains a "choice", and although it is influenced by the environment, it is not 'determined' by environment. This is demonstrated by the dynamism, strategy, performance interconnection.

If generic types of adaptation are associated with specific strategic orientations, organisational structures, and production technologies employed, what then is the purpose of manufacturing strategy?

The results have shown that in small manufacturing firms, environment not only influences the strategy of the firm but also the organisational structure and the type of production technologies employed. If environment is so influential, then what role does manufacturing strategy play? Is it necessary?

In case of small manufacturing firms, manufacturing strategy is reduced to one single important decision, and that is, the choice of production technologies employed. Even this single decision can be argued, is determined by business strategy.

The main concern of manufacturing strategy, linking manufacturing structure and infrastructure to business strategy, is irrelevant in case of small manufacturing firms, since as the results have shown, there are significant associations between business strategies adopted and production technologies employed. There is also evidence of association between organisational structure and production technologies employed. Taken together, one can argue that strategy-organisation combination determines the production technology choice.

Based on the results, one can argue that manufacturing strategy for small manufacturing firms is not strategy, but policies [rules and guidelines that express the limits within which actions should occur (Mintzberg 1995)] derived from business strategy for governing the operations of production technologies employed.

One may also argue that a manufacturing strategy does exist in the form of Advanced Manufacturing Technologies (AMT) which addresses such issues as volatile market environment by trying to offer mass-customisation. AMT can be used to enhance differentiation (Porter 1983). For example AMT can reduce lead times, enabling firms to improve their customer services to their customers, or ensuring higher and more consistent quality. However, the potential benefits of these new technologies are difficult to realise (Adler 1989a; Beatty 1986; Schroeder, et al. 1989) especially in the absence of skilled workers and adequate organisational changes that it may require (Jaikumar 1986). AMT is also expensive and requires both skilled workforce and appropriate organisational structure; all of which are rather difficult for small manufacturing firms to acquire or manage.

There is also the matter of performance. The results of this study showed that dynamism significantly interacted with strategies to affect performance. The findings of this study seem partly compatible with speculation advanced by Bourgeois (1980). He reasoned that complexity remains a relatively constant factor in task environment; therefore, dynamism would have a larger impact than complexity on performance. The results are also compatible with propositions advanced by McArthur and Nystrom (1991). They argued that dynamism interact with strategies to determine company performance.

Practical Implications

The practitioners are naturally concerned with the immediate practical implications of the present research. Such practical advice will have to be rather normative. Normative syntheses of complex phenomena are made at the risk of over-simplifying and over-generalising.

Here we shall make a distinction between two types of practitioners, namely: management consultants, and managers of small manufacturing firms,.

Management consultants in Norway can benefit from the findings of this research by using the dynamism ranking provided. This ranking could be used to examine any deviation from standard practice by their customers. They could also diagnose an ailing firm by seeing which part of the firm (i.e., strategy, organisation, technology) that does not match the provided prescribed types.

The consultants could also use the findings of this research to advise those who intend in starting their own small manufacturing firm. This could be done by looking at the dynamism of the industry within which the proposed firm is to operate, and then suggest the ideal configuration of strategy-organisation-technology combination.

Similarly, the managers of small manufacturing firms could use both dynamism ranking and adaptation types (product oriented and operations oriented) as an aid in restructuring their organisations when that becomes necessary. They could also use the result in assessing their suppliers, partners, and the market for their products.

Implications for Government

It is perhaps a statement of the obvious that empirical research is hampered by lack of data. Even the most carefully planned surveys are adversely affected by lack of response and by lack of standards in reporting financial and manufacturing data. Development of databases for empirical analysis would be a definite contribution to the discipline. For this to happen, owner-managers of small manufacturing firms must have an interest in the research, and something to gain by making the effort to respond. This might include getting professional organisations such as NHO, involved in the research design and data collection process.

There is also an extremely limited number of journal and magazines devoted to problems of manufacturing in general and small manufacturing firms in particular. If the results of research are to have an impact, they must be communicated to those who stand to gain the most - manufacturing managers- as well as to fellow researchers.

Further Research

Past studies in business policy have focused on stage of the product life cycle, which, it was argued, serves as a major determinant of strategies that lead to subsequent success (Hofer, 1975). However, stage of the product life cycle by itself captures only one of the environmental dimensions delineated by organisational theorists. This study's findings may explain the inconsistent results obtained by researchers when trying to determine which strategies lead to higher performance in different stages of the product life cycle. Researchers should consider environmental dynamism along with product life cycle into future projects. Rather than continuing to seek a universal model for the life-cycle effects, researchers may obtain a better understanding of this issue if their future models included environmental conditions as well.

Another area that should be considered for future research is determining how in small firms, manufacturing relates to other business functions such as marketing and management accounting. Studies of small manufacturing firms would benefit by further considering cross-functional relationships under different environmental dynamism.

Relative to the previous point, consideration should be given to how strategies, and production technologies employed interrelate among different manufacturers. For example, are there profiles of strategies and technologies that would tend to mix well together? This could be useful information to manufacturing managers in choosing suppliers and partners.

Finally, this research could be duplicated for small firms in service industries. It would be extremely valuable to find out how environmental dynamism impacts small businesses. Considering the rapid expansion of service sector, it could produce valuable results

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Appendix A: Calculating Dynamism

Industry Name	ISIC	Growth in total sales: Regression slope Coefficient (B) divided by mean value (Y)	Growth in Total Employment:Regression slope Coefficient (B) divided by mean value (Y)	Growth in Value-Added:Regression slope Coefficient (B) divided by mean value (Y)	Instability in Total Sales - Standard error of the regression Coefficient (Sb) divided by mean Value (Y); 1982-1992	Instability in Total Employment - Standard error of the regression Coefficient (Sb) divided by mean Value (Y); 1982-1992	Instability in Value-Added by Manufacture - Standard error of the regression Coefficient (Sb) divided by mean Value (Y); 1982-1992
Fur dressing and dyeing	3232	-0,1260116	-0,1698341	-0,0772152	0,0538521	0,0497124	0,0606466
Manufacture of musical instruments	3902	-0,0285714	-0,0870504	-0,0176471	0,0874314	0,0317590	0,0254734
Manufacture of office machinery	3825	0,0033337	-0,0272445	-0,0213163	0,0315165	0,0342048	0,0336105
Petroleum refining	3530	0,0087790	0,0378747	0,2272111	0,0252122	0,0063886	0,0452411
Manufacture of sporting & athletic goods	3903	0,1052595	0,0394357	0,1168981	0,0195564	0,0169507	0,0310535
Manufacture of Industrial machinery not elsewhere classified	3824	0,1121616	0,0258480	0,0771372	0,0518612	0,0108654	0,0138068
Manufacture of non-ferrous metals	3720	0,0632578	-0,0277446	0,0382684	0,0201005	0,0053206	0,0319150

Industry Name	ISIC	Growth in total sales: Regression slope Coefficient (B) divided by mean value (Y)	Growth in Total Employment:Regression slope Coefficient (B) divided by mean value (Y)	Growth in Value-Added:Regression slope Coefficient (B) divided by mean value (Y)	Instability in Total Sales - Standard error of the regression Coefficient (Sb) divided by mean Value (Y); 1982-1992	Instability in Total Employment - Standard error of the regression Coefficient (Sb) divided by mean Value (Y); 1982-1992	Instability in Value-Added by Manufacture - Standard error of the regression Coefficient (Sb) divided by mean Value (Y); 1982-1992
Manufacture of soft drinks and carbonated water	3134	0,0890265	0,0121536	0,0868223	0,0058597	0,0114617	0,0065006
Manufacture of other transport equipment	3849	0,0994048	0,0186948	0,0880282	0,0070632	0,0076078	0,0096501
Manufacture of fabrics, except narrow fabrics	3212	0,0233703	-0,0348188	0,0399499	0,0092280	0,0089167	0,0114305
Manufacture of pulp, paper and paperboard	3411	0,0542778	-0,0379589	0,0455416	0,0114672	0,0020408	0,0171589
Manufacture of cordage, ropes and nets	3215	0,0777802	-0,0024332	0,0754082	0,0097498	0,0088254	0,0066185
Manufacture of textiles not elswhere classified	3219	-0,0039687	-0,0609677	0,0245571	0,0104342	0,0071167	0,0134299
Manufacture of cement & lime	3692	0,0171215	-0,0478111	0,0203899	0,0091195	0,0069920	0,0139178

Industry Name	ISIC	Growth in total sales: Regression slope Coefficient (B) divided by mean value (Y)	Growth in Total Employment:Regression slope Coefficient (B) divided by mean value (Y)	Growth in Value-Added:Regression slope Coefficient (B) divided by mean value (Y)	Instability in Total Sales - Standard error of the regression Coefficient (Sb) divided by mean Value (Y); 1982-1992	Instability in Total Employment - Standard error of the regression Coefficient (Sb) divided by mean Value (Y); 1982-1992	Instability in Value-Added by Manufacture - Standard error of the regression Coefficient (Sb) divided by mean Value (Y); 1982-1992
Manufacture of structural clay products	3691	0,0204754	-0,0666839	0,0063306	0,0107148	0,0092974	0,0116517
Manufacture of fixtures	3322	0,0366624	-0,0242802	0,0254865	0,0094662	0,0075215	0,0112718
Manufacture of agricultural machinery	3822	0,0437676	-0,0285767	0,0332214	0,0130866	0,0048315	0,0112739
Manufacture of electrical apparatus & equipment not elsewhere classified	3839	0,0521328	-0,0160470	0,0227976	0,0074680	0,0073992	0,0125390
Manufacture of wood products not elsewhere classified	3319	0,0374566	-0,0179785	0,0389029	0,0110097	0,0085253	0,0067561
Manufacture of prepared animal feeds	3122	0,0710962	0,0346023	0,0786472	0,0068278	0,0052371	0,0087433
Manufacture of motor vehicles	3843	0,0629663	-0,0133937	0,0564453	0,0127047	0,0065237	0,0062892

Industry Name	ISIC	Growth in total sales: Regression slope Coefficient (B) divided by mean value (Y)	Growth in Total Employment:Regression slope Coefficient (B) divided by mean value (Y)	Growth in Value-Added:Regression slope Coefficient (B) divided by mean value (Y)	Instability in Total Sales - Standard error of the regression Coefficient (Sb) divided by mean Value (Y); 1982-1992	Instability in Total Employment - Standard error of the regression Coefficient (Sb) divided by mean Value (Y); 1982-1992	Instability in Value-Added by Manufacture - Standard error of the regression Coefficient (Sb) divided by mean Value (Y); 1982-1992
Manufacture of wearing apparel not elswhere classified	3229	-0,0373288	-0,1095288	-0,0371531	0,0154518	0,0117359	0,0165587
Manufacture of leather	3231	0,0980429	-0,0228035	0,0802532	0,0094014	0,0103854	0,0104488
Manufacture of electrical household appliances	3833	0,0139607	-0,0623023	-0,0042583	0,0131068	0,0093384	0,0156872
Manufacture of metal products not elsewhere classified	3819	0,0383059	-0,0253443	0,0345590	0,0105790	0,0100326	0,0126859
Manufacture of basic industrial chemicals, except fertilizers	3511	0,0449409	0,0062965	0,0704756	0,0070916	0,0041397	0,0180294
Manufacture of radio, television and communication apparatus	3832	0,0504189	-0,0607551	0,0209513	0,0175502	0,0086788	0,0099522
Manufacture of products of petroleum and coal	3540	0,0092772	-0,0718927	0,0084281	0,0096221	0,0095299	0,0161444

Industry Name	ISIC	Growth in total sales: Regression slope Coefficient (B) divided by mean value (Y)	Growth in Total Employment:Regression slope Coefficient (B) divided by mean value (Y)	Growth in Value-Added:Regression slope Coefficient (B) divided by mean value (Y)	Instability in Total Sales - Standard error of the regression Coefficient (Sb) divided by mean Value (Y); 1982-1992	Instability in Total Employment - Standard error of the regression Coefficient (Sb) divided by mean Value (Y); 1982-1992	Instability in Value-Added by Manufacture - Standard error of the regression Coefficient (Sb) divided by mean Value (Y); 1982-1992
Manufacture & repair of rubber products	3550	0,0259525	-0,0555805	0,0170536	0,0178563	0,0096972	0,0164573
Manufacturing industries not elsewhere classified	3909	0,0882166	0,0347003	0,0779838	0,0040039	0,0144235	0,0118328
Manufacture of stoneware & earthenware not elsewhere classified	3699	0,0347636	-0,0288561	0,0330971	0,0139531	0,0096803	0,0148381
Manufacture of profasional & scientific instruments not elsewhere classified	3851	0,1634843	0,0592357	0,1331116	0,0136472	0,0054116	0,0090738
Manufacture of iron & steel	3710	0,0302659	-0,0639734	0,0116328	0,0133418	0,0047112	0,0226375
Manufacture & repair of railway and tramway equipment	3842	0,0627273	-0,0315855	0,0238595	0,0243671	0,0071241	0,0085298
Manufacture of drugs and medicines	3522	0,1433442	0,0356186	0,1503968	0,0099397	0,0037464	0,0123804

Industry Name	ISIC	Growth in total sales: Regression slope Coefficient (B) divided by mean value (Y)	Growth in Total Employment:Regression slope Coefficient (B) divided by mean value (Y)	Growth in Value-Added:Regression slope Coefficient (B) divided by mean value (Y)	Instability in Total Sales - Standard error of the regression Coefficient (Sb) divided by mean Value (Y); 1982-1992	Instability in Total Employment - Standard error of the regression Coefficient (Sb) divided by mean Value (Y); 1982-1992	Instability in Value-Added by Manufacture - Standard error of the regression Coefficient (Sb) divided by mean Value (Y); 1982-1992
Manufacture of grain mill products	3116	0,0470658	-0,0300588	0,1373974	0,0050447	0,0037827	0,0362553
Manufacture of carpets & rugs	3214	-0,0541284	-0,0947284	-0,0141304	0,0186369	0,0148610	0,0243348
Building of ships & boats	3841	0,0394015	-0,0827583	0,0144025	0,0238863	0,0165648	0,0152115
Manufacture of furniture & fixtures of metal	3812	0,0605890	0,0050926	0,0400791	0,0174453	0,0137553	0,0165594
Manufacture of photographic & optical goods	3852	0,0681614	0,0062698	0,0702983	0,0171527	0,0114954	0,0137261
Manufacture of metal & wood working machinery	3823	-0,0116035	-0,0515108	-0,0011013	0,0198195	0,0127324	0,0133589
Manufacture of aircraft	3845	0,0661298	0,0187538	0,0837720	0,0132774	0,0082954	0,0144524

Industry Name	ISIC	Growth in total sales: Regression slope Coefficient (B) divided by mean value (Y)	Growth in Total Employment:Regression slope Coefficient (B) divided by mean value (Y)	Growth in Value-Added:Regression slope Coefficient (B) divided by mean value (Y)	Instability in Total Sales - Standard error of the regression Coefficient (Sb) divided by mean Value (Y); 1982-1992	Instability in Total Employment - Standard error of the regression Coefficient (Sb) divided by mean Value (Y); 1982-1992	Instability in Value-Added by Manufacture - Standard error of the regression Coefficient (Sb) divided by mean Value (Y); 1982-1992
Manufacture of food products not elswhere classified	3121	0,0900407	0,0461644	0,1099919	0,0048394	0,0032479	0,0091481
Manufacture of glass & glass products	3620	0,0473181	-0,0304080	0,0405443	0,0084539	0,0072794	0,0091225
Manufacture of wooden containers	3312	-0,0373884	-0,0380573	-0,0324930	0,0100126	0,0065803	0,0129324
Manufacture of machinery not elsewhere classified	3829	0,0569410	-0,0204379	0,0468976	0,0104007	0,0070118	0,0066222
Manufacture of electric motors & equipment for electricity production	3831	0,0654595	-0,0152585	0,0511453	0,0108503	0,0049695	0,0081153
Manufacture of lumber and other building materials of wood	3311	0,0256682	-0,0435598	0,0186392	0,0108740	0,0051817	0,0109603
Manufacturing of Dairy Products	3112	0,0856310	-0,0078397	-0,0363037	0,0030463	0,0017287	0,0228549

Industry Name	ISIC	Growth in total sales: Regression slope Coefficient (B) divided by mean value (Y)	Growth in Total Employment:Regression slope Coefficient (B) divided by mean value (Y)	Growth in Value-Added:Regression slope Coefficient (B) divided by mean value (Y)	Instability in Total Sales - Standard error of the regression Coefficient (Sb) divided by mean Value (Y); 1982-1992	Instability in Total Employment - Standard error of the regression Coefficient (Sb) divided by mean Value (Y); 1982-1992	Instability in Value-Added by Manufacture - Standard error of the regression Coefficient (Sb) divided by mean Value (Y); 1982-1992
Manufacture of chemical products not elsewhere classified	3529	0,0048630	-0,0726480	-0,0130308	0,0081774	0,0116639	0,0078383
Manufacture of paints, varnishes and lacquers	3521	0,0385589	-0,0320954	0,0449987	0,0061691	0,0049643	0,0116168
Printing & bookbinding	3421	0,0718966	-0,0053280	0,0649176	0,0078693	0,0047586	0,0076289
Manufacture of bakery products	3117	0,0789198	-0,0036799	0,0627498	0,0047599	0,0068622	0,0069750
Manufacture of structural metal products	3813	0,0674523	-0,0097551	0,0556400	0,0078143	0,0055552	0,0067996
Manufacture of furniture	3321	0,0354452	-0,0283403	0,0267181	0,0091406	0,0052172	0,0084326
Manufacture of oils and fat	3115	-0,0182935	-0,0676735	-0,0224148	0,0112142	0,0045539	0,0122050

Industry Name	ISIC	Growth in total sales: Regression slope Coefficient (B) divided by mean value (Y)	Growth in Total Employment:Regression slope Coefficient (B) divided by mean value (Y)	Growth in Value-Added:Regression slope Coefficient (B) divided by mean value (Y)	Instability in Total Sales - Standard error of the regression Coefficient (Sb) divided by mean Value (Y); 1982-1992	Instability in Total Employment - Standard error of the regression Coefficient (Sb) divided by mean Value (Y); 1982-1992	Instability in Value-Added by Manufacture - Standard error of the regression Coefficient (Sb) divided by mean Value (Y); 1982-1992
Manufacture of outer garments of textiles and plastics	3221	-0,0235117	-0,0991432	-0,0248449	0,0104196	0,0079246	0,0101750
Manufacture of cutlery, hand tools & general hardware	3811	0,0637832	-0,0146878	0,0678895	0,0066873	0,0042918	0,0076058
Manufacture of footware	3240	-0,0244671	-0,0899897	-0,0116702	0,0065953	0,0109677	0,0079658
Manufacture of plastic products	3560	0,0613927	-0,0143933	0,0683398	0,0067659	0,0048307	0,0067570
Manufacture of luggage, bags, etc.	3233	-0,0106434	-0,0935737	0,0139647	0,0091824	0,0070317	0,0084312
Manufacture of jewellery & related goods	3901	0,0384972	-0,0083980	0,0623298	0,0051497	0,0046041	0,0074507
Manufacture of paper & paperboard articles not elsewhere classified	3419	0,0339294	-0,0564600	0,0069275	0,0060564	0,0064529	0,0094085

Industry Name	ISIC	Growth in total sales: Regression slope Coefficient (B) divided by mean value (Y)	Growth in Total Employment:Regression slope Coefficient (B) divided by mean value (Y)	Growth in Value-Added:Regression slope Coefficient (B) divided by mean value (Y)	Instability in Total Sales - Standard error of the regression Coefficient (Sb) divided by mean Value (Y); 1982-1992	Instability in Total Employment - Standard error of the regression Coefficient (Sb) divided by mean Value (Y); 1982-1992	Instability in Value-Added by Manufacture - Standard error of the regression Coefficient (Sb) divided by mean Value (Y); 1982-1992
Spinning, weaving & finishing of textiles	3211	0,0229080	-0,0746908	0,0283321	0,0071184	0,0057477	0,0087706
Manufacture of ceramics	3610	0,0275057	-0,0401914	0,0233004	0,0071024	0,0049723	0,0083581
Canning & preserving of fruits & vegetables	3113	0,0479312	-0,0582536	0,0239759	0,0058068	0,0073256	0,0065774
Canning & preserving and processing of fish	3114	0,0491595	-0,0399179	0,0436200	0,0077647	0,0036125	0,0062870
Publishing	3422	0,0744735	0,0037957	0,0806757	0,0056099	0,0020901	0,0051847
Manufacture of cocoa, choclate and suger confectionery	3119	0,0570248	0,0046073	0,0611379	0,0062525	0,0041423	0,0033271
Manufacture of narrow fabrics & elastic fabrics	3213	-0,0058626	-0,0815341	0,0117537	0,0050327	0,0062928	0,0063271

Industry Name	ISIC	Growth in total sales: Regression slope Coefficient (B) divided by mean value (Y)	Growth in Total Employment:Regression slope Coefficient (B) divided by mean value (Y)	Growth in Value-Added:Regression slope Coefficient (B) divided by mean value (Y)	Instability in Total Sales - Standard error of the regression Coefficient (Sb) divided by mean Value (Y); 1982-1992	Instability in Total Employment - Standard error of the regression Coefficient (Sb) divided by mean Value (Y); 1982-1992	Instability in Value-Added by Manufacture - Standard error of the regression Coefficient (Sb) divided by mean Value (Y); 1982-1992
Manufacture of soap and cleaning preparations, perfumes, cosmetics & other toilet preperations	3523	0,0282774	-0,0700971	0,0147982	0,0021613	0,0054858	0,0088055
Manufacture of containers & boxes of paper and paperboard	3412	0,0584436	-0,0048041	0,0760700	0,0025874	0,0023917	0,0049302

Industry Name	ISIC	Munificence Factor Score	Munificence Rank	Stability-Instability Factor Score	Stability-Instability Rank
Fur dressing and dyeing	3232	-2,5765326	72	4,8576777	1
Manufacture of musical instruments	3902	-0,7889955	57	3,8466579	2
Manufacture of office machinery	3825	-0,3585843	45	2,6037443	3
Petroleum refining	3530	2,4035274	2	2,2792815	4
Manufacture of sporting & athletic goods	3903	2,0045728	4	1,7195656	5
Manufacture of industrial machinery not elsewhere classified	3824	1,6396863	5	1,5906512	6
Manufacture of non-ferrous metals	3720	0,4489938	22	0,8470815	7

Industry Name	ISIC	Munificence Factor Score	Munificence Rank	Stability-Instability Factor Score	Stability-Instability Rank
Manufacture of grain mill products	3116	1,0580385	9	0,7256927	8
Manufacture of carpets & rugs	3214	-1,5532198	68	0,6980353	9
Building of ships & boats	3841	-0,6002756	53	0,6526781	10
Manufacture of furniture & fixtures of metal	3812	0,5433381	20	0,5998322	11
Manufacture of photographic & optical goods	3852	0,8194020	13	0,4361735	12
Manufacture of metal & wood working machinery	3823	-0,8619727	61	0,2740800	13
Manufacture of aircraft	3845	1,0093085	11	0,2400958	14

Industry Name	ISIC	Munificence Factor Score	Munificence Rank	Stability-Instability Factor Score	Stability-Instability Rank
Manufacture & repair of rubber products	3550	-0,4561994	49	0,2249852	15
Manufacturing Industries not elsewhere classified	3909	1,1687731	8	0,1497117	16
Manufacture of stoneware & earthenware not elsewhere classified	3699	-0,0630274	39	0,1225665	17
Manufacture of profasional & scientific instruments not elsewhere classified	3851	2,4316111	1	0,0759874	18
Manufacture of iron & steel	3710	-0,5067728	51	0,0588183	19
Manufacture & repair of railway and tramway equipment	3842	0,0417417	32	0,0285485	20
Manufacture of drugs and medicines	3522	2,2197430	3	0,0138298	21

Industry Name	ISIC	Munificence Factor Score	Munificence Rank	Stability-Instability Factor Score	Stability-Instability Rank
Manufacture of wearing apparel not elswhere classified	3229	-1,8745675	71	0,0097511	22
Manufacture of leather	3231	0,7504558	14	-0,0483599	23
Manufacture of electrical household appliances	3833	-0,8248911	60	-0,0496273	24
Manufacture of metal products not elsewhere classified	3819	-0,0443807	37	-0,0513426	25
Manufacture of basic industrial chemicals, except fertilizers	3511	0,6274985	17	-0,0761583	26
Manufacture of radio, television and communication apparatus	3832	-0,3755286	46	-0,1184402	27
Manufacture of products of petroleum and coal	3540	-0,8648346	62	-0,1187420	28

Industry Name	ISIC	Munificence Factor Score	Munificence Rank	Stability-Instability Factor Score	Stability-Instability Rank
Manufacture of soft drinks and carbonated water	3134	0,9875770	12	-0,1901315	**29**
Manufacture of other transport equipment	3849	1,1801174	7	-0,1959107	**30**
Manufacture of fabrics, except narrow fabrics	3212	-0,2220136	44	-0,2085285	**31**
Manufacture of pulp, paper and paperboard	3411	0,1046372	31	-0,2330977	**32**
Manufacture of cordage, ropes and nets	3215	0,7082951	16	-0,2499775	**33**
Manufacture of textiles not elswhere classified	3219	-0,7551566	56	-0,2645614	**34**
Manufacture of cement & lime	3692	-0,5183359	52	-0,2800649	**35**

Industry Name	ISIC	Munificence Factor Score	Munificence Rank	Stability-Instability Factor Score	Stability-Instability Rank
Manufacture of structural clay products	3691	-0,7984816	58	-0,2840876	36
Manufacture of fixtures	3322	-0,1463619	42	-0,2971693	37
Manufacture of agricultural machinery	3822	-0,0441500	36	-0,3041864	38
Manufacture of electrical apparatus & equipment not elsewhere classified	3839	0,0204073	33	-0,3066503	39
Manufacture of wood products not elsewhere classified	3319	-0,0154932	34	-0,3415505	40
Manufacture of prepared animal feeds	3122	1,0319985	10	-0,3522367	41
Manufacture of motor vehicles	3843	0,3625285	27	-0,3549161	42

Industry Name	ISIC	Munificence Factor Score	Munificence Rank	Stability-Instability Factor Score	Stability-Instability Rank
Manufacture of food products not elswhere classified	3121	1,5222716	6	-0,3961646	**43**
Manufacture of glass & glass products	3620	-0,0362981	35	-0,4080767	**44**
Manufacture of wooden containers	3312	-1,2612930	65	-0,4286543	**45**
Manufacture of machinery not elsewhere classified	3829	0,1622323	30	-0,4297421	**46**
Manufacture of electric motors & equipment for electricity production	3831	0,3279706	28	-0,4338206	**47**
Manufacture of lumber and other building materials of wood	3311	-0,4538678	48	-0,4385614	**48**
Manufacturing of Dairy Products	3112	-0,0524546	38	-0,4400878	**49**

Industry Name	ISIC	Munificence Factor Score	Munificence Rank	Stability-Instability Factor Score	Stability-Instability Rank
Manufacture of chemical products not elsewhere classified	3529	-1,1902919	63	-0,4720401	**50**
Manufacture of paints, varnishes and lacquers	3521	-0,0665415	40	-0,4832302	**51**
Printing & bookbinding	3421	0,5506374	19	-0,5067717	**52**
Manufacture of bakery products	3117	0,5679741	18	-0,5329334	**53**
Manufacture of structural metal products	3813	0,3912512	26	-0,5367921	**54**
Manufacture of furniture	3321	-0,2197209	43	-0,5508988	**55**
Manufacture of oils and fat	3115	-1,3141220	67	-0,5579999	**56**

Industry Name	ISIC	Munificence Factor Score	Munificence Rank	Stability-Instability Factor Score	Stability-Instability Rank
Manufacture of outer garments of textiles and plastics	3221	-1,6932096	**70**	-0,5690814	**57**
Manufacture of cutlery, hand tools & general hardware	3811	0,4201107	**24**	-0,5797490	**58**
Manufacture of footware	3240	-1,5631913	**69**	-0,5809210	**59**
Manufacture of plastic products	3560	0,3995362	**25**	-0,5842440	**60**
Manufacture of luggage, bags, etc.	3233	-1,2617092	**66**	-0,6165984	**61**
Manufacture of jewellery & related goods	3901	0,2356971	**29**	-0,6198702	**62**
Manufacture of paper & paperboard articles not elsewhere classified	3419	-0,6639511	**54**	-0,6556399	**63**

Industry Name	ISIC	Munificence Factor Score	Munificence Rank	Stability-Instability Factor Score	Stability-Instability Rank
Spinning, weaving & finishing of textiles	3211	-0,7375677	**55**	-0,6623383	**64**
Manufacture of ceramics	3610	-0,4313051	**47**	-0,6647326	**65**
Canning & preserving of fruits & vegetables	3113	-0,4755770	**50**	-0,7009455	**66**
Canning & preserving and processing of fish	3114	-0,1256350	**41**	-0,7488327	**67**
Publishing	3422	0,7355645	**15**	-0,7604666	**68**
Manufacture of cocoa, choclate and suger confectionery	3119	0,4393337	**23**	-0,7635400	**69**
Manufacture of narrow fabrics & elastic fabrics	3213	-1,1905792	**64**	-0,8618130	**70**

Industry Name	ISIC	Munificence Factor Score	Munificence Rank	Stability-Instability Factor Score	Stability-Instability Rank
Manufacture of soap and cleaning preparations, perfumes, cosmetics & other toilet preperations	3523	-0,8037464	**59**	-0,8630416	**71**
Manufacture of containers & boxes of paper and paperboard	3412	0,4760057	**21**	-0,8821179	**72**

Apendix B: Checking For missing Values

Using descriptive statistics, all variables were checked for missing values. The following table list the findings.

Variable	Count	Missing
A1	102	0,0 %
A2	102	0,0 %
A3	102	0,0 %
A4	102	0,0 %
A5	102	0,0 %
A6	102	0,0 %
A7	100	2,0 %
A8	102	0,0 %
A9	102	0,0 %
A10	102	0,0 %
A11	102	0,0 %
B1	102	0,0 %
B2	100	2,0 %
B3	100	2,0 %
B4	100	2,0 %
B5	100	2,0 %
C1N1	102	0,0 %
C1N2	102	0,0 %
C1N3	102	0,0 %
C1N4	101	1,0 %
C1N5	102	0,0 %
C1N6	102	0,0 %
C1N7	102	0,0 %
C1N8	102	0,0 %
C1N9	102	0,0 %
C1N10	102	0,0 %
C1N11	102	0,0 %
C1N12	102	0,0 %
C1N13	102	0,0 %
C1N14	101	1,0 %
C1N15	102	0,0 %
C1N16	102	0,0 %
C1N17	100	2,0 %
C1N18	**96**	**5,9 %**
C1N19	100	2,0 %
C2N1	102	0,0 %
C2N2	102	0,0 %
C2N3	102	0,0 %
C2N4	102	0,0 %
C2N5	102	0,0 %
C3N1	101	1,0 %
C3N2	102	0,0 %
C3N3	97	4,9 %
C3N4	99	2,9 %
C3N5	102	0,0 %
C3N6	101	1,0 %
C3N7	100	2,0 %
C3N8	101	1,0 %
C3N9	100	2,0 %
C4N1	102	0,0 %

Variable	Count	Missing
C4N2	102	0,0 %
C4N3	102	0,0 %
C4N4	99	2,9 %
C4N5	97	4,9 %
C4N6	97	4,9 %
C4N7	99	2,9 %
C5N4	97	4,9 %
C5N5	**94**	**7,8 %**
C5N6	96	5,9 %
D1N1	102	0,0 %
D1N2	102	0,0 %
D1N3	102	0,0 %
D1N4	102	0,0 %
D1N5	102	0,0 %
D1N7	102	0,0 %
D1N8	102	0,0 %
D1N9	102	0,0 %
D1N10	102	0,0 %
D1N11	102	0,0 %
D1N12	102	0,0 %
D1N13	102	0,0 %
D1N14	102	0,0 %
D1N16	102	0,0 %
D1N17	102	0,0 %
D1N18	102	0,0 %
D1N19	102	0,0 %
D1N20	102	0,0 %
D1N21	102	0,0 %
D1N22	102	0,0 %
D1N25	102	0,0 %
D1N28	102	0,0 %
D2N1	102	0,0 %
D2N2	**89**	**12,7 %**
D2N3	**75**	**26,5 %**
D2N4	100	2,0 %
D2N5	102	0,0 %
D2N6	102	0,0 %
D2N7	102	0,0 %
D2N8	102	0,0 %
D2N9	102	0,0 %
D2N10	102	0,0 %
D2N11	102	0,0 %
D2N12	100	2,0 %
D2N13	**95**	**6,9 %**
D2N14	**93**	**8,8 %**
D2N15	**94**	**7,8 %**
D2N16	**95**	**6,9 %**
D2N17	**93**	**8,8 %**
D2N18	**93**	**8,8 %**

As can be seen, there are 10 variables with above 5% missing values. The missing values were checked against the number of cases to see whether it was possible to remove some cases and thereby reduce the overall missing values. It was shown that the missing values were evenly distributed between cases, and therefore impossible to remove only a few cases. It was decided instead to remove the variables.

The following variables were removed

C1N18, C5N5, D2N2, D2N3, D2N13, D2N14, D2N15, D2N16, D2N17, D2N18.

Appendix C: Normal P-P chart

Cumulative Proportions

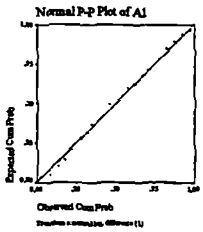
The cumulative proportion for a specified value within a distribution is the proportion of the distribution that is less than the specified value.

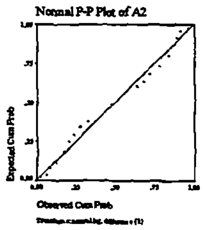
Normal Distribution

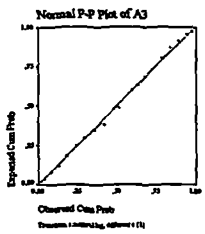
A symmetric, bell-shaped distribution which plays an important role in statistical inference. Sometimes called the Gaussian normal distribution.

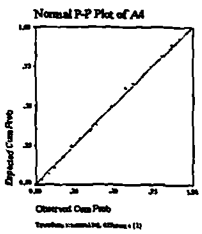
The cumulative proportion for a single numeric variable is plotted against the cumulative proportion expected if the sample were from a normal distribution. If the sample is from a normal distribution, points will cluster around a straight line.

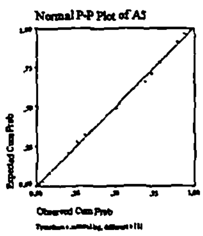
A separate plot will be produced for each variable.

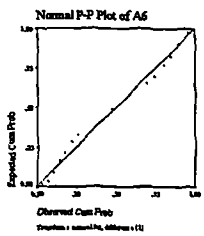


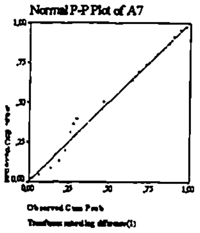


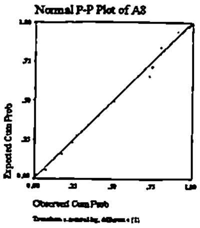


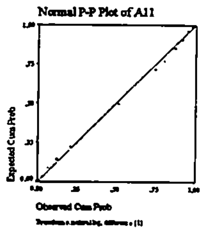


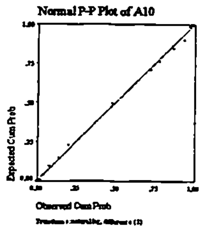


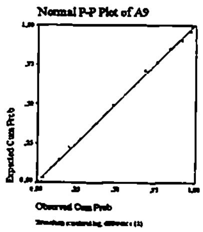


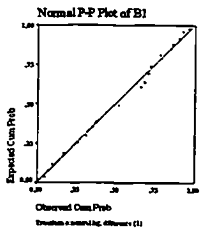

Normal P-P Plot of A7
Observed Cum Prob

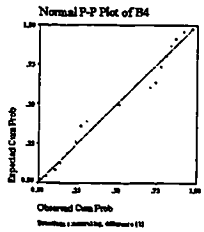

Normal P-P Plot of A8
Expected Cum Prob
Observed Cum Prob

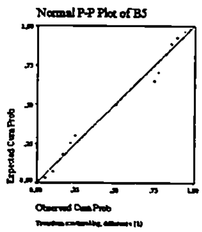

Normal P-P Plot of A11
Expected Cum Prob
Observed Cum Prob

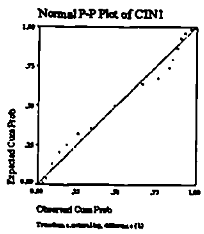

Normal P-P Plot of A10
Expected Cum Prob
Observed Cum Prob

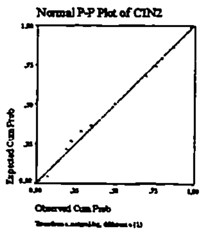

Normal P-P Plot of A9
Expected Cum Prob
Observed Cum Prob

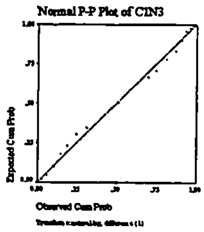

Normal P-P Plot of B1
Expected Cum Prob
Observed Cum Prob

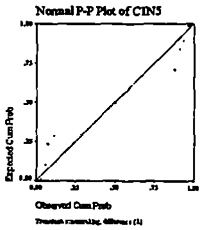

Normal P-P Plot of B4
Expected Cum Prob
Observed Cum Prob

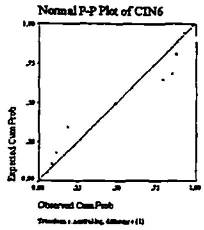

Normal P-P Plot of B5
Expected Cum Prob
Observed Cum Prob

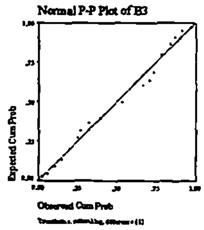

Normal P-P Plot of CIN1
Expected Cum Prob
Observed Cum Prob

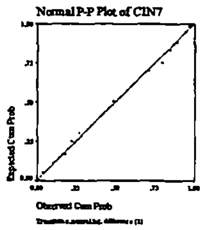

Normal P-P Plot of CIN2
Expected Cum Prob
Observed Cum Prob

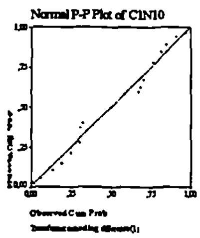

Normal P-P Plot of CIN3
Expected Cum Prob
Observed Cum Prob

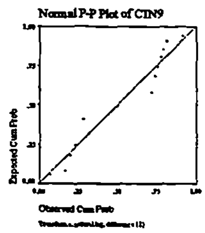

Normal P-P Plot of CIN5
Expected Cum Prob
Observed Cum Prob

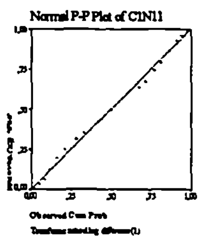

Normal P-P Plot of CIN6
Expected Cum Prob
Observed Cum Prob

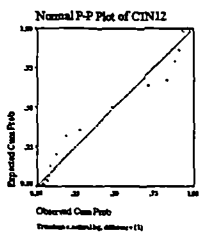

Normal P-P Plot of B3
Expected Cum Prob
Observed Cum Prob

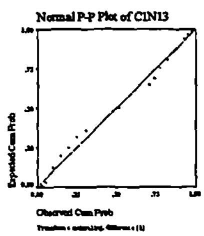

Normal P-P Plot of CIN7
Expected Cum Prob
Observed Cum Prob

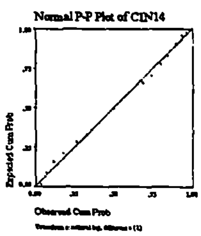

Normal P-P Plot of CIN10
Observed Cum Prob

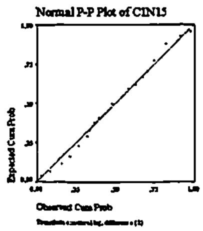

Normal P-P Plot of CIN9
Expected Cum Prob
Observed Cum Prob

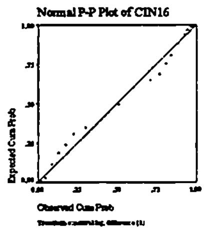

Normal P-P Plot of CIN11
Observed Cum Prob

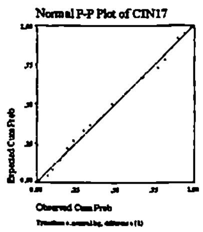

Normal P-P Plot of CIN12
Expected Cum Prob
Observed Cum Prob

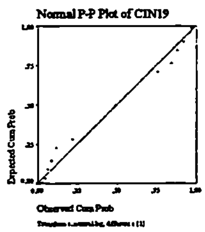

Normal P-P Plot of CIN13
Expected Cum Prob
Observed Cum Prob

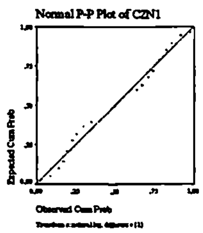

Normal P-P Plot of CIN14
Expected Cum Prob
Observed Cum Prob

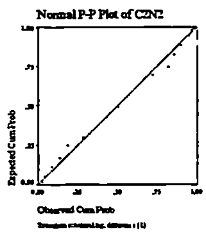

Normal P-P Plot of C1N15
Expected Cum Prob
Observed Cum Prob

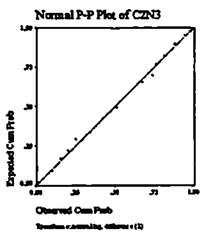

Normal P-P Plot of C1N16
Expected Cum Prob
Observed Cum Prob

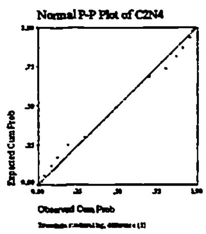

Normal P-P Plot of C1N17
Expected Cum Prob
Observed Cum Prob

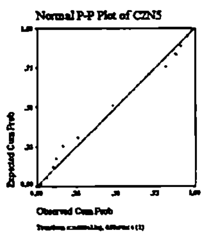

Normal P-P Plot of C1N19
Expected Cum Prob
Observed Cum Prob

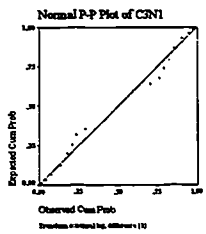

Normal P-P Plot of C2N1
Expected Cum Prob
Observed Cum Prob

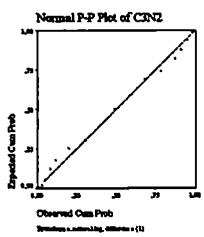

Normal P-P Plot of C2N2
Expected Cum Prob
Observed Cum Prob

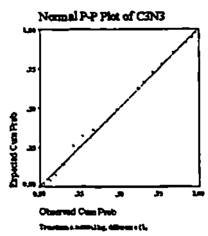

Normal P-P Plot of C2N3
Expected Cum Prob
Observed Cum Prob

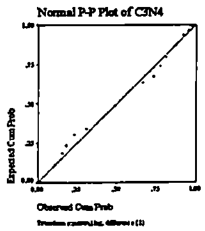

Normal P-P Plot of C2N4
Expected Cum Prob
Observed Cum Prob

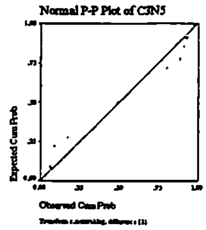

Normal P-P Plot of C2N5
Expected Cum Prob
Observed Cum Prob

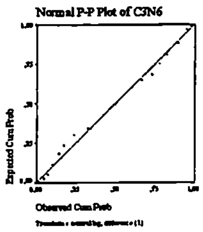

Normal P-P Plot of C3N1
Expected Cum Prob
Observed Cum Prob

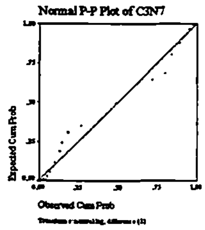

Normal P-P Plot of C3N2
Expected Cum Prob
Observed Cum Prob

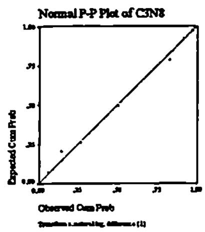

Normal P-P Plot of C3N3
Expected Cum Prob
Observed Cum Prob

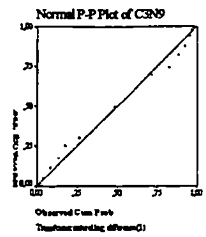

Normal P-P Plot of C3N4
Expected Cum Prob
Observed Cum Prob

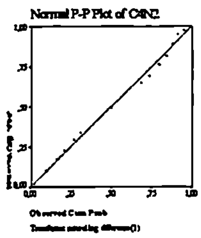

Normal P-P Plot of C3N5
Expected Cum Prob
Observed Cum Prob

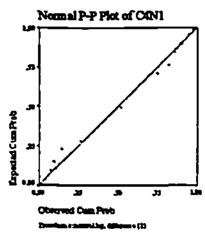

Normal P-P Plot of C3N6
Expected Cum Prob
Observed Cum Prob

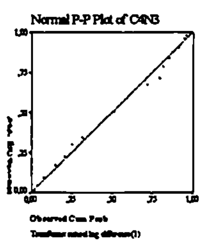

Normal P-P Plot of C3N7
Expected Cum Prob
Observed Cum Prob

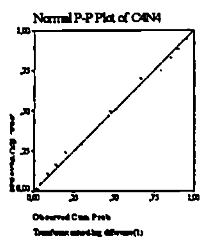

Normal P-P Plot of C3N8
Expected Cum Prob
Observed Cum Prob

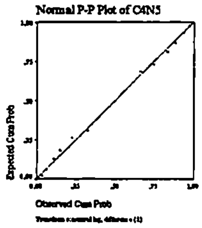

Normal P-P Plot of C3N9
Observed Cum Prob

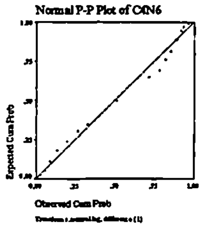

Normal P-P Plot of C4N2
Observed Cum Prob

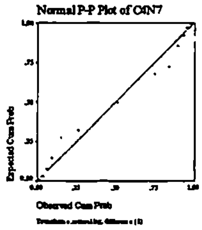

Normal P-P Plot of C4N1
Expected Cum Prob
Observed Cum Prob

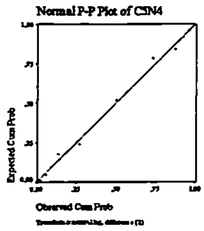

Normal P-P Plot of C4N3
Observed Cum Prob

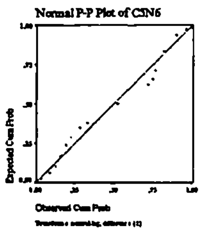

Normal P-P Plot of C4N4
Observed Cum Prob

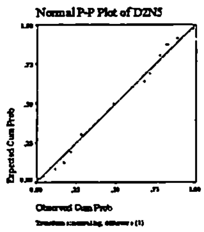

Normal P-P Plot of C4N5
Expected Cum Prob
Observed Cum Prob

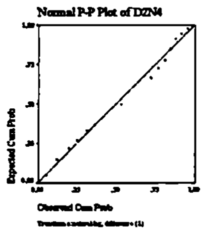

Normal P-P Plot of C4N6
Expected Cum Prob
Observed Cum Prob

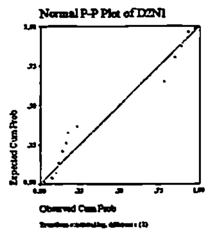

Normal P-P Plot of C4N7
Expected Cum Prob
Observed Cum Prob

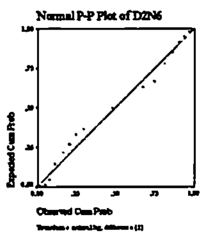

Normal P-P Plot of C5N4
Expected Cum Prob
Observed Cum Prob

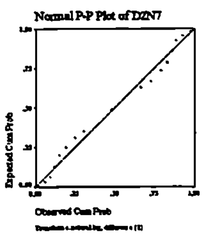

Normal P-P Plot of C5N6
Expected Cum Prob
Observed Cum Prob

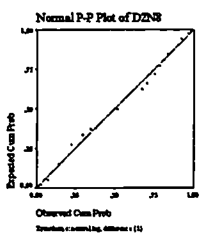

Normal P-P Plot of D2N5
Expected Cum Prob
Observed Cum Prob

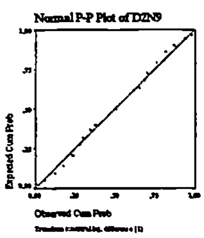

Normal P-P Plot of D2N4
Expected Cum Prob
Observed Cum Prob

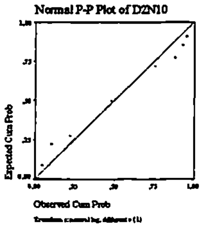

Normal P-P Plot of D2N1
Expected Cum Prob
Observed Cum Prob

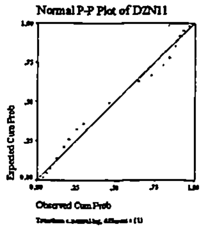

Normal P-P Plot of D2N6
Expected Cum Prob
Observed Cum Prob

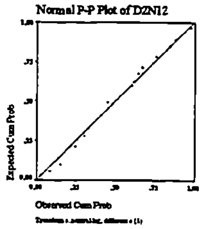

Normal P-P Plot of D2N7
Expected Cum Prob
Observed Cum Prob


Normal P-P Plot of D2N8
Expected Cum Prob
Observed Cum Prob


Normal P-P Plot of D2N9
Expected Cum Prob
Observed Cum Prob


Normal P-P Plot of D2N10
Expected Cum Prob
Observed Cum Prob


Normal P-P Plot of D2N11
Expected Cum Prob
Observed Cum Prob


Normal P-P Plot of D2N12
Expected Cum Prob
Observed Cum Prob

Appendix D: Independent-Sample T-test of Means

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
A1				
GROUPING 1	60	2,9500	1,419	,183
GROUPING 0	42	3,2143	1,570	,242

Mean Difference = -,2643

Levene's Test for Equality of Variances: F= ,885 **P= ,349**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-,89	100	,378	,298	(-,856; ,328)
Unequal	-,87	82,55	,387	,304	(-,868; ,340)

(--)

Variable	Number of Cases	Mean	SD	SE of Mean
A2				
GROUPING 1	60	3,3833	1,391	,180
GROUPING 0	42	3,3333	1,572	,243

Mean Difference = ,0500

Levene's Test for Equality of Variances: F= 2,726 **P= ,102**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	,17	100	,866	,295	(-,536; ,636)
Unequal	,17	81,29	,869	,302	(-,551; ,651)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
A3				
GROUPING 1	60	2,8500	1,376	,178
GROUPING 0	42	3,0714	1,351	,208

Mean Difference = -,2214

Levene's Test for Equality of Variances: F= ,135 P= ,714

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-,81	100	,422	,275	(-,766; ,324)
Unequal	-,81	89,41	,421	,274	(-,765; ,323)

(--)

Variable	Number of Cases	Mean	SD	SE of Mean
A4				
GROUPING 1	60	2,2000	1,117	,144
GROUPING 0	42	3,4762	1,131	,175

Mean Difference = -1,2762

Levene's Test for Equality of Variances: F= ,070 P= ,792

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-5,65	100	,000	,226	(-1,724; -,828)
Unequal	-5,64	87,67	,000	,226	(-1,726; -,826)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
A5				
GROUPING 1	60	2,0333	,802	,104
GROUPING 0	42	3,8810	,942	,145

Mean Difference = -1,8476

Levene's Test for Equality of Variances: F= 2,330 P= ,130

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-10,65	100	,000	,173	(-2,192; -1,503)
Unequal	-10,35	78,99	,000	,178	(-2,203; -1,492)

(---)

Variable	Number of Cases	Mean	SD	SE of Mean
A6				
GROUPING 1	60	2,1167	,885	,114
GROUPING 0	42	3,6667	,846	,131

Mean Difference = -1,5500

Levene's Test for Equality of Variances: F= ,004 **P= ,952**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-8,87	100	**,000**	,175	(-1,897; -1,203)
Unequal	-8,94	90,83	,000	,173	(-1,895; -1,205)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
A7				
GROUPING 1	60	2,3167	1,200	,155
GROUPING 0	40	2,5750	1,279	,202

Mean Difference = -,2583

Levene's Test for Equality of Variances: F= ,424 **P= ,517**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-1,03	98	,307	,251	(-,757; ,241)
Unequal	-1,01	80,01	,314	,255	(-,765; ,249)

(--)

Variable	Number of Cases	Mean	SD	SE of Mean
A8				
GROUPING 1	60	1,5333	,791	,102
GROUPING 0	42	2,0714	1,218	,188

Mean Difference = -,5381

Levene's Test for Equality of Variances: F= 13,179 **P= ,000**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-2,71	100	,008	,199	(-,933; -,144)
Unequal	-2,52	64,88	**,014**	,214	(-,965; -,111)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
A9				
GROUPING 1	60	3,3167	,833	,108
GROUPING 0	42	3,5714	,991	,153

Mean Difference = -,2548

Levene's Test for Equality of Variances: F= 4,745 P= ,032

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-1,40	100	,163	,181	(-,615; ,105)
Unequal	-1,36	78,30	,177	,187	(-,627; ,118)

(--)

Variable	Number of Cases	Mean	SD	SE of Mean
A10				
GROUPING 1	60	3,0333	,712	,092
GROUPING 0	42	3,2381	,850	,131

Mean Difference = -,2048

Levene's Test for Equality of Variances: F= 5,539 P= ,021

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-1,32	100	,190	,155	(-,513; ,103)
Unequal	-1,28	78,10	,205	,160	(-,524; ,114)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
A11				
GROUPING 1	60	3,2333	,745	,096
GROUPING 0	42	3,3810	,987	,152

Mean Difference = -,1476

Levene's Test for Equality of Variances: F= 4,787 P= ,031

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-,86	100	,391	,171	(-,488; ,193)
Unequal	-,82	72,25	,415	,180	(-,507; ,211)

(--)

Variable	Number of Cases	Mean	SD	SE of Mean
B1				
GROUPING 1	60	2,1833	1,372	,177
GROUPING 0	42	3,3095	1,388	,214

Mean Difference = -1,1262

Levene's Test for Equality of Variances: F= ,244 **P= ,623**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-4,06	100	**,000**	,277	(-1,676; -,576)
Unequal	-4,05	87,73	,000	,278	(-1,678; -,574)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
B2				
GROUPING 1	58	2,7414	1,470	,193
GROUPING 0	42	3,2381	1,478	,228

Mean Difference = -,4967

Levene's Test for Equality of Variances: F= ,000 P= ,998

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-1,66	98	,099	,299	(-1,089; ,096)
Unequal	-1,66	88,19	,100	,299	(-1,091; ,097)

(---)

Variable	Number of Cases	Mean	SD	SE of Mean
B3				
GROUPING 1	58	3,2931	1,389	,182
GROUPING 0	42	2,3333	1,509	,233

Mean Difference = ,9598

Levene's Test for Equality of Variances: F= ,764 **P= ,384**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	3,29	98	**,001**	,292	(,381; 1,539)
Unequal	3,25	84,02	,002	,296	(,372; 1,548)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
B4				
GROUPING 1	58	3,1379	1,572	,206
GROUPING 0	42	1,8810	1,329	,205

Mean Difference = 1,2570

Levene's Test for Equality of Variances: F= 3,910 **P= ,051**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	4,21	98	**,000**	,299	(,664; 1,850)
Unequal	4,32	95,59	,000	,291	(,679; 1,835)

(--)

Variable	Number of Cases	Mean	SD	SE of Mean
B5				
GROUPING 1	58	2,0345	1,337	,176
GROUPING 0	42	1,7619	1,206	,186

Mean Difference = ,2726

Levene's Test for Equality of Variances: F= 2,144 P= ,146

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	1,05	98	,297	,260	(-,244; ,789)
Unequal	1,07	93,31	,289	,256	(-,235; ,781)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
C1N1				
GROUPING 1	60	3,8833	1,027	,133
GROUPING 0	42	2,8571	1,117	,172

Mean Difference = 1,0262

Levene's Test for Equality of Variances: F= ,458 **P= ,500**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	4,79	100	**,000**	,214	(,601; 1,451)
Unequal	4,72	83,53	,000	,217	(,594; 1,459)

(--)

Variable	Number of Cases	Mean	SD	SE of Mean
C1N2				
GROUPING 1	60	3,1667	1,011	,131
GROUPING 0	42	1,9286	1,068	,165

Mean Difference = 1,2381

Levene's Test for Equality of Variances: F= ,102 **P= ,750**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	5,95	100	**,000**	,208	(,825; 1,651)
Unequal	5,89	85,26	,000	,210	(,820; 1,656)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
C1N3				
GROUPING 1	60	3,7667	1,170	,151
GROUPING 0	42	2,8810	,942	,145

Mean Difference = ,8857

Levene's Test for Equality of Variances: F= 4,041 **P= ,047**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	4,07	100	,000	,218	(,454; 1,318)
Unequal	4,23	97,96	,000	,210	(,470; 1,302)

(--)

Variable	Number of Cases	Mean	SD	SE of Mean
C1N4				
GROUPING 1	59	2,3729	1,299	,169
GROUPING 0	42	1,9286	1,218	,188

Mean Difference = ,4443

Levene's Test for Equality of Variances: F= 1,361 **P= ,246**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	1,74	99	,085	,256	(-,063; ,951)
Unequal	1,76	91,75	,082	,253	(-,058; ,946)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
C1N5				
GROUPING 1	60	4,6333	,843	,109
GROUPING 0	42	4,6190	,962	,148

Mean Difference = ,0143

Levene's Test for Equality of Variances: F= ,136 P= ,713

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	,08	100	,937	,180	(-,342; ,371)
Unequal	,08	80,75	,938	,184	(-,352; ,380)

(--)

Variable	Number of Cases	Mean	SD	SE of Mean
C1N6				
GROUPING 1	60	4,5000	,911	,118
GROUPING 0	42	4,3095	1,278	,197

Mean Difference = ,1905

Levene's Test for Equality of Variances: F= 4,433 P= ,038

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	,88	100	,381	,217	(-,239; ,620)
Unequal	,83	69,28	,410	,230	(-,268; ,649)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
C1N7				
GROUPING 1	60	4,0667	,861	,111
GROUPING 0	42	2,9286	1,068	,165

Mean Difference = 1,1381

Levene's Test for Equality of Variances: F= ,005 **P= ,943**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	5,95	100	**,000**	,191	(,758; 1,518)
Unequal	5,72	75,86	,000	,199	(,742; 1,534)

(--)

Variable	Number of Cases	Mean	SD	SE of Mean
C1N8				
GROUPING 1	60	3,2167	1,075	,139
GROUPING 0	42	3,3571	1,246	,192

Mean Difference = -,1405

Levene's Test for Equality of Variances: F= 1,735 P= ,191

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-,61	100	,544	,231	(-,599; ,318)
Unequal	-,59	79,81	,555	,237	(-,612; ,331)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
C1N9				
GROUPING 1	60	2,4667	1,808	,233
GROUPING 0	42	3,1905	1,811	,279

Mean Difference = -,7238

Levene's Test for Equality of Variances: F= ,001 **P= ,974**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-1,99	100	**,050**	,364	(-1,446; -,002)
Unequal	-1,99	88,31	,050	,364	(-1,447; ,000)

(--)

Variable	Number of Cases	Mean	SD	SE of Mean
C1N10				
GROUPING 1	60	2,1833	1,359	,175
GROUPING 0	42	2,0952	1,284	,198

Mean Difference = ,0881

Levene's Test for Equality of Variances: F= 1,311 P= ,255

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	,33	100	,742	,267	(-,442; ,619)
Unequal	,33	91,43	,740	,265	(-,438; ,614)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
C1N11				
GROUPING 1	60	2,4833	1,033	,133
GROUPING 0	42	3,8095	,862	,133

Mean Difference = -1,3262

Levene's Test for Equality of Variances: F= 3,622 **P= ,060**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-6,82	100	**,000**	,194	(-1,712; -,940)
Unequal	-7,04	96,85	,000	,188	(-1,700; -,952)

(--)

Variable	Number of Cases	Mean	SD	SE of Mean
C1N12				
GROUPING 1	60	3,9500	1,126	,145
GROUPING 0	42	4,0476	1,125	,174

Mean Difference = -,0976

Levene's Test for Equality of Variances: F= ,055 P= ,815

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-,43	100	,667	,227	(-,547; ,352)
Unequal	-,43	88,45	,667	,226	(-,548; ,352)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
C1N13				
GROUPING 1	60	3,4000	1,167	,151
GROUPING 0	42	2,1667	1,188	,183

Mean Difference = 1,2333

Levene's Test for Equality of Variances: F= ,030 **P= ,864**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	5,21	100	**,000**	,237	(,764; 1,703)
Unequal	5,20	87,42	,000	,237	(,762; 1,705)

(--)

Variable	Number of Cases	Mean	SD	SE of Mean
C1N14				
GROUPING 1	59	3,2712	,906	,118
GROUPING 0	42	3,0952	,983	,152

Mean Difference = ,1759

Levene's Test for Equality of Variances: F= ,085 P= ,771

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	,93	99	,356	,190	(-,200; ,552)
Unequal	,92	83,92	,363	,192	(-,206; ,558)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
C1N15				
GROUPING 1	60	2,7500	1,373	,177
GROUPING 0	42	2,6905	1,506	,232

Mean Difference = ,0595

Levene's Test for Equality of Variances: F= 2,007 P= ,160

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	,21	100	,836	,288	(-,511; ,630)
Unequal	,20	83,06	,839	,292	(-,522; ,641)

(---)

Variable	Number of Cases	Mean	SD	SE of Mean
C1N16				
GROUPING 1	60	2,8333	1,137	,147
GROUPING 0	42	4,3333	,846	,131

Mean Difference = -1,5000

Levene's Test for Equality of Variances: F= 4,425 **P= ,038**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-7,25	100	,000	,207	(-1,910; -1,090)
Unequal	-7,64	99,60	**,000**	,196	(-1,890; -1,110)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
C1N17				
GROUPING 1	60	2,5500	1,064	,137
GROUPING 0	40	3,0750	1,163	,184

Mean Difference = -,5250

Levene's Test for Equality of Variances: F= ,223 **P= ,638**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-2,33	98	**,022**	,226	(-,973; -,077)
Unequal	-2,29	78,52	,025	,230	(-,982; -,068)

(--)

Variable	Number of Cases	Mean	SD	SE of Mean
C1N19				
GROUPING 1	60	4,1333	,947	,122
GROUPING 0	40	3,9250	1,047	,166

Mean Difference = ,2083

Levene's Test for Equality of Variances: F= 1,035 P= ,312

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	1,03	98	,304	,202	(-,192; ,609)
Unequal	1,01	77,83	,315	,206	(-,201; ,618)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
C2N1				
GROUPING 1	60	3,0167	1,214	,157
GROUPING 0	42	2,8810	1,485	,229

Mean Difference = ,1357

Levene's Test for Equality of Variances: F= 4,497 P= ,036

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	,51	100	,614	,268	(-,396; ,667)
Unequal	,49	76,69	,626	,278	(-,417; ,689)

(--)

Variable	Number of Cases	Mean	SD	SE of Mean
C2N2				
GROUPING 1	60	3,8500	,971	,125
GROUPING 0	42	4,1190	1,064	,164

Mean Difference = -,2690

Levene's Test for Equality of Variances: F= ,575 P= ,450

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-1,32	100	,189	,203	(-,672; ,134)
Unequal	-1,30	83,13	,196	,207	(-,680; ,142)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
C2N3				
GROUPING 1	60	3,3167	1,200	,155
GROUPING 0	42	4,1905	,943	,146

Mean Difference = -,8738

Levene's Test for Equality of Variances: F= 6,028 **P= ,016**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-3,94	100	,000	,222	(-1,314; -,434)
Unequal	-4,11	98,59	**,000**	,213	(-1,296; -,452)

(--)

Variable	Number of Cases	Mean	SD	SE of Mean
C2N4				
GROUPING 1	60	4,0000	,803	,104
GROUPING 0	42	3,8333	1,102	,170

Mean Difference = ,1667

Levene's Test for Equality of Variances: F= 4,269 P= ,041

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	,88	100	,379	,189	(-,207; ,541)
Unequal	,84	70,33	,406	,199	(-,231; ,564)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
C2N5				
GROUPING 1	60	4,2000	,798	,103
GROUPING 0	42	3,0714	1,177	,182

Mean Difference = 1,1286

Levene's Test for Equality of Variances: F= 10,242 **P= ,002**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	5,77	100	,000	,195	(,741; 1,516)
Unequal	5,40	66,85	**,000**	,209	(,712; 1,545)

(---)

Variable	Number of Cases	Mean	SD	SE of Mean
C3N1				
GROUPING 1	60	3,9833	1,033	,133
GROUPING 0	41	3,0488	1,448	,226

Mean Difference = ,9346

Levene's Test for Equality of Variances: F= 11,358 **P= ,001**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	3,79	99	,000	,247	(,445; 1,424)
Unequal	3,56	67,15	**,001**	,263	(,410; 1,459)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
C3N2				
GROUPING 1	60	3,8833	,783	,101
GROUPING 0	42	3,0238	1,093	,169

Mean Difference = ,8595

Levene's Test for Equality of Variances: F= 3,165 **P= ,078**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	4,63	100	**,000**	,186	(,491; 1,228)
Unequal	4,37	69,52	,000	,197	(,467; 1,252)

(---)

Variable	Number of Cases	Mean	SD	SE of Mean
C3N3				
GROUPING 1	60	2,6000	1,012	,131
GROUPING 0	37	3,7027	1,244	,205

Mean Difference = -1,1027

Levene's Test for Equality of Variances: F= 2,518 **P= ,116**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-4,77	95	**,000**	,231	(-1,562; -,644)
Unequal	-4,54	64,78	,000	,243	(-1,587; -,618)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
C3N4				
GROUPING 1	59	2,9831	1,182	,154
GROUPING 0	40	4,0750	,997	,158

Mean Difference = -1,0919

Levene's Test for Equality of Variances: F= 2,003 **P= ,160**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-4,80	97	**,000**	,228	(-1,544; -,640)
Unequal	-4,96	92,34	,000	,220	(-1,529; -,654)

(---)

Variable	Number of Cases	Mean	SD	SE of Mean
C3N5				
GROUPING 1	60	4,5500	,649	,084
GROUPING 0	42	3,3571	,958	,148

Mean Difference = 1,1929

Levene's Test for Equality of Variances: F= 6,138 **P= ,015**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	7,50	100	,000	,159	(,877; 1,508)
Unequal	7,02	66,78	**,000**	,170	(,854; 1,532)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
C3N6				
GROUPING 1	60	4,0500	,891	,115
GROUPING 0	41	2,6585	1,109	,173

Mean Difference = 1,3915

Levene's Test for Equality of Variances: F= 4,468 **P= ,037**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	6,97	99	,000	,200	(,995; 1,788)
Unequal	6,69	73,38	**,000**	,208	(,977; 1,806)

(--)

Variable	Number of Cases	Mean	SD	SE of Mean
C3N7				
GROUPING 1	60	3,9667	,956	,123
GROUPING 0	40	3,0500	1,197	,189

Mean Difference = ,9167

Levene's Test for Equality of Variances: F= 4,421 **P= ,038**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	4,24	98	,000	,216	(,488; 1,346)
Unequal	4,06	70,76	**,000**	,226	(,466; 1,367)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
C3N8				
GROUPING 1	60	4,0000	,759	,098
GROUPING 0	41	4,2927	,981	,153

Mean Difference = -,2927

Levene's Test for Equality of Variances: F= 3,016 P= ,086

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-1,69	99	,095	,173	(-,637; ,051)
Unequal	-1,61	71,34	,112	,182	(-,655; ,070)

(--)

Variable	Number of Cases	Mean	SD	SE of Mean
C3N9				
GROUPING 1	60	3,7667	,998	,129
GROUPING 0	40	4,1500	,975	,154

Mean Difference = -,3833

Levene's Test for Equality of Variances: F= ,232 P= ,631

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-1,90	98	,060	,202	(-,784; ,017)
Unequal	-1,91	85,04	,060	,201	(-,783; ,016)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
C4N1				
GROUPING 1	60	3,6667	1,036	,134
GROUPING 0	42	4,2381	,958	,148

Mean Difference = -,5714

Levene's Test for Equality of Variances: F= 1,366 **P= ,245**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-2,83	100	**,006**	,202	(-,972; -,170)
Unequal	-2,87	92,53	,005	,199	(-,967; -,176)

(--)

Variable	Number of Cases	Mean	SD	SE of Mean
C4N2				
GROUPING 1	60	2,0667	1,006	,130
GROUPING 0	42	3,9048	,850	,131

Mean Difference = -1,8381

Levene's Test for Equality of Variances: F= 2,163 **P= ,144**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-9,67	100	**,000**	,190	(-2,215; -1,461)
Unequal	-9,96	96,42	,000	,185	(-2,204; -1,472)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
C4N3				
GROUPING 1	60	4,1333	,791	,102
GROUPING 0	42	2,7381	1,191	,184

Mean Difference = 1,3952

Levene's Test for Equality of Variances: F= 10,391 **P= ,002**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	7,11	100	,000	,196	(1,006; 1,784)
Unequal	6,64	65,89	**,000**	,210	(,976; 1,815)

(--)

Variable	Number of Cases	Mean	SD	SE of Mean
C4N4				
GROUPING 1	59	3,8305	,950	,124
GROUPING 0	40	3,8750	1,042	,165

Mean Difference = -,0445

Levene's Test for Equality of Variances: F= ,419 P= ,519

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-,22	97	,826	,202	(-,446; ,357)
Unequal	-,22	78,52	,830	,206	(-,455; ,366)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
C4N5				
GROUPING 1	59	3,6441	,924	,120
GROUPING 0	38	3,2895	1,088	,177

Mean Difference = ,3546

Levene's Test for Equality of Variances: F= ,974 P= ,326

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	1,72	95	,089	,206	(-,055; ,764)
Unequal	1,66	69,75	,101	,214	(-,071; ,781)

(---)

Variable	Number of Cases	Mean	SD	SE of Mean
C4N6				
GROUPING 1	57	3,5439	1,001	,133
GROUPING 0	40	3,1750	1,259	,199

Mean Difference = ,3689

Levene's Test for Equality of Variances: F= 1,968 P= ,164

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	1,61	95	,112	,230	(-,087; ,825)
Unequal	1,54	71,51	,127	,239	(-,108; ,846)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
C4N7				
GROUPING 1	59	3,8305	,950	,124
GROUPING 0	40	4,0500	,959	,152

Mean Difference = -,2195

Levene's Test for Equality of Variances: F= ,827 P= ,365

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-1,12	97	,264	,195	(-,607; ,168)
Unequal	-1,12	83,30	,265	,196	(-,609; ,170)

(--)

Variable	Number of Cases	Mean	SD	SE of Mean
C5N4				
GROUPING 1	60	4,3833	,739	,095
GROUPING 0	37	3,7027	,845	,139

Mean Difference = ,6806

Levene's Test for Equality of Variances: F= ,921 **P= ,340**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	4,17	95	**,000**	,163	(,357; 1,005)
Unequal	4,04	68,59	,000	,169	(,344; 1,017)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
C5N6				
GROUPING 1	60	2,0167	1,200	,155
GROUPING 0	36	3,5833	,996	,166

Mean Difference = -1,5667

Levene's Test for Equality of Variances: F= 3,227 **P= ,076**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-6,58	94	**,000**	,238	(-2,039; -1,094)
Unequal	-6,90	84,48	,000	,227	(-2,018; -1,115)

(--)

Variable	Number of Cases	Mean	SD	SE of Mean
D2N1				
GROUPING 1	60	4,4000	,942	,122
GROUPING 0	42	1,7619	1,055	,163

Mean Difference = 2,6381

Levene's Test for Equality of Variances: F= 2,670 **P= ,105**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	13,24	100	**,000**	,199	(2,243; 3,033)
Unequal	12,98	81,86	,000	,203	(2,234; 3,042)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
D2N4				
GROUPING 1	60	2,6833	1,000	,129
GROUPING 0	40	3,7750	1,459	,231

Mean Difference = -1,0917

Levene's Test for Equality of Variances: F= 12,749 **P= ,001**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-4,44	98	,000	,246	(-1,579; -,604)
Unequal	-4,13	63,16	**,000**	,264	(-1,620; -,564)

(--)

Variable	Number of Cases	Mean	SD	SE of Mean
D2N5				
GROUPING 1	60	1,8167	1,097	,142
GROUPING 0	42	1,9286	1,177	,182

Mean Difference = -,1119

Levene's Test for Equality of Variances: F= ,150 P= ,699

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-,49	100	,624	,227	(-,563; ,339)
Unequal	-,49	84,35	,628	,230	(-,570; ,346)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
D2N6				
GROUPING 1	60	3,5000	1,157	,149
GROUPING 0	42	2,6905	1,506	,232

Mean Difference = ,8095

Levene's Test for Equality of Variances: F= 8,792 **P= ,004**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	3,07	100	,003	,264	(,286; 1,333)
Unequal	2,93	73,21	**,005**	,276	(,259; 1,360)

Variable	Number of Cases	Mean	SD	SE of Mean
D2N7				
GROUPING 1	60	3,4500	1,096	,141
GROUPING 0	42	2,5476	1,310	,202

Mean Difference = ,9024

Levene's Test for Equality of Variances: F= 2,571 **P= ,112**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	3,77	100	**,000**	,239	(,428; 1,377)
Unequal	3,66	77,98	,000	,247	(,411; 1,394)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
D2N8				
GROUPING 1	60	2,2667	1,087	,140
GROUPING 0	42	3,1905	1,110	,171

Mean Difference = -,9238

Levene's Test for Equality of Variances: F= ,345 **P= ,558**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-4,19	100	**,000**	,221	(-1,361; -,486)
Unequal	-4,17	87,24	,000	,221	(-1,364; -,484)

(---)

Variable	Number of Cases	Mean	SD	SE of Mean
D2N9				
GROUPING 1	60	2,7333	1,177	,152
GROUPING 0	42	2,5714	1,434	,221

Mean Difference = ,1619

Levene's Test for Equality of Variances: F= 4,003 P= ,048

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	,62	100	,534	,259	(-,352; ,676)
Unequal	,60	76,91	,548	,268	(-,373; ,696)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
D2N10				
GROUPING 1	60	4,3500	,709	,092
GROUPING 0	42	3,8333	1,034	,160

Mean Difference = ,5167

Levene's Test for Equality of Variances: F= 2,893 **P= ,092**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	3,00	100	**,003**	,172	(,175; ,859)
Unequal	2,81	67,35	,006	,184	(,150; ,884)

(--)

Variable	Number of Cases	Mean	SD	SE of Mean
D2N11				
GROUPING 1	60	3,3333	1,115	,144
GROUPING 0	42	3,2619	1,515	,234

Mean Difference = ,0714

Levene's Test for Equality of Variances: F= 9,670 P= ,002

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	,27	100	,784	,260	(-,445; ,588)
Unequal	,26	70,89	,795	,275	(-,476; ,619)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
D2N12				
GROUPING 1	60	2,4667	1,308	,169
GROUPING 0	40	2,2250	1,387	,219

Mean Difference = ,2417

Levene's Test for Equality of Variances: F= ,068 P= ,794

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	,88	98	,379	,273	(-,301; ,784)
Unequal	,87	80,31	,385	,277	(-,309; ,792)

(---)

Variable	Number of Cases	Mean	SD	SE of Mean
EVAR				
GROUPING 1	60	6,3500	1,912	,247
GROUPING 0	42	11,0238	1,994	,308

Mean Difference = -4,6738

Levene's Test for Equality of Variances: F= ,315 **P= ,576**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-11,94	100	**,000**	,391	(-5,450; -3,897)
Unequal	-11,85	86,01	,000	,394	(-5,458; -3,890)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
EDIV				
GROUPING 1	60	9,1833	3,122	,403
GROUPING 0	42	9,6190	2,963	,457

Mean Difference = -,4357

Levene's Test for Equality of Variances: F= ,393 P= ,532

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-,71	100	,480	,615	(-1,656; ,785)
Unequal	-,71	91,21	,476	,609	(-1,646; ,775)

(--)

Variable	Number of Cases	Mean	SD	SE of Mean
EGROWTH				
GROUPING 1	60	9,5833	1,690	,218
GROUPING 0	42	10,1905	2,244	,346

Mean Difference = -,6071

Levene's Test for Equality of Variances: F= 1,881 P= ,173

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-1,56	100	,122	,390	(-1,380; ,166)
Unequal	-1,48	72,13	,142	,409	(-1,423; ,209)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
OFORM				
GROUPING 1	60	2,1333	1,546	,200
GROUPING 0	42	-1,4286	1,382	,213

Mean Difference = 3,5619

Levene's Test for Equality of Variances: F= ,099 **P= ,754**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	11,96	100	**,000**	,298	(2,971; 4,153)
Unequal	12,20	94,10	,000	,292	(2,982; 4,142)

(---)

Variable	Number of Cases	Mean	SD	SE of Mean
OHR				
GROUPING 1	60	6,1333	1,789	,231
GROUPING 0	42	4,7381	1,988	,307

Mean Difference = 1,3952

Levene's Test for Equality of Variances: F= ,465 **P= ,497**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	3,70	100	**,000**	,377	(,647; 2,143)
Unequal	3,63	82,29	,000	,384	(,631; 2,159)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
OSTR				
GROUPING 1	60	12,1333	4,463	,576
GROUPING 0	42	10,2381	4,898	,756

Mean Difference = 1,8952

Levene's Test for Equality of Variances: F= ,595 **P= ,442**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	2,03	100	**,045**	,935	(,041; 3,750)
Unequal	1,99	83,01	,049	,950	(,005; 3,785)

(--)

Variable	Number of Cases	Mean	SD	SE of Mean
OVALUES				
GROUPING 1	60	2,6833	1,000	,129
GROUPING 0	42	3,5952	1,639	,253

Mean Difference = -,9119

Levene's Test for Equality of Variances: F= 19,491 **P= ,000**

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	SE of Diff	95% CI for Diff
Equal	-3,49	100	,001	,262	(-1,431; -,393)
Unequal	-3,21	62,21	**,002**	,284	(-1,479; -,344)

t-tests for Independent Samples of GROUPING

Variable	Number of Cases	Mean	SD	SE of Mean
DYNAMISM				
GROUPING 1	60	-,8821	,000	,000
GROUPING 0	42	2,3118	,938	,145

Mean Difference = -3,1939

Levene's Test for Equality of Variances: F= 82,637 **P= ,000**

t-test for Equality of Means					95%
Variances	t-value	df	2-Tail Sig	SE of Diff	CI for Diff
Equal	-26,44	100	,000	,121	(-3,434; -2,954)
Unequal	-22,07	41,00	**,000**	,145	(-3,486; -2,902)

Appendix E: Factor Analysis

Factor Analysis (Section A)

----------- F A C T O R   A N A L Y S I S -----------

Analysis number 1 Listwise deletion of cases with missing values

Extraction 1 for analysis 1, Principal Components Analysis (PC)

Initial Statistics:

Variable	Communality	*	Factor	Eigenvalue	Pct of Var	Cum Pct
		*				
A1	1,00000	*	1	2,49607	22,7	22,7
A10	1,00000	*	2	1,66228	15,1	37,8
A11	1,00000	*	3	1,54567	14,1	51,9
A2	1,00000	*	4	1,38025	12,5	64,4
A3	1,00000	*	5	,83750	7,6	72,0
A4	1,00000	*	6	,78600	7,1	79,2
A5	1,00000	*	7	,63249	5,7	84,9
A6	1,00000	*	8	,54449	4,9	89,9
A7	1,00000	*	9	,51372	4,7	94,5
A8	1,00000	*	10	,41552	3,8	98,3
A9	1,00000	*	11	,18601	1,7	100,0

PC extracted 4 factors.

Factor Matrix:

	Factor 1	Factor 2	Factor 3	Factor 4
A1				,54944
A10	,50788	-,54116		
A11	,43636	-,63995		
A2		,40293	,69527	
A3			,51982	
A4	,72732			
A5	,68781		-,49509	
A6	,62208	,40281	-,49899	
A7				,54616
A8				,63461
A9	,48667	-,43278		

Final Statistics:

Variable	Communality	*	Factor	Eigenvalue	Pct of Var	Cum Pct
		*				
A1	,53972	*	1	2,49607	22,7	22,7
A10	,57829	*	2	1,66228	15,1	37,8
A11	,67156	*	3	1,54567	14,1	51,9
A2	,73972	*	4	1,38025	12,5	64,4
A3	,60930	*				
A4	,54678	*				
A5	,87811	*				
A6	,84520	*				
A7	,46411	*				
A8	,59437	*				
A9	,61711	*				

VARIMAX rotation 1 for extraction 1 in analysis 1 - Kaiser Normalization.

VARIMAX converged in 5 iterations.

Rotated Factor Matrix:

	Factor 1	Factor 2	Factor 3	Factor 4
A1				,68382
A10		,72054		
A11		,79706		
A2			,85447	
A3			,75061	
A4	,50805			
A5	,93459			
A6	,91723			
A7				,50888
A8				,76569
A9		,74040		

Factor Transformation Matrix:

	Factor 1	Factor 2	Factor 3	Factor 4
Factor 1	,69041	,57723	,22108	,37586
Factor 2	,42038	-,76047	,48206	,11217
Factor 3	-,56220	,20673	,75304	,27225
Factor 4	-,17480	-,21389	-,38945	,87865

(--)

Reliability Analysis (Factor 1)

RELIABILITY ANALYSIS - SCALE (ALPHA)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
A4	5,5490	5,2005	,3836	**,8823**
A5	5,4804	3,8758	,7386	,4612
A6	5,5196	4,5689	,6453	,5915

Reliability Coefficients

N of Cases = 102,0 N of Items = 3

Alpha = ,7488

A4 will be removed to increase reliability. **Reliability Coefficient for A5 and A6 = ,8823**

Alpha = ,8823

(--)

Reliability Analysis (Factor 2)

RELIABILITY ANALYSIS - SCALE (ALPHA)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
A9	6,4118	1,8486	,4606	,5671
A10	6,7157	2,2055	,4339	,5989
A11	6,5392	1,8945	,5056	,5005

Reliability Coefficients

N of Cases = 102,0 N of Items = 3

Alpha = ,6541

(--)

Reliability Analysis (Factor 3)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
A2	2,9412	1,8579	,4583	.
A3	3,3627	2,1344	,4583	.

Reliability Coefficients

N of Cases = 102,0 N of Items = 2

Alpha = ,6275

(--)

Reliability Analysis (Factor 4)

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
A1	4,1300	2,8213	,2793	,2460
A7	4,7700	3,9971	,1708	,4421
A8	5,4800	4,1713	,3082	,2371

Reliability Coefficients

N of Cases = 100,0 N of Items = 3

Alpha = ,4071

New Factor Analysis for Section A

(Variables A1,A4,A7,and A8 are excluded).

Analysis number 1 Listwise deletion of cases with missing values

Extraction 1 for analysis 1, Principal Components Analysis (PC)

Initial Statistics:

Variable	Communality	*	Factor	Eigenvalue	Pct of Var	Cum Pct
		*				
A10	1,00000	*	1	1,98999	28,4	28,4
A11	1,00000	*	2	1,62619	23,2	51,7
A2	1,00000	*	3	1,47186	21,0	72,7
A3	1,00000	*	4	,65204	9,3	82,0
A5	1,00000	*	5	,58488	8,4	90,4
A6	1,00000	*	6	,48326	6,9	97,3
A9	1,00000	*	7	,19179	2,7	100,0

PC extracted 3 factors.

Factor Matrix:

	Factor 1	Factor 2	Factor 3
A10	,50969	,48093	
A11	,56820	,48404	
A2			,83365
A3			,77348
A5	,70123	-,63113	
A6	,69391	-,64239	
A9	,56509	,55048	

Final Statistics:

Variable	Communality	*	Factor	Eigenvalue	Pct of Var	Cum Pct
		*				
A10	,56044	*	1	1,98999	28,4	28,4
A11	,66444	*	2	1,62619	23,2	51,7
A2	,74547	*	3	1,47186	21,0	72,7
A3	,70916	*				
A5	,89107	*				
A6	,89470	*				
A9	,62276	*				

VARIMAX rotation 1 for extraction 1 in analysis 1 - Kaiser Normalization.

VARIMAX converged in 4 iterations.

Rotated Factor Matrix:

	Factor 1	Factor 2	Factor 3
A10		,74647	
A11		,80641	
A2			,85956
A3			,83157
A5	,94238		
A6	,94491		
A9		,74979	

Factor Transformation Matrix:

	Factor 1	Factor 2	Factor 3
Factor 1	,70289	,67343	,22900
Factor 2	-,71034	,68127	,17688
Factor 3	-,03689	-,28700	,95722

Following factor scores will be added to the working file:

Name	Label
EVARF	**Environmental Volatility Factor**
GrowthF	**Growth Factor**
EDIVF	**Environmental Diversity Factor**

Factor Analysis (Strategy)

Analysis number 1 Listwise deletion of cases with missing values

Extraction 1 for analysis 1, Principal Components Analysis (PC)

Initial Statistics:

Variable	Communality	*	Factor	Eigenvalue	Pct of Var	Cum Pct
		*				
C2N1	1,00000	*	1	3,26927	23,4	23,4
C2N2	1,00000	*	2	1,87156	13,4	36,7
C2N3	1,00000	*	3	1,31853	9,4	46,1
C2N4	1,00000	*	4	1,15609	8,3	54,4
C2N5	1,00000	*	5	1,05030	7,5	61,9
C3N1	1,00000	*	6	1,00732	7,2	69,1
C3N2	1,00000	*	7	,93022	6,6	75,7
C3N3	1,00000	*	8	,72469	5,2	80,9
C3N4	1,00000	*	9	,64101	4,6	85,5
C3N5	1,00000	*	10	,58350	4,2	89,7
C3N6	1,00000	*	11	,46919	3,4	93,0
C3N7	1,00000	*	12	,36715	2,6	95,6
C3N8	1,00000	*	13	,31873	2,3	97,9
C3N9	1,00000	*	14	,29244	2,1	100,0

PC extracted 6 factors.

Factor Matrix:

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
C2N1			,68864		,46074	
C2N2		,52328			-,51518	
C2N3		,43622	,42547			
C2N4				,78572		
C2N5	,75432					
C3N1	,77142					
C3N2	,56901					
C3N3			-,47320	,41883		
C3N4		,61367				
C3N5	,80052					
C3N6	,64307					
C3N7	,64322					-,50753
C3N8		,60365				
C3N9		,65810				

Final Statistics:

Variable	Communality	*	Factor	Eigenvalue	Pct of Var	Cum Pct
		*				
C2N1	,78606	*	1	3,26927	23,4	23,4
C2N2	,82956	*	2	1,87156	13,4	36,7
C2N3	,70156	*	3	1,31853	9,4	46,1
C2N4	,71152	*	4	1,15609	8,3	54,4
C2N5	,64716	*	5	1,05030	7,5	61,9
C3N1	,70228	*	6	1,00732	7,2	69,1
C3N2	,56152	*				
C3N3	,79295	*				
C3N4	,71285	*				
C3N5	,69664	*				
C3N6	,52630	*				
C3N7	,70099	*				
C3N8	,68854	*				
C3N9	,61513	*				

VARIMAX rotation 1 for extraction 1 in analysis 1 - Kaiser Normalization.

VARIMAX converged in 18 iterations.

Rotated Factor Matrix:

	Factor 1	Factor 2	Factor 3	Factor 4	Factor5	Factor 6
C2N1					,87094	
C2N2				,90222		
C2N3			**-,40434**		**,57126**	
C2N4						,70415
C2N5	,77559					
C3N1	,78165					
C3N2	,67903					
C3N3						,75777
C3N4		,81569				
C3N5	,78247					
C3N6	,60039					
C3N7			,71545			
C3N8			**,60247**	**,48169**		
C3N9	.	,67241				

Factor Transformation Matrix:

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Factor 1	,91132	-,06081	,39083	,06857	-,05736	,07115
Factor 2	-,08910	,77969	,24714	,49621	,22887	,15641
Factor 3	,05352	-,35401	-,06377	,38580	,74095	-,41218
Factor 4	,05699	-,29152	-,37842	,37799	,06572	,78827
Factor 5	,15759	,26500	-,17142	-,66506	,59880	,27330
Factor 6	,36141	,32840	-,78072	,12270	-,18012	-,32329

C2N3 and C3N8 load on two factors and are therefore taken out.
(---)

----------- FACTOR ANALYSIS -----------

Analysis number 1 Listwise deletion of cases with missing values

Extraction 1 for analysis 1, Principal Components Analysis (PC)

Initial Statistics:

Variable	Communality	*	Factor	Eigenvalue	Pct of Var	Cum Pct
		*				
C2N1	1,00000	*	1	3,12074	26,0	26,0
C2N2	1,00000	*	2	1,55239	12,9	38,9
C2N4	1,00000	*	3	1,19518	10,0	48,9
C2N5	1,00000	*	4	1,11380	9,3	58,2
C3N1	1,00000	*	5	1,02655	8,6	66,7
C3N2	1,00000	*	6	,93228	7,8	74,5
C3N3	1,00000	*	7	,77744	6,5	81,0
C3N4	1,00000	*	8	,62624	5,2	86,2
C3N5	1,00000	*	9	,52938	4,4	90,6
C3N6	1,00000	*	10	,48451	4,0	94,7
C3N7	1,00000	*	11	,34577	2,9	97,5
C3N9	1,00000	*	12	,29571	2,5	100,0

PC extracted 5 factors.

Factor Matrix:

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
C2N1			,62358		,53962
C2N2				,71300	-,40148
C2N4			-,47234	,64222	
C2N5	,78340				

C3N1	,77389				
C3N2	,57452				
C3N3		,49314	-,47290		,59739
C3N4		,73308			
C3N5	,80382				
C3N6	,65634				
C3N7	,62255				
C3N9		,75574			

Final Statistics:

Variable	Communality	*	Factor	Eigenvalue	Pct of Var	Cum Pct
		*				
C2N1	,78546	*	1	3,12074	26,0	26,0
C2N2	,84190	*	2	1,55239	12,9	38,9
C2N4	,70701	*	3	1,19518	10,0	48,9
C2N5	,64170	*	4	1,11380	9,3	58,2
C3N1	,67312	*	5	1,02655	8,6	66,7
C3N2	,45741	*				
C3N3	,82527	*				
C3N4	,66393	*				
C3N5	,69048	*				
C3N6	,53882	*				
C3N7	,55025	*				
C3N9	,63330	*				

VARIMAX rotation 1 for extraction 1 in analysis 1 - Kaiser Normalization.

VARIMAX converged in 10 iterations.

Rotated Factor Matrix:

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
C2N1					,88083
C2N2				,85366	
C2N4			**,47086**	**,61089**	
C2N5	,77694				
C3N1	,78635				
C3N2	,57243				
C3N3			,88124		
C3N4		,80107			
C3N5	,81139				
C3N6	,66839				
C3N7	,60543				
C3N9		,76128			

Factor Transformation Matrix:

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Factor 1	,99056	-,03651	,05018	,11593	,03868
Factor 2	-,00813	,90434	,37589	,20028	-,02624
Factor 3	,01546	,28375	-,62274	-,01635	,72881
Factor 4	-,13411	-,26220	,16563	,90261	,26670
Factor 5	-,02231	-,17766	,66404	-,36260	,62890

C2N4 loads on two factors and is therefore taken out.

(---)

Analysis number 1 Listwise deletion of cases with missing values

Extraction 1 for analysis 1, Principal Components Analysis (PC)

Initial Statistics:

Variable	Communality	*	Factor	Eigenvalue	Pct of Var	Cum Pct
		*				
C2N1	1,00000	*	1	3,07625	28,0	28,0
C2N2	1,00000	*	2	1,55104	14,1	42,1
C2N5	1,00000	*	3	1,17050	10,6	52,7
C3N1	1,00000	*	4	1,02726	9,3	62,0
C3N2	1,00000	*	5	,96742	8,8	70,8
C3N3	1,00000	*	6	,85802	7,8	78,6
C3N4	1,00000	*	7	,63440	5,8	84,4
C3N5	1,00000	*	8	,55769	5,1	89,5
C3N6	1,00000	*	9	,48928	4,4	93,9
C3N7	1,00000	*	10	,37070	3,4	97,3
C3N9	1,00000	*	11	,29744	2,7	100,0

PC extracted 4 factors.

Factor Matrix:

	Factor 1	Factor 2	Factor 3	Factor 4
C2N1			,69225	,51875
C2N2			,56933	-,47318
C2N5	,77941			
C3N1	,77647			
C3N2	,57261			
C3N3		,48135	-,40187	,55931
C3N4		,74156		
C3N5	,81496			
C3N6	,66086			
C3N7	,62466			
C3N9		,76025		

Final Statistics:

Variable	Communality	*	Factor	Eigenvalue	Pct of Var	Cum Pct
		*				
C2N1	,75804	*	1	3,07625	28,0	28,0
C2N2	,63690	*	2	1,55104	14,1	42,1
C2N5	,63443	*	3	1,17050	10,6	52,7
C3N1	,66367	*	4	1,02726	9,3	62,0
C3N2	,46835	*				
C3N3	,70730	*				
C3N4	,58959	*				
C3N5	,69719	*				
C3N6	,50242	*				
C3N7	,55452	*				
C3N9	,61263	*				

VARIMAX rotation 1 for extraction 1 in analysis 1 - Kaiser Normalization.

VARIMAX converged in 5 iterations.

Rotated Factor Matrix:

	Factor 1	Factor 2	Factor 3	Factor 4
C2N1			,86722	
C2N2		**,41738**		**-,66618**
C2N5	,78206			
C3N1	,78348			
C3N2	,60087			
C3N3				,76230
C3N4		,75034		
C3N5	,81631			
C3N6	,63806			
C3N7	,60189			
C3N9		,76555		

Factor Transformation Matrix:

	Factor 1	Factor 2	Factor 3	Factor 4
Factor 1	,99653	-,00208	,07751	-,03035
Factor 2	,00795	,98401	-,00625	,17781
Factor 3	-,07830	,11940	,76302	-,63041
Factor 4	-,02720	-,13214	,64168	,75502

C2N2 loads on two factors and is therefore taken out.

(--)

Final Factor Analysis (Strategy Factors)

Analysis number 1 Listwise deletion of cases with missing values

Extraction 1 for analysis 1, Principal Components Analysis (PC)

Initial Statistics:

Variable	Communality	*	Factor	Eigenvalue	Pct of Var	Cum Pct
		*				
C2N1	1,00000	*	1	2,82954	31,4	31,4
C2N5	1,00000	*	2	1,52203	16,9	48,4
C3N1	1,00000	*	3	1,05394	11,7	60,1
C3N4	1,00000	*	4	,96527	10,7	70,8
C3N5	1,00000	*	5	,74344	8,3	79,0
C3N6	1,00000	*	6	,61084	6,8	85,8
C3N7	1,00000	*	7	,55496	6,2	92,0
C3N9	1,00000	*	8	,40430	4,5	96,5
C3N3	1,00000	*	9	,31569	3,5	100,0

PC extracted 3 factors.

Factor Matrix:

	Factor 1	Factor 2	Factor 3
C2N1			,95772
C2N5	,77437		
C3N1	,76316		
C3N4		,73411	
C3N5	,80313		
C3N6	,71132		
C3N7	,66916		
C3N9		,75344	
C3N3		,54115	

Final Statistics:

Variable	Communality	*	Factor	Eigenvalue	Pct of Var	Cum Pct
		*				
C2N1	,94108	*	1	2,82954	31,4	31,4
C2N5	,62380	*	2	1,52203	16,9	48,4
C3N1	,64552	*	3	1,05394	11,7	60,1
C3N4	,59896	*				
C3N5	,66726	*				
C3N6	,52094	*				
C3N7	,49866	*				
C3N9	,60170	*				
C3N3	,30759	*				

VARIMAX rotation 1 for extraction 1 in analysis 1 - Kaiser Normalization.

VARIMAX converged in 4 iterations.

Rotated Factor Matrix:

	Factor 1	Factor 2	Factor 3
C2N1			,96803
C2N5	,77098		
C3N1	,77351		
C3N4		,75683	
C3N5	,80236		
C3N6	,70491		
C3N7	,66939		
C3N9		,72662	
C3N3		,55181	

Factor Transformation Matrix:

	Factor 1	Factor 2	Factor 3
Factor 1	,99888	-,03680	,02980
Factor 2	,04006	,99228	-,11738
Factor 3	-,02525	,11844	,99264

Following factor scores will be added to the working file:

Name	Label
OperatF	**Operations Oriented Strategy Factor**
ProductF	**Product Oriented Strategy Factor**

(--)

Reliability Analysis (Factor 1= OperatF)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
C2N5	14,7500	12,1894	,5739	,7415
C3N1	14,9000	11,0404	,5957	,7347
C3N5	14,4200	12,3471	,6523	,7220
C3N6	15,0000	12,0000	,5289	,7565
C3N7	14,8900	12,6039	,4832	,7703

Reliability Coefficients

N of Cases = 100,0 N of Items = 5

Alpha = ,7853

(--)

Reliability Analysis (Factor 2= ProductF)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
C3N3	7,6733	4,0222	,5392	,6839
C3N4	7,8218	3,4079	,5342	,7128
C3N9	7,3564	4,0917	,6517	,5777

Reliability Coefficients

N of Cases = 101,0 N of Items = 3

Alpha = ,7399

Factor Analysis: Technology

Analysis number 1 Listwise deletion of cases with missing values

Extraction 1 for analysis 1, Principal Components Analysis (PC)

Initial Statistics:

Variable	Communality	*	Factor	Eigenvalue	Pct of Var	Cum Pct
		*				
B1	1,00000	*	1	2,19750	43,9	43,9
B2	1,00000	*	2	1,05747	21,1	65,1
B3	1,00000	*	3	,82870	16,6	81,7
B4	1,00000	*	4	,54825	11,0	92,6
B5	1,00000	*	5	,36808	7,4	100,0

PC extracted 2 factors.

Factor Matrix:

	Factor 1	Factor 2
B1	-,73080	
B2	-,55607	,64628
B3	,71262	
B4	,82982	
B5		,64368

Final Statistics:

Variable	Communality	*	Factor	Eigenvalue	Pct of Var	Cum Pct
		*				
B1	,64674	*	1	2,19750	43,9	43,9
B2	,72690	*	2	1,05747	21,1	65,1
B3	,59045	*				
B4	,71879	*				
B5	,57210	*				

VARIMAX rotation 1 for extraction 1 in analysis 1 - Kaiser Normalization.

VARIMAX converged in 3 iterations.

Rotated Factor Matrix:

	Factor 1	Factor 2
B1		,75062
B2		,85091
B3	,71078	
B4	,71525	
B5	,73384	

Factor Transformation Matrix:

	Factor 1	Factor 2
Factor 1	,71571	-,69839
Factor 2	,69839	,71571

Following factor scores will be added to the working file:

Name	**Label**
MassTecF	**Mass Production Technology Factor**
CusttecF	**Custom Technology Factor**

(--)

Reliability Analysis (Factor 1= MassTecF)

RELIABILITY ANALYSIS - SCALE (ALPHA)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
B3	4,5300	5,4031	,4800	,4478
B4	4,8100	4,5797	,5759	,2834
B5	5,5000	7,5455	,2634	,6215

Reliability Coefficients

N of Cases = 100,0 N of Items = 3

Alpha = ,6413

Reliability Analysis (Factor 2= CusttecF)

RELIABILITY ANALYSIS - SCALE (ALPHA)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
B1	2,9500	2,2096	,4253	.
B2	2,6800	2,1794	,4253	.

Reliability Coefficients

N of Cases = 100,0 N of Items = 2

Alpha = ,5968

Appendix F: Correlation Analysis

Correlation (Bivariate: Pearson)

-- Correlation Coefficients --

	DYNAMISM	OPERATF	PRODUCTF	OFORM	OHR	OSTR	OVALUES	CUSTTECF	MASSTECF
DYNAMISM	1,0000 (93) P=,	-,7269 (93) P=,000	,4206 (93) P=,000	-,7831 (93) P=,000	-,3381 (93) P=,000	-,2159 (93) P=,019	,1708 (93) P=,051	,2806 (93) P=,003	-,3468 (93) P=,000
OPERATF	-,7269 (93) P=,000	1,0000 (93) P=,	-,0011 (93) P=,496	,6481 (93) P=,000	,3198 (93) P=,001	,2523 (93) P=,007	-,1124 (93) P=,142	-,1932 (93) P=,032	,3866 (93) P=,000
PRODUCTF	,4206 (93) P=,000	-,0011 (93) P=,496	1,0000 (93) P=,	-,3688 (93) P=,000	-,0685 (93) P=,257	,0302 (93) P=,387	,2994 (93) P=,002	,2128 (93) P=,020	-,0290 (93) P=,391
OFORM	-,7831 (93) P=,000	,6481 (93) P=,000	-,3688 (93) P=,000	1,0000 (93) P=,	,2554 (93) P=,007	,0914 (93) P=,192	-,2615 (93) P=,006	-,1805 (93) P=,042	,2568 (93) P=,006
OHR	-,3381 (93) P=,000	,3198 (93) P=,001	-,0685 (93) P=,257	,2554 (93) P=,007	1,0000 (93) P=,	,3280 (93) P=,001	,0098 (93) P=,463	-,0313 (93) P=,383	,1779 (93) P=,044
OSTR	-,2159 (93) P=,019	,2523 (93) P=,007	,0302 (93) P=,387	,0914 (93) P=,192	,3280 (93) P=,001	1,0000 (93) P=,	,1213 (93) P=,123	-,0495 (93) P=,319	,2625 (93) P=,006
OVALUES	,1708 (93) P=,051	-,1124 (93) P=,142	,2994 (93) P=,002	-,2615 (93) P=,006	,0098 (93) P=,463	,1213 (93) P=,123	1,0000 (93) P=,	,1696 (93) P=,052	,0326 (93) P=,378
CUSTTECF	,2806 (93) P=,003	-,1932 (93) P=,032	,2128 (93) P=,020	-,1805 (93) P=,042	-,0313 (93) P=,383	-,0495 (93) P=,319	,1696 (93) P=,052	1,0000 (93) P=,	,0233 (93) P=,412
MASSTECF	-,3468 (93) P=,000	,3866 (93) P=,000	-,0290 (93) P=,391	,2568 (93) P=,006	,1779 (93) P=,044	,2625 (93) P=,006	,0326 (93) P=,378	,0233 (93) P=,412	1,0000 (93) P=,

(Coefficient / (Cases) / 1-tailed Significance) " , " is printed if a coefficient cannot be computed

Correlation: Dynamism & Perceived Dynamism (Bivariate: Pearson)

-- Correlation Coefficients --

	DYNAMISM	EVARF
DYNAMISM	1,0000 (102) P= ,	**,7058** (102) **P= ,000**
EVARF	,7058 (102) P= ,000	1,0000 (102) P= ,

Correlation: Dynamism & Organisation (Bivariate: Pearson)

-- Correlation Coefficients --

	DYNAMISM	OFORM	OHR	OSTR	OVALUES
DYNAMISM	1,0000 (102) P= ,	**-,7498** (102) **P= ,000**	**-,3471** (102) **P= ,000**	**-,2135** (102) **P= ,016**	**,1865** (102) **P= ,030**
OFORM	-,7498 (102) P= ,000	1,0000 (102) P= ,	,2169 (102) P= ,014	,0631 (102) P= ,264	-,2391 (102) P= ,008
OHR	-,3471 (102) P= ,000	,2169 (102) P= ,014	1,0000 (102) P= ,	,3768 (102) P= ,000	,0278 (102) P= ,391
OSTR	-,2135 (102) P= ,016	,0631 (102) P= ,264	,3768 (102) P= ,000	1,0000 (102) P= ,	,1622 (102) P= ,052
OVALUES	,1865 (102) P= ,030	-,2391 (102) P= ,008	,0278 (102) P= ,391	,1622 (102) P= ,052	1,0000 (102) P= ,

Correlation: Dynamism & Strategy (Bivariate: Pearson)

	DYNAMISM	PRODUCTF	OPERATF
DYNAMISM	1,0000 (102) P= ,	,4171 (95) P= ,000	-,7295 (95) P= ,000
PRODUCTF	,4171 (95) P= ,000	1,0000 (95) P= ,	,0000 (95) P= ,500
OPERATF	-,7295 (95) P= ,000	,0000 (95) P= ,500	1,0000 (95) P= ,

(Coefficient / (Cases) / 1-tailed Significance)

Correlation: Dynamism & Technology (Bivariate: Pearson)

	DYNAMISM	CUSTTECF	MASSTECF
DYNAMISM	1,0000 (102) P= ,	,2799 (100) P= ,002	-,3695 (100) P= ,000
CUSTTECF	,2799 (100) P= ,002	1,0000 (100) P= ,	,0000 (100) P= ,500
MASSTECF	-,3695 (100) P= ,000	,0000 (100) P= ,500	1,0000 (100) P= ,

(Coefficient / (Cases) / 1-tailed Significance)

Correlation: Strategy and Organisation

------- PARTIAL CORRELATION COEFFICIENTS -------

Controlling for.. DYNAMISM

	OPERATF	PRODUCTF	OFORM	OHR	OSTR	OVALUES
OPERATF	1,0000 (0) P= ,	**,4895** (92) **P= ,000**	,1685 (92) P= ,105	,1136 (92) P= ,275	,1410 (92) P= ,175	,0152 (92) P= ,884
PRODUCTF	**,4895** (92) **P= ,000**	1,0000 (0) P= ,	-,0887 (92) P= ,395	,0894 (92) P= ,391	,1419 (92) P= ,172	**,2473** (92) **P= ,016**
OFORM	,1685 (92) P= ,105	-,0887 (92) P= ,395	1,0000 (0) P= ,	-,0532 (92) P= ,610	-,1759 (92) P= ,090	-,1884 (92) P= ,069
OHR	,1136 (92) P= ,275	,0894 (92) P= ,391	-,0532 (92) P= ,610	1,0000 (0) P= ,	**,3070** (92) **P= ,003**	,0798 (92) P= ,445
OSTR	,1410 (92) P= ,175	,1419 (92) P= ,172	-,1759 (92) P= ,090	**,3070** (92) **P= ,003**	1,0000 (0) P= ,	,1657 (92) P= ,110
OVALUES	,0152 (92) P= ,884	**,2473** (92) **P= ,016**	-,1884 (92) P= ,069	,0798 (92) P= ,445	,1657 (92) P= ,110	1,0000 (0) P= ,

(Coefficient / (D.F.) / 2-tailed Significance) " , " is printed if a coefficient cannot be computed

------------------Bivariate Correlations--------------

-- Correlation Coefficients --

	OPERATF	PRODUCTF	OFORM	OHR	OSTR	OVALUES
OPERATF	1,0000 (95) P= ,	,0000 (95) P=1,000	**,6336** (95) **P= ,000**	**,3120** (95) **P= ,002**	**,2437** (95) **P= ,017**	-,1218 (95) P= ,240
PRODUCTF	,0000 (95) P=1,000	1,0000 (95) P= ,	**-,3717** (95) **P= ,000**	-,0596 (95) P= ,566	,0409 (95) P= ,694	**,2965** (95) **P= ,004**
OFORM	**,6336** (95) **P= ,000**	**-,3717** (95) **P= ,000**	1,0000 (95) P= ,	**,2186** (95) **P= ,033**	,0466 (95) P= ,654	**-,2577** (95) **P= ,012**
OHR	**,3120** (95) **P= ,002**	-,0596 (95) P= ,566	**,2186** (95) **P= ,033**	1,0000 (95) P= ,	**,3509** (95) **P= ,000**	,0150 (95) P= ,886
QSTR	**,2437** (95) **P= ,017**	,0409 (95) P= ,694	,0466 (95) P= ,654	**,3509** (95) **P= ,000**	1,0000 (95) P= ,	,1225 (95) P= ,237
OVALUES	-,1218 (95) P= ,240	**,2965** (95) **P= ,004**	**-,2577** (95) **P= ,012**	,0150 (95) P= ,886	,1225 (95) P= ,237	1,0000 (95) P= ,

(Coefficient / (Cases) / 2-tailed Significance) " , " is printed if a coefficient cannot be computed

Correlation: Strategy and Technology

------ PARTIAL CORRELATION COEFFICIENTS ------

Controlling for.. DYNAMISM

	OPERATF	PRODUCTF	CUSTTECF	MASSTECF
OPERATF	1,0000 (0) P= ,	,4890 (90) P= ,000	,0164 (90) P= ,877	**,2087** **(90)** **P= ,046**
PRODUCTF	,4890 (90) P= ,000	1,0000 (0) P= ,	,1088 (90) P= ,302	,1373 (90) P= ,192
CUSTTECF	,0164 (90) P= ,877	,1088 (90) P= ,302	1,0000 (0) P= ,	,1340 (90) P= ,203
MASSTECF	**,2087** **(90)** **P= ,046**	,1373 (90) P= ,192	,1340 (90) P= ,203	1,0000 (0) P= ,

(Coefficient / (D.F.) / 2-tailed Significance) " , " is printed if a coefficient cannot be computed

Correlation: Strategy and Technology

------------------Bivariate Correlations--------------

- - Correlation Coefficients - -

	OPERATF	PRODUCTF	CUSTTECF	MASSTECF
OPERATF	1,0000 (93) P= ,	-,0011 (93) P= ,992	-,1932 (93) P= ,064	**,3866** **(93)** **P= ,000**
PRODUCTF	-,0011 (93) P= ,992	1,0000 (93) P= ,	**,2128** **(93)** **P= ,041**	-,0290 (93) P= ,783
CUSTTECF	-,1932 (93) P= ,064	**,2128** **(93)** **P= ,041**	1,0000 (93) P= ,	,0233 (93) P= ,824
MASSTECF	**,3866** **(93)** **P= ,000**	-,0290 (93) P= ,783	,0233 (93) P= ,824	1,0000 (93) P= ,

(Coefficient / (Cases) / 2-tailed Significance) " , " is printed if a coefficient cannot be computed

Correlation: Organisation and Technology

------ PARTIAL CORRELATION COEFFICIENTS -------

Controlling for.. DYNAMISM

	OHR	OMSETNIN	OSTR	OVALUES	CUSTTECF	MASSTECF
OHR	1,0000 (0) P= ,	,1438 (85) P= ,184	**,2867** (85) **P= ,007**	,0089 (85) P= ,934	,0946 (85) P= ,384	,1245 (85) P= ,251
OMSETNIN	,1438 (85) P= ,184	1,0000 (0) P= ,	,1287 (85) P= ,235	,0845 (85) P= ,436	,0794 (85) P= ,465	,1367 (85) P= ,207
OSTR	**,2867** (85) **P= ,007**	,1287 (85) P= ,235	1,0000 (0) P= ,	,1087 (85) P= ,316	,0231 (85) P= ,832	,1788 (85) P= ,097
OVALUES	,0089 (85) P= ,934	,0845 (85) P= ,436	,1087 (85) P= ,316	1,0000 (0) P= ,	,1663 (85) P= ,124	,0349 (85) P= ,748
CUSTTECF	,0946 (85) P= ,384	,0794 (85) P= ,465	,0231 (85) P= ,832	,1663 (85) P= ,124	1,0000 (0) P= ,	,1142 (85) P= ,292
MASSTECF	,1245 (85) P= ,251	,1367 (85) P= ,207	,1788 (85) P= ,097	,0349 (85) P= ,748	,1142 (85) P= ,292	1,0000 (0) P= ,

(Coefficient / (D.F.) / 2-tailed Significance) " , " is printed if a coefficient cannot be computed

Correlation: Organisation and Technology

------------------Bivariate Correlations--------------

	OFORM	OHR	OSTR	OVALUES	CUSTTECF	MASSTECF
OFORM	1,0000 (100) P= ,	,2507 (100) **P= ,012**	,1065 (100) P= ,291	**-,2425** (100) **P= ,015**	-,1772 (100) P= ,078	**,2543** (100) **P= ,011**
OHR	**,2507** (100) **P= ,012**	1,0000 (100) P= ,	,3576 (100) P= ,000	,0238 (100) P= ,814	-,0273 (100) P= ,787	**,1953** (100) **P= ,051**
OSTR	,1065 (100) P= ,291	,3576 (100) P= ,000	1,0000 (100) P= ,	,1624 (100) P= ,106	-,0262 (100) P= ,796	**,2570** (100) **P= ,010**
OVALUES	**-,2425** (100) **P= ,015**	,0238 (100) P= ,814	,1624 (100) P= ,106	1,0000 (100) P= ,	**,2225** (100) **P= ,026**	-,0004 (100) P= ,997
CUSTTECF	-,1772 (100) P= ,078	-,0273 (100) P= ,787	-,0262 (100) P= ,796	**,2225** (100) **P= ,026**	1,0000 (100) P= ,	,0000 (100) P=1,000
MASSTECF	**,2543** (100) **P= ,011**	**,1953** (100) **P= ,051**	**,2570** (100) **P= ,010**	-,0004 (100) P= ,997	,0000 (100) P=1,000	1,0000 (100) P= ,

(Coefficient / (Cases) / 2-tailed Significance) " , " is printed if a coefficient cannot be computed

Correlations between Performance Indicators and other Indicators

Unstable Group
- - Correlation Coefficients - -

	RENTABIL	GROWTHF
PRODUCTF	,1145 (36) P= ,253	**,3705** (36) **P= ,013**
OPERATF	-,1645 (36) P= ,169	**,3054** (36) **P= ,035**
OFORM	,0774 (42) P= ,313	,0802 (42) (36) P= ,307
OHR	-,0986 (42) P= ,267	**,3303** (42) **P= ,016**
OSTR	-,0501 (42) P= ,376	,2524 (42) P= ,053
OVALUES	,0761 (42) P= ,316	**,3350** (42) **P= ,015**
CUSTTECF	,0566 (42) P= ,361	,2323 (42) P= ,069
MASSTECF	,0258 (42) P= ,436	**,2569** (42) **P= ,050**

(Coefficient / (Cases) / 1-tailed Significance) " , " is printed if a coefficient cannot be computed

Correlations between Performance Indicators and other Indicators

Stable Group
-- Correlation Coefficients --

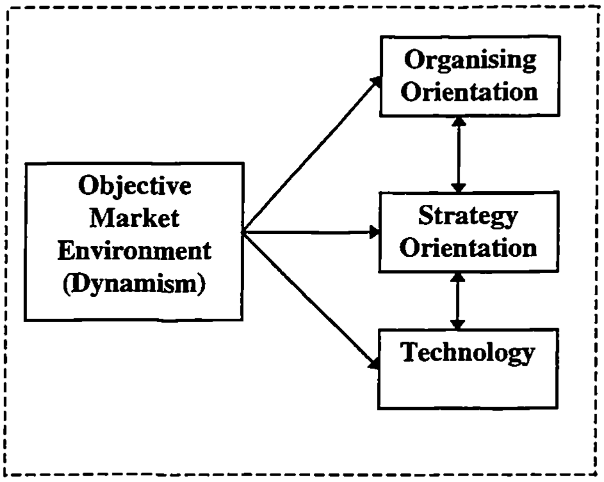
-- Correlation Coefficients --

	RENTABIL	GROWTHF
OPERATF	-,0587	-,0490
	(59)	(59)
	P= ,329	P= ,356
PRODUCTF	**-,2208**	-,0258
	(59)	(59)
	P= ,046	P= ,423
OFORM	,1666	**-,2172**
	(60)	(60)
	P= ,102	**P= ,048**
OHR	-,0805	,0660
	(60)	(60)
	P= ,270	P= ,308
OSTR	-,0916	**,1824**
	(60)	(60)
	P= ,243	**P= ,082**
OVALUES	,0153	-,1727
	(60)	(60)
	P= ,454	P= ,094
CUSTTECF	-,0044	-,1393
	(58)	(58)
	P= ,487	P= ,148
MASSTECF	-,1119	**,2909**
	(58)	(58)
	P= ,201	**P= ,013**

(Coefficient / (Cases) / 1-tailed Significance) " , " is printed if a coefficient cannot be computed

Appendix G: Regression Analysis

Regression Analysis: Dynamism & Other Indicators



Regression analysis (Linear) was carried out for each group separately.

Dynamism & Perceived Environmental Variability Factor

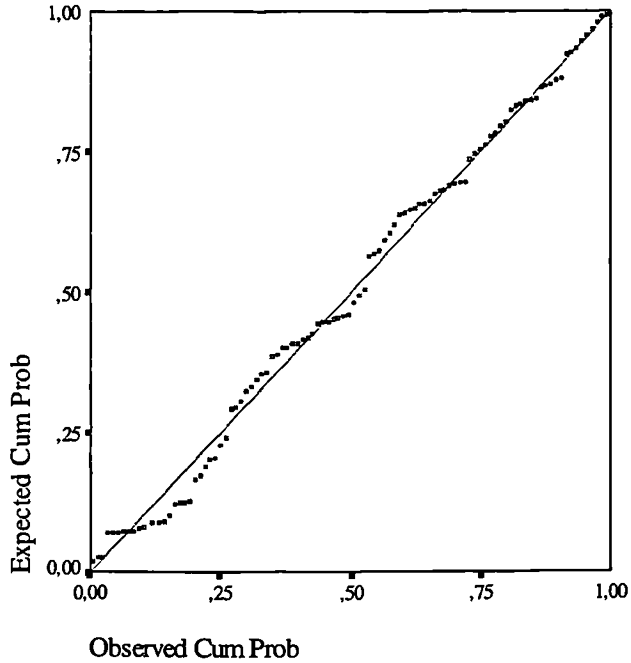
Independent: DYNAMISM

Dependent	Mth	Rsq	d.f.	F	Sigf	b0	b1
EVARF	LIN	,498	100	99,25	,000	-,1810	,4179

Normal Probability Plot (p-p) for Dynamism & Perceived Environmental Variability Factors

A normal probability plot shows the cumulative distribution of a variable on one axis, and the cumulative distribution expected from a normally distributed variable on the other. If the variable is normally distributed, the plotted points form a straight diagonal line.

Normal P-P Plot of Error for EVARF with DYNAMISM from CURVEFIT, MOD_20 L



Dynamism & Organisation Factors

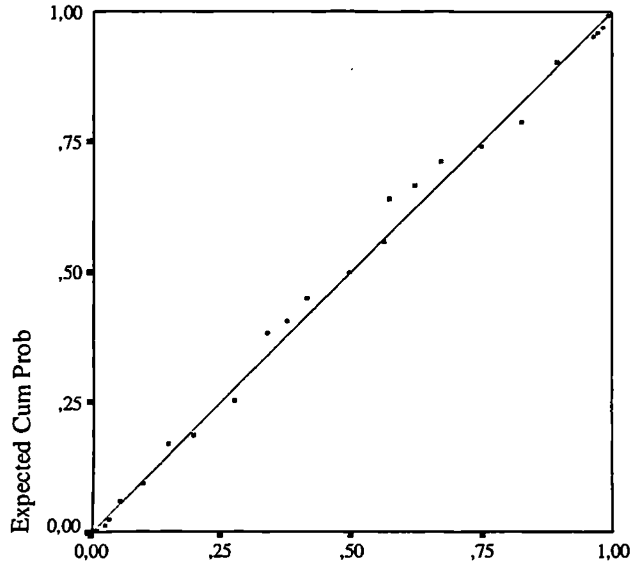
Independent: DYNAMISM

Dependent	Mth	Rsq	d.f.	F	Sigf	b0	b1
OFORM	LIN	**,562**	100	128,39	**,000**	1,1081	**-1,0195**
OHR	LIN	**,120**	100	13,70	**,000**	5,7358	**-,4086**
OSTR	LIN	**,046**	100	4,78	**,031**	11,6112	**-,5964**
OVALUES	LIN	,035	100	3,60	,061	2,9933	,1513

Normal Probability Plot (p-p) for Dynamism & Organisational Structural Factors

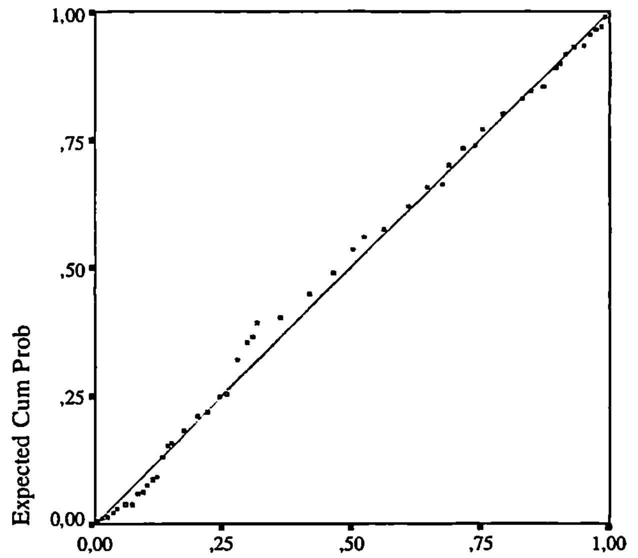
A normal probability plot shows the cumulative distribution of a variable on one axis, and the cumulative distribution expected from a normally distributed variable on the other. If the variable is normally distributed, the plotted points form a straight diagonal line.

Normal P-P Plot of Error for OFORM with DYNAMISM from CURVEFIT, MOD_16 L



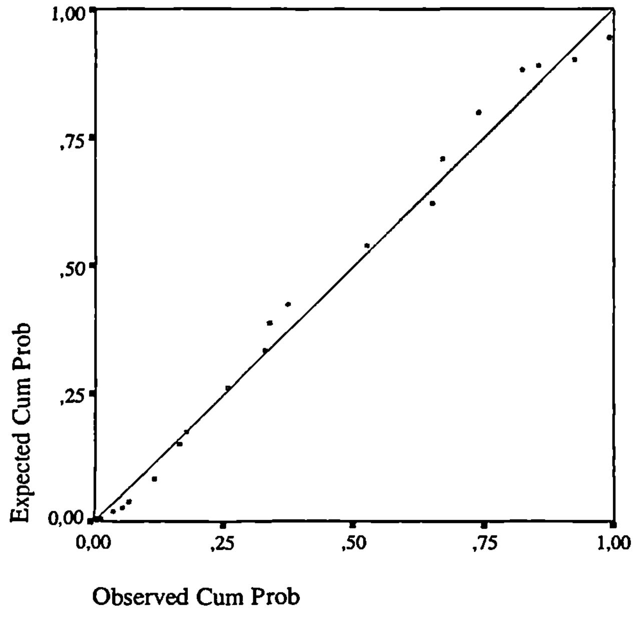
Observed Cum Prob

Normal P-P Plot of Error for OSTR with DYNAMISM from CURVEFIT, MOD_16 LI

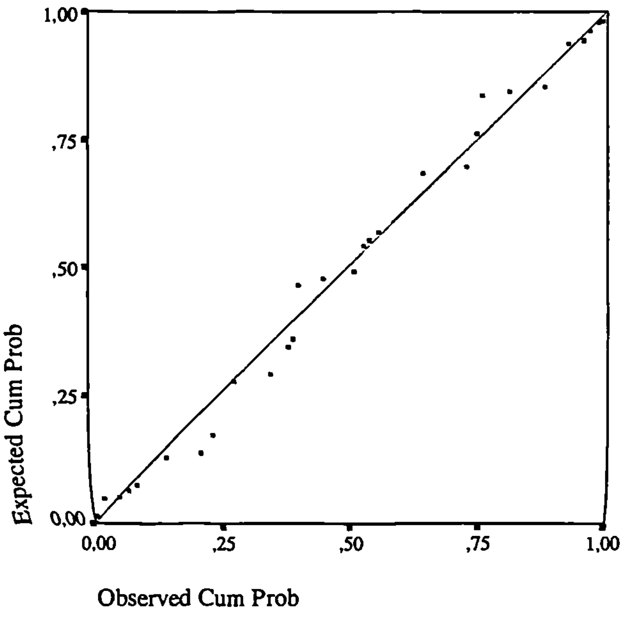


Observed Cum Prob

Normal P-P Plot of Error for OVALUES with DYNAMISM from CURVEFIT, MOD_16



Normal P-P Plot of Error for OHR with DYNAMISM from CURVEFIT, MOD_16 LIN



Dynamism & Strategy Factors

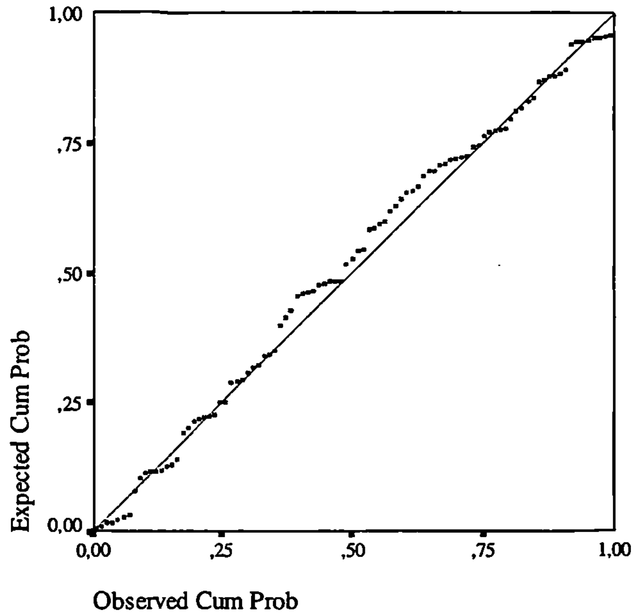
Independent: DYNAMISM

Dependent	Mth	Rsq	d.f.	F	Sigf	b0	b1
OPERATF	LIN	,532	93	105,79	,000	,1526	-,4282
PRODUCTF	LIN	,174	93	19,59	,000	-,0872	,2448

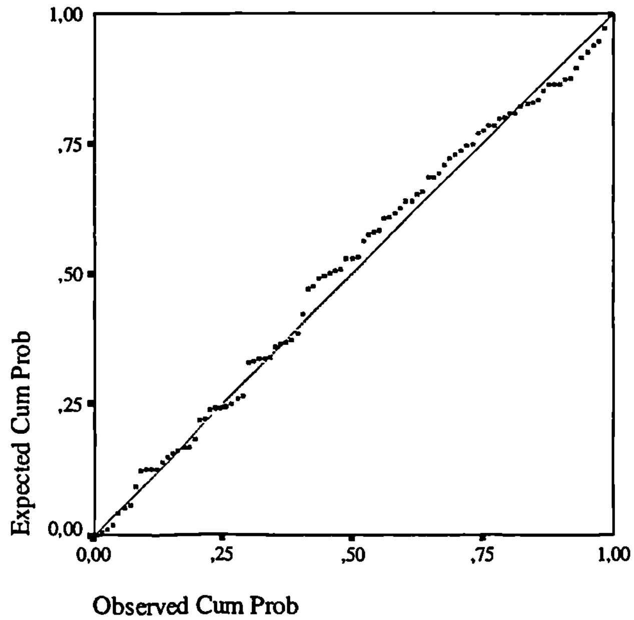
Normal Probability Plot (p-p) for Dynamism & Strategy Factors

A normal probability plot shows the cumulative distribution of a variable on one axis, and the cumulative distribution expected from a normally distributed variable on the other. If the variable is normally distributed, the plotted points form a straight diagonal line.

Normal P-P Plot of Error for PRODUCTF with DYNAMISM from CURVEFIT



Normal P-P Plot of Error for OPERATF with DYNAMISM from CURVEFIT



Dynamism & Technology Factors

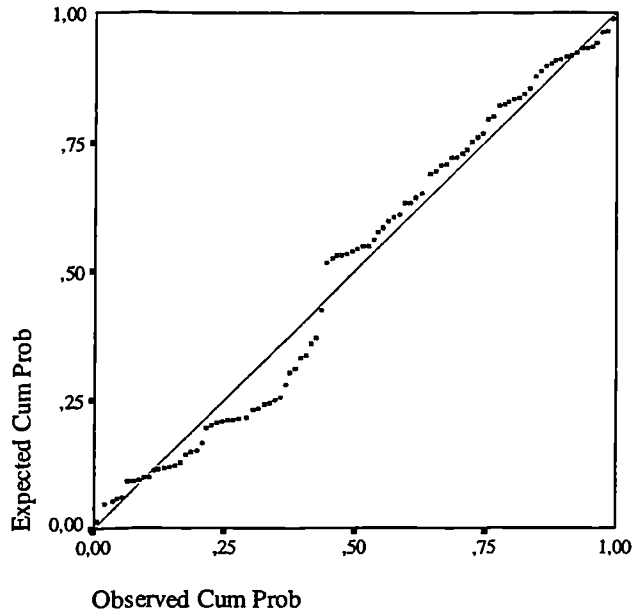
Independent: DYNAMISM

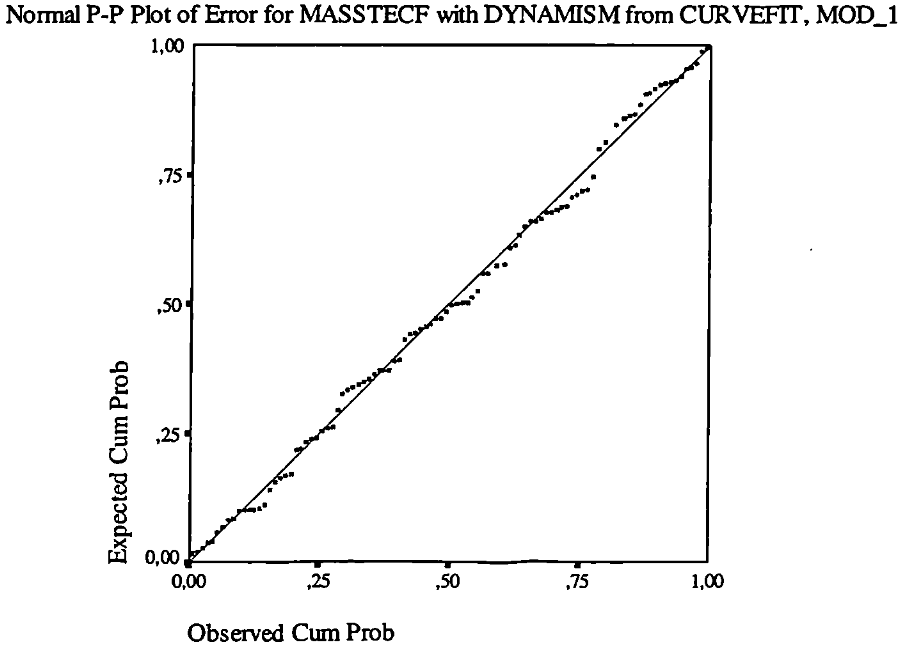
Dependent	Mth	Rsq	d.f.	F	Sigf	b0	b1
MASSTECF	LIN	**,137**	98	15,50	**,000**	,1001	**-,2179**
CUSTTECF	LIN	**,078**	98	8,33	**,005**	-,0758	**,1651**

Normal Probability Plot (p-p) for Dynamism Technology Factors

A normal probability plot shows the cumulative distribution of a variable on one axis, and the cumulative distribution expected from a normally distributed variable on the other. If the variable is normally distributed, the plotted points form a straight diagonal line.

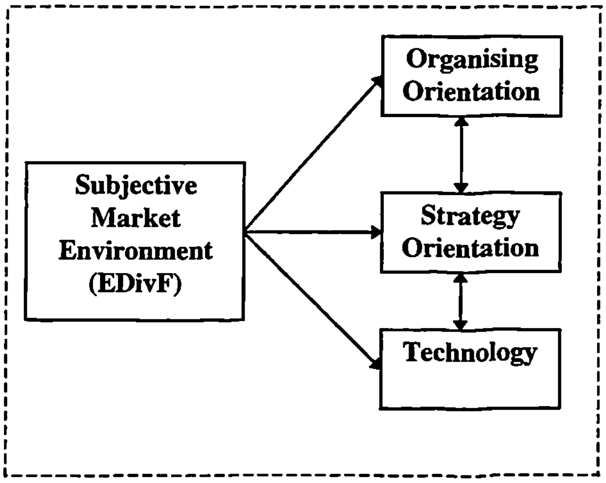
Normal P-P Plot of Error for CUSTTECF with DYNAMISM from CURVEFIT, MOD_1





Independent: Objective Dynamism	**Dependent**	**Rsq**	**Beta**
Organisation			
Formalisation	**OFORM**	0,562***	-1,0195
Human Resource Emphasis	**OHR**	0,12***	-0,4086
Standardisation	**OSTR**	0,046*	-0,5964
Sharing of Values	**OVALUES**	0,035	0,1513
Strategy			
Operations Oriented Strategy	**OPERATF**	0,532***	-0,4282
Product Oriented Strategy	**PRODUCTF**	0,174***	0,2248
Technology			
Mass Production Technology	**MASSTECF**	0,137***	-0,2179
Customised Production Technology	**CUSTTECF**	0,078**	0,1651
*** P<0.05 ** P<01 *** P<001**			

Regression Analysis: Perceived Dynamism & Other Indicators



Regression analysis (Linear) was carried out for each group separately.

Independent: Percieved Dynamism	Dependent	Rsq	Beta
Organisation			
Formalisation	**OFORM**	0,347***	-1,3518
Human Resource Emphasis	**OHR**	0,046*	-0,4254
Standardisation	**OSTR**	0,053*	-1,0813
Sharing of Values	**OVALUES**	0,062	0,3399
Strategy			
Operations Oriented Strategy	**OPERATF**	0,320***	-0,556
Product Oriented Strategy	**PRODUCTF**	0,090**	0,095
Technology			
Customised Production Technology	**MASSTECF**	0,031	0,1764
Mass Production Technology	**CUSTTECF**	0,079**	-0,2828
*** P<0.05 ** P<01 *** P<001**			

EDivF & Organisation Factors

Independent: EDivF

Dependent	Mth	Rsq	d.f.	F	Sigf	b0	b1
OFORM	LIN	**,347**	100	53,03	**,000**	,6667	**-1,3518**
OHR	LIN	**,046**	100	4,80	**,031**	5,5588	**-,4254**
OSTR	LIN	**,053**	100	5,55	**,020**	11,3529	**-1,0813**
OVALUES	LIN	**,062**	100	6,56	**,012**	3,0588	**,3399**

EDivF & Strategy Factors

Independent: EDivF

Dependent	Mth	Rsq	d.f.	F	Sigf	b0	b1
PRODUCTF	LIN	**,090**	93	9,20	**,003**	,0027	**,2950**
OPERATF	LIN	**,320**	93	43,74	**,000**	-,0052	**-,5560**

EDivF & Strategy Factors

Independent: EDivF

Dependent	Mth	Rsq	d.f.	F	Sigf	b0	b1
CUSTTECF	LIN	,031	98	3,12	,080	-,0039	,1764
MASSTECF	LIN	**,079**	98	8,44	**,005**	,0062	**-,2828**

Comparison: Objective vs. Subjective Environmental Dynamism

		Objective Dynamism		Subjective Dynamism	
Organisation	**Dependent**	**Rsq**	**Beta**	**Rsq**	**Beta**
Formalisation	**OFORM**	0,562***	-1,0195	0,347***	-1,3518
Human Resource Emphasis	**OHR**	0,12***	-0,4086	0,046*	-0,4254
Standardisation	**OSTR**	0,046*	-0,5964	0,053*	-1,0813
Sharing of Values	**OVALUES**	0,035	0,1513	0,062	0,3399
Strategy					
Operations Oriented Strategy	**OPERATF**	0,532***	-0,4282	0,320***	-0,556
Product Oriented Strategy	**PRODUCTF**	0,174***	0,2248	0,090**	0,095
Technology					
Customised Production Technology	**CUSTTECF**	0,078**	0,1651	0,031	0,1764
Mass Production Technology	**MASSTECF**	0,137***	-0,2179	0,079**	-0,2828
*** P<0.05 ** P<01 *** P<001**					

Does Strategy Determine Organisation's Orientation?

Regression Analysis

Independent: PRODUCTF

Dependent	Mth	Rsq	d.f.	F	Sigf	b0	b1
OFORM	LIN	**,138**	93	14,91	**,000**	,6632	**-,8804**
OHR	LIN	,004	93	,33	,566	5,6000	-,1141
OSTR	LIN	,002	93	,16	,694	11,4000	,1925
OVALUES	LIN	**,088**	93	8,97	**,004**	3,0421	**,3962**

Regression Analysis

Independent: OPERATF

Dependent	Mth	Rsq	d.f.	F	Sigf	b0	b1
OFORM	LIN	**,401**	93	62,39	**,000**	,6632	**1,5006**
OHR	LIN	**,097**	93	10,03	**,002**	5,6000	**,5975**
OSTR	LIN	**,059**	93	5,87	**,017**	11,4000	**1,1465**
OVALUES	LIN	,015	93	1,40	,240	3,0421	-,1627

		Strategy Factors			
		ProductF		OperatF	
Organisation's Indicators	Dependent	Rsq	Beta	Rsq	Beta
Formalisation	OFORM	0,138***	-0,8804	0,401***	1,5006
Human Resource Emphasis	OHR	0,004	-0,1141	0,097**	0,5975
Standardisation	OSTR	0,002	0,1925	0,059*	1,1465
Sharing of Values	OVALUES	0,088**	0,3399	0,015	-0,1627
* P<0.05 ** P<01 *** P<001					

Does Organisation's Orientation Determine Strategy?

Regression Analysis

Independent: OFORM

Dependent	Mth	Rsq	d.f.	F	Sigf	b0	b1
OPERATF	LIN	**,401**	93	62,39	**,000**	-,1774	**,2676**
PRODUCTF	LIN	**,138**	93	14,91	**,000**	,1041	**-,1570**

Regression Analysis

Independent: OHR

Dependent	Mth	Rsq	d.f.	F	Sigf	b0	b1
OPERATF	LIN	**,097**	93	10,03	**,002**	-,9122	**,1629**
PRODUCTF	LIN	,004	93	,33	,566	,1742	-,0311

Regression Analysis

Independent: OSTR

Dependent	Mth	Rsq	d.f.	F	Sigf	b0	b1
OPERATF	LIN	**,059**	93	5,87	**,017**	-,5904	**,0518**
PRODUCTF	LIN	,002	93	,16	,694	-,0992	,0087

Regression Analysis

Independent: OVALUES

Dependent	Mth	Rsq	d.f.	F	Sigf	b0	b1
OPERATF	LIN	,015	93	1,40	,240	,2773	-,0911
PRODUCTF	LIN	**,088**	93	8,97	**,004**	-,6751	**,2219**

		Organisation							
		OFORM		OHR		OSTR		OVALUES	
Strategy Indicators	**Dependent**	**Rsq**	**Beta**	**Rsq**	**Beta**	**Rsq**	**Beta**	**Rsq**	**Beta**
Operations Oriented Strategy	**OPERATF**	0,401***	0,2676	0,097**	0,1629	0,059**	0,0518	0,015	-0,0911
Product Oriented Strategy	**PRODUCTF**	0,138***	-0,157	0,004	-0,0311	0,002	0,0087	0,088**	0,2219
* P<0.05 ** P<01 *** P<001									

Does Technology Determine Strategy?

Regression Analysis

Independent: CUSTTECF

Dependent	Mth	Rsq	d.f.	F	Sigf	b0	b1
OPERATF	LIN	,037	91	3,53	,064	-,0131	-,1918
PRODUCTF	LIN	**,045**	91	4,32	**,041**	-,0011	,2119

Regression Analysis

Independent: MASSTECF

Dependent	Mth	Rsq	d.f.	F	Sigf	b0	b1
OPERATF	LIN	**,149**	91	15,99	**,000**	-,0241	,3813
PRODUCTF	LIN	,001	91	,08	,783	,0002	-,0287

		Technology Factors			
		CusttecF		MasstecF	
Strategy Indicators	Dependent	Rsq	Beta	Rsq	Beta
Operations Oriented Strategy	**OPERATF**	0,037	-0,1918	0,149***	0,3813
Product Oriented Strategy	**PRODUCTF**	0,045*	0,2119	0,001	-0,0287
* P<0.05 ** P<01 *** P<001					

Does Strategy Determine Technology?

Regression Analysis

Independent: PRODUCTF

Dependent	Mth	Rsq	d.f.	F	Sigf	b0	b1
CUSTTECF	LIN	**,045**	91	4,32	**,041**	,0023	**,2137**
MASSTECF	LIN	,001	91	,08	,783	,0278	-,0293

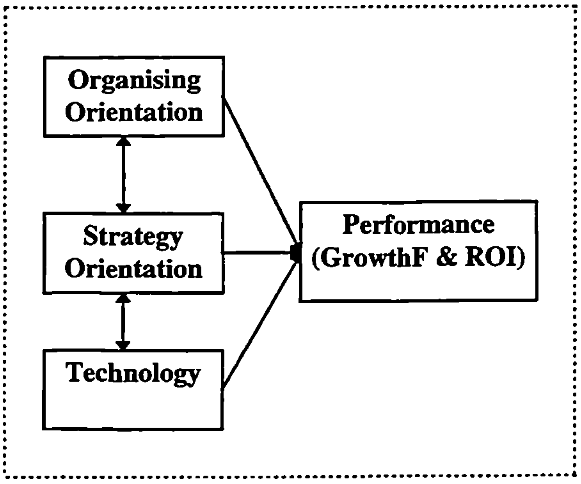
Regression Analysis

Independent: OPERATF

Dependent	Mth	Rsq	d.f.	F	Sigf	b0	b1
CUSTTECF	LIN	,037	91	3,53	,064	-,0004	-,1946
MASSTECF	LIN	**,149**	91	15,99	**,000**	,0331	**,3919**

		Strategy Factors			
		ProductF		OperatF	
Technology Indicators	Dependent	Rsq	Beta	Rsq	Beta
Mass Production Technology	**MASSTECF**	0,001	-0,0293	**0,149*****	0,3919
Customised Production Technology	**CUSTTECF**	0,045*	0,2137	0,037	-0,1946
*** P<0.05 ** P<01 *** P<001**					

Regression Analysis: Part2



Interactive Effects of Factors on Performance (Total Sample)

Performance indicators: ROI and Growth factor (sales, demand, and employees)

Dependent Variables: Rentabilitet , GrowthF
Dynamism

Strategy
- OperatF
- ProductF

Organisation
- Oform
- OHR
- OSTR
- Ovalues

Technology
- CusttecF
- MasstecF

Interaction

OperatF	x	Dynamism
ProductF	x	Dynamism
Oform	x	Dynamism
OHR	x	Dynamism
OSTR	x	Dynamism
Ovalues	x	Dynamism
CusttecF	x	Dynamism
MasstecF	x	Dynamism

STEPWISE LINEAR REGRESSION

* * * * MULTIPLE REGRESSION * * * *

Pairwise Deletion of Missing Data

	Mean	Std Dev	Cases	Label
GROWTHF	,000	1,000	102	Growth Factor
DYNAMISM	,433	1,689	102	
PRODUCTF	,000	1,000	95	Product Oriented Strategy Factor
OPERATF	,000	1,000	95	Operations Oriented Strategy
OFORM	,667	2,297	102	
OHR	5,559	1,988	102	
OSTR	11,353	4,717	102	
OVALUES	3,059	1,370	102	
CUSTTECF	,000	1,000	100	Customise Production Technology Factor
MASSTECF	,000	1,000	100	Mass Production Technology Factor
INTPRODU	,703	1,700	95	
INTOPERA	-1,230	2,414	95	
INTOFORM	-2,591	2,887	102	
INTOHR	1,253	8,929	102	
INTOSTR	3,232	19,080	102	
INTVALUE	1,752	5,498	102	
INTCUSTT	,470	1,793	100	
INTMASST	-,620	1,768	100	

Minimum Pairwise N of Cases = 93

* * * * MULTIPLE REGRESSION * * * *

Correlation, 1-tailed Sig, N of Cases:

	GROWTHF	DYNAMISM	PRODUCTF	OPERATF	OFORM	OHR	OSTR	OVALUES	CUSTTECF	MASSTECF	INTPRODU	INTOPERA	INTOFORM
GROWTHF	1,000	,015	,171	,063	-,143	,144	,187	,163	,076	,220	,190	,235	,087
	,	,441	,048	,273	,076	,074	,030	,050	,227	,014	,033	,011	,194
	102	102	95	95	102	102	102	102	100	100	95	95	102
DYNAMISM	,015	1,000	,417	-,730	-,750	-,347	-,214	,187	,280	-,369	,280	-,605	-,454
	,441	,	,000	,000	,000	,000	,016	,030	,002	,000	,003	,000	,000
	102	102	95	95	102	102	102	102	100	100	95	95	102
PRODUCTF	,171	,417	1,000	,000	-,372	-,060	,041	,297	,213	-,029	,388	-,013	-,240
	,048	,000	,	,500	,000	,283	,347	,002	,020	,391	,000	,449	,010
	95	95	95	95	95	95	95	95	93	93	95	95	95
OPERATF	,063	-,730	,000	1,000	,634	,312	,244	-,122	-,193	,387	-,019	,652	,322
	,273	,000	,500	,	,000	,001	,009	,120	,032	,000	,428	,000	,001
	95	95	95	95	95	95	95	95	93	93	95	95	95
OFORM	-,143	-,750	-,372	,634	1,000	,217	,063	-,239	-,177	,254	-,285	,303	,338
	,076	,000	,000	,000	,	,014	,264	,008	,039	,005	,003	,001	,000
	102	102	95	95	102	102	102	102	100	100	95	95	102
OHR	,144	-,347	-,060	,312	,217	1,000	,377	,028	-,027	,195	,021	,268	,044
	,074	,000	,283	,001	,014	,	,000	,391	,394	,026	,418	,004	,331

	102	102	95	95	102	102	102	102	100	100	95	95	102	
OSTR	,187	-,214	,041	,244	,063	,377	1,000	,162	-,026	,257	,071	,093	,066	
	,030	,016	,347	,009	,264	,000	,	,052	,398	,005	,247	,184	,254	
	102	102	95	95	102	102	102	102	100	100	95	95	102	
OVALUES	,163	,187	,297	-,122	-,239	,028	,162	1,000	,223	,000	,216	,073	-,035	
	,050	,030	,002	,120	,008	,391	,052	,	,013	,498	,018	,242	,362	
	102	102	95	95	102	102	102	102	100	100	95	95	102	
CUSTTECF	,076	,280	,213	-,193	-,177	-,027	-,026	,223	1,000	,000	-,079	-,216	-,096	
	,227	,002	,020	,032	,039	,394	,398	,013	,	,500	,225	,019	,172	
	100	100	93	93	100	100	100	100	100	100	93	93	100	
MASSTECF	,220	-,369	-,029	,387	,254	,195	,257	,000	,000	1,000	,069	,324	,173	
	,014	,000	,391	,000	,005	,026	,005	,498	,500	,	,255	,001	,043	
	100	100	93	93	100	100	100	100	100	100	93	93	100	
INTPRODU	,190	,280	,388	-,019	-,285	,021	,071	,216	-,079	,069	1,000	,226	-,242	
	,033	,003	,000	,428	,003	,418	,247	,018	,225	,255	,	,014	,009	
	95	95	95	95	95	95	95	95	93	93	95	95	95	
INTOPERA	,235	-,605	-,013	,652	,303	,268	,093	,073	-,216	,324	,226	1,000	,364	
	,	011	,000	,449	,000	,001	,004	,184	,242	,019	,001	,014	,	,000
	95	95	95	95	95	95	95	95	93	93	95	95	95	
INTOFORM	,087	-,454	-,240	,322	,338	,044	,066	-,035	-,096	,173	-,242	,364	1,000	
	,194	,000	,010	,001	,000	,331	,254	,362	,172	,043	,009	,000	,	
	102	102	95	95	102	102	102	102	100	100	95	95	102	
INTOHR	,101	,923	,450	-,635	-,738	-,213	-,149	,305	,305	-,346	,332	-,466	-,492	
	,157	,000	,000	,000	,000	,016	,068	,001	,001	,000	,000	,000	,000	
	102	102	95	95	102	102	102	102	100	100	95	95	102	
INTOSTR	,090	,895	,453	-,685	-,707	-,265	-,055	,278	,313	-,325	,312	-,518	-,452	
	,184	,000	,000	,000	,000	,004	,290	,002	,001	,000	,001	,000	,000	
	102	102	95	95	102	102	102	102	100	100	95	95	102	
INTVALUE	,159	,853	,482	-,645	-,738	-,205	-,109	,482	,262	-,282	,342	-,381	-,369	
	,056	,000	,000	,000	,000	,020	,137	,000	,004	,002	,000	,000	,000	
	102	102	95	95	102	102	102	102	100	100	95	95	102	
INTCUSTT	,130	,171	-,074	-,288	-,144	,028	,073	-,004	,315	,023	-,250	-,353	-,028	
	,099	,044	,242	,003	,076	,392	,236	,484	,001	,410	,008	,000	,390	
	100	100	93	93	100	100	100	100	100	100	93	93	100	
INTMASST	,123	-,465	,077	,417	,226	,108	,109	,153	,023	,286	,028	,592	,360	
	,111	,000	,232	,000	,012	,142	,140	,064	,408	,002	,395	,000	,000	
	100	100	93	93	100	100	100	100	100	100	93	93	100	

**** MULTIPLE REGRESSION ****

	INTOHR	INTOSTR	INTVALUE	INTCUSTT	INTMASST
GROWTHF	,101	,090	,159	,130	,123
	,157	,184	,056	,099	,111
	102	102	102	100	100
DYNAMISM	,923	,895	,853	,171	-,465
	,000	,000	,000	,044	,000
	102	102	102	100	100
PRODUCTF	,450	,453	,482	-,074	,077
	,000	,000	,000	,242	,232
	95	95	95	93	93
OPERATF	-,635	-,685	-,645	-,288	,417
	,000	,000	,000	,003	,000
	95	95	95	93	93
OFORM	-,738	-,707	-,738	-,144	,226
	,000	,000	,000	,076	,012
	102	102	102	100	100
OHR	-,213	-,265	-,205	,028	,108
	,016	,004	,020	,392	,142
	102	102	102	100	100
OSTR	-,149	-,055	-,109	,073	,109
	,068	,290	,137	,236	,140
	102	102	102	100	100
OVALUES	,305	,278	,482	-,004	,153
	,001	,002	,000	,484	,064
	102	102	102	100	100
CUSTTECF	,305	,313	,262	,315	,023
	,001	,001	,004	,001	,408
	100	100	100	100	100
MASSTECF	-,346	-,325	-,282	,023	,286
	,000	,000	,002	,410	,002
	100	100	100	100	100
INTPRODU	,332	,312	,342	-,250	,028
	,000	,001	,000	,008	,395
	95	95	95	93	93
INTOPERA	-,466	-,518	-,381	-,353	,592
	,000	,000	,000	,000	,000
	95	95	95	93	93
INTOFORM	-,492	-,452	-,369	-,028	,360
	,000	,000	,000	,390	,000
	102	102	102	100	100
INTOHR	1,000	,905	,886	,229	-,341
	,	,000	,000	,011	,000
	102	102	102	100	100
INTOSTR	,905	1,000	,861	,245	-,298
	,000	,	,000	,007	,001
	102	102	102	100	100
INTVALUE	,886	,861	1,000	,176	-,223
	,000	,000	,	,040	,013
	102	102	102	100	100
INTCUSTT	,229	,245	,176	1,000	,085
	,011	,007	,040	,	,202
	100	100	100	100	100
INTMASST	-,341	-,298	-,223	,085	1,000

,000	,001	,013	,202	,
100	100	100	100	100

**** MULTIPLE REGRESSION ****

Equation Number 1 Dependent Variable.. GROWTHF Growth Factor

Descriptive Statistics are printed on Page 128

Block Number 1. Method: Stepwise Criteria PIN ,0500 POUT ,1000
DYNAMISM PRODUCTF OPERATF OFORM OHR OSTR OVALUES CUSTTECF
MASSTECF INTPRODU INTOPERA INTOFORM INTOHR INTOSTR
INTVALUE INTCUSTT INTMASST

Step	MultR	Rsq	AdjRsq	F(Eqn)	SigF	RsqCh	FCh	SigCh		Variable	Betaln	Correl
1	,2347	,0551	,0447	5,303	,024	,0551	5,303	,024	In:	INTOPERA	,2347	,2347
2	,3563	,1270	,1076	6,544	,002	,0719	7,412	,008	In:	INTVALUE	,2900	,1586
3	,4157	,1728	,1449	6,196	,001	,0458	4,928	,029	In:	INTCUSTT	,2290	,1296

Variable(s) Entered on Step Number 3.. INTCUSTT

Multiple R	,41565	Analysis of Variance			
R Square	,17277		DF	Sum of Squares	Mean Square
Adjusted R Square	,14488	Regression	3	15,89459	5,29820
Standard Error	,92473	Residual	89	76,10541	,85512

F = 6,19587 Signif F = ,0007

Var-Covar Matrix of Regression Coefficients (B)
Below Diagonal: Covariance Above: Correlation

	INTOPERA	INTVALUE	INTCUSTT
INTOPERA	,00207	,34581	,31357
INTVALUE	2,987E-04	3,605E-04	-,04880
INTCUSTT	8,203E-04	-5,329E-05	,00331

------------------------------------ Variables in the Equation ------------------------------------

Variable	B	SE B	95% Confdnce Intrvl	B	Beta	Tolerance	VIF	T	Sig T
INTOPERA	,174605	,045485	,084228	,264981	,421497	,770961	1,297	3,839	,0002
INTVALUE	,050689	,018988	,012961	,088418	,278665	,852994	1,172	2,670	,0090
INTCUSTT	,127686	,057516	,013403	,241969	,228991	,873596	1,145	2,220	,0290
(Constant)	,065925	,105005	-,142719	,274568				,628	,5317

**** MULTIPLE REGRESSION ****

Equation Number 1 Dependent Variable.. GROWTHF Growth Factor

---------------------- Variables not in the Equation ----------------------

Variable	Beta In	Partial	Tolerance	VIF	Min Toler	T	Sig T
DYNAMISM	-,040436	-,018569	,174449	5,732	,174449	-,174	,8621
PRODUCTF	,082339	,076902	,721584	1,386	,619951	,724	,4713
OPERATF	,087050	,059711	,389229	2,569	,389229	,561	,5761
OFORM	-,069701	-,051643	,454132	2,202	,427213	-,485	,6288
OHR	,091161	,094940	,897227	1,115	,725147	,895	,3734
OSTR	,166520	,180430	,971204	1,030	,764620	1,721	,0888
OVALUES	-,001008	-,000921	,690696	1,448	,592595	-,009	,9931
CUSTTECF	,025347	,025767	,854927	1,170	,769336	,242	,8095
MASSTECF	,186420	,188010	,841398	1,188	,708732	1,796	,0760
INTPRODU	,081433	,074504	,692451	1,444	,645143	,701	,4852
INTOFORM	,053392	,052210	,791021	1,264	,707058	,490	,6250
INTOHR	-,012316	-,005972	,194465	5,142	,194465	-,056	,9555
INTOSTR	,055623	,028348	,214867	4,654	,214867	,266	,7908
INTMASST	-,151452	-,123586	,550825	1,815	,454456	-1,168	,2458

Collinearity Diagnostics

Number	Eigenval	Cond Index	Variance Proportions Constant	INTOPERA	INTVALUE	INTCUSTT
1	2,08444	1,000	,08716	,09866	,08605	,07747
2	,77188	1,643	,09106	,00008	,21034	,74045
3	,69423	1,733	,63571	,00042	,47261	,00869
4	,44945	2,154	,18607	,90084	,23099	,17339

End Block Number 1 PIN = ,050 Limits reached.

>Note # 12650
>No outliers found. No casewise plot produced.

* * * * MULTIPLE REGRESSION * * * *

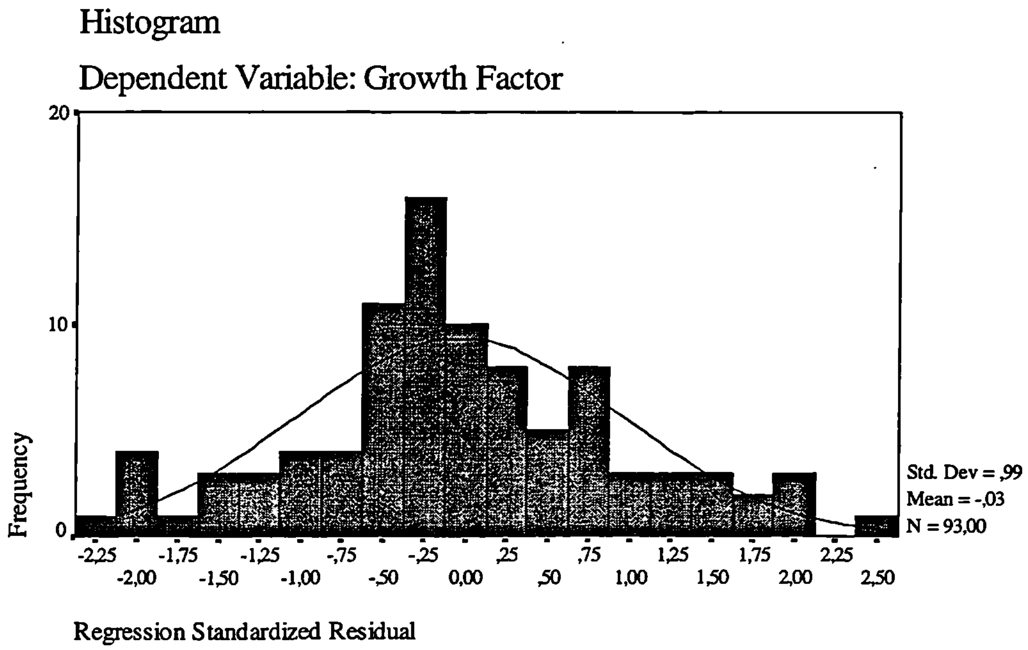
Equation Number 1 Dependent Variable.. GROWTHF Growth Factor

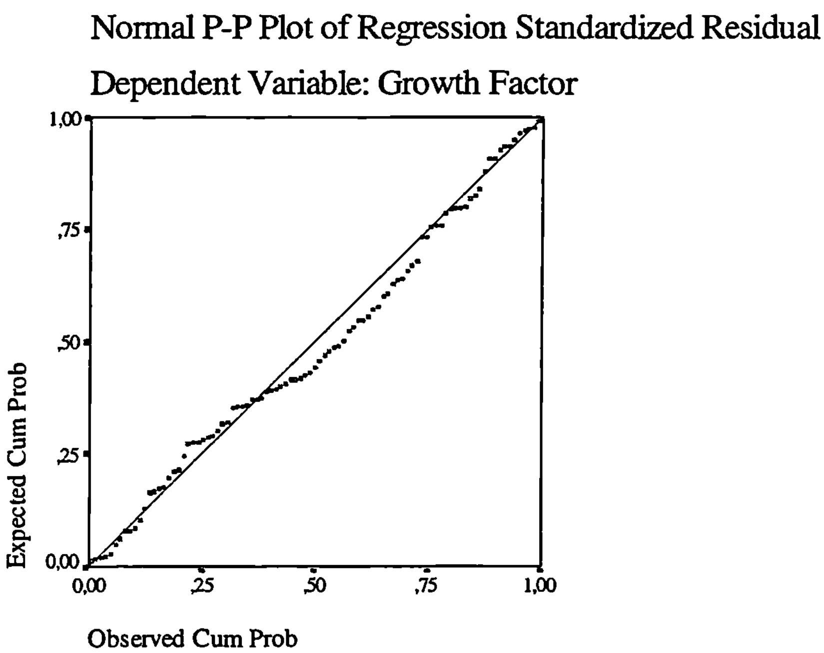
Residuals Statistics:

	Min	Max	Mean	Std Dev	N
*PRED	-1,8506	1,3343	-,0105	,4201	93
*RESID	-2,0774	2,2165	-,0320	,9135	93
*ZPRED	-4,4523	3,2102	-,0254	1,0108	93
*ZRESID	-2,2465	2,3970	-,0347	,9878	93

Total Cases = 102

Durbin-Watson Test = 1,92415





(==)

Enter Method of Regression Analysis

ROI (RENTABIL)

**** MULTIPLE REGRESSION ****

Pairwise Deletion of Missing Data

Equation Number 1 Dependent Variable.. RENTABIL

Block Number 1. Method: Enter
DYNAMISM PRODUCTF OPERATF OFORM OHR OSTR OVALUES CUSTTECF MASSTECF INTPRODU INTOPERA INTOFORM INTOHR INTOSTR INTVALUE INTCUSTT INTMASST

Variable(s) Entered on Step Number
1.. INTMASST
2.. CUSTTECF Customise Production Technology Factor
3.. INTPRODU
4.. OHR
5.. MASSTECF Mass Production Technology Factor
6.. OVALUES
7.. INTCUSTT
8.. OSTR
9.. INTOFORM
10.. PRODUCTF Product Oriented Strategy Factor
11.. OFORM
12.. INTOPERA
13.. OPERATF Operations Oriented Strategy
14.. INTOSTR
15.. INTVALUE
16.. INTOHR
17.. DYNAMISM

Multiple R	,37553	Analysis of Variance			
R Square	,14102		DF	Sum of Squares	Mean
Square					
Adjusted R Square	-,05368	Regression	17	1795,68734	105,62867
Standard Error	12,07636	Residual	75	10937,88133	145,83842

F = ,72429 Signif F = ,7687

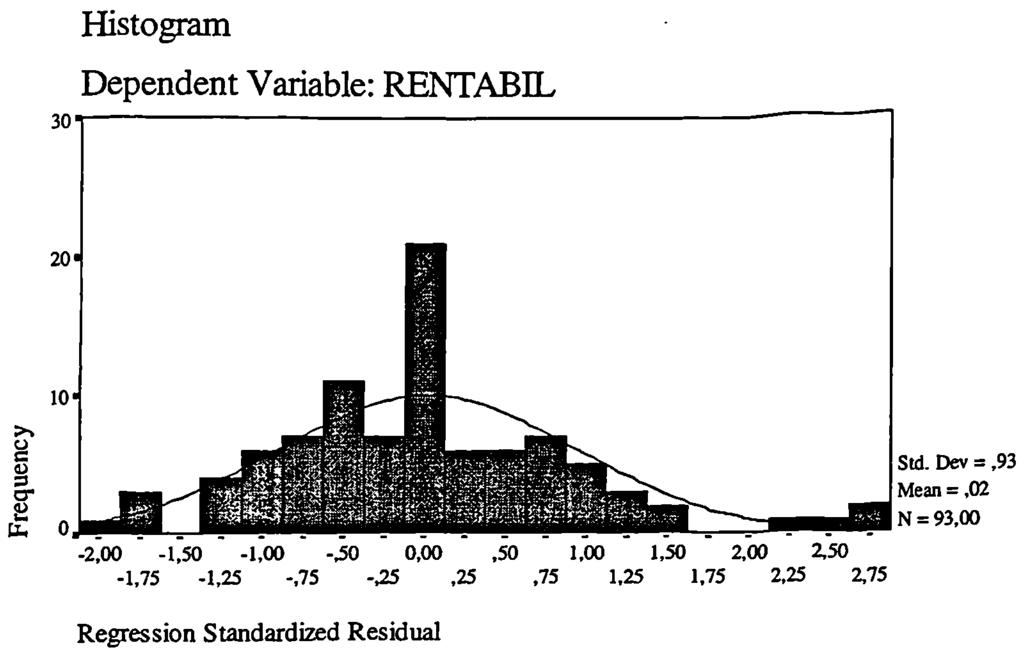
**** MULTIPLE REGRESSION ****

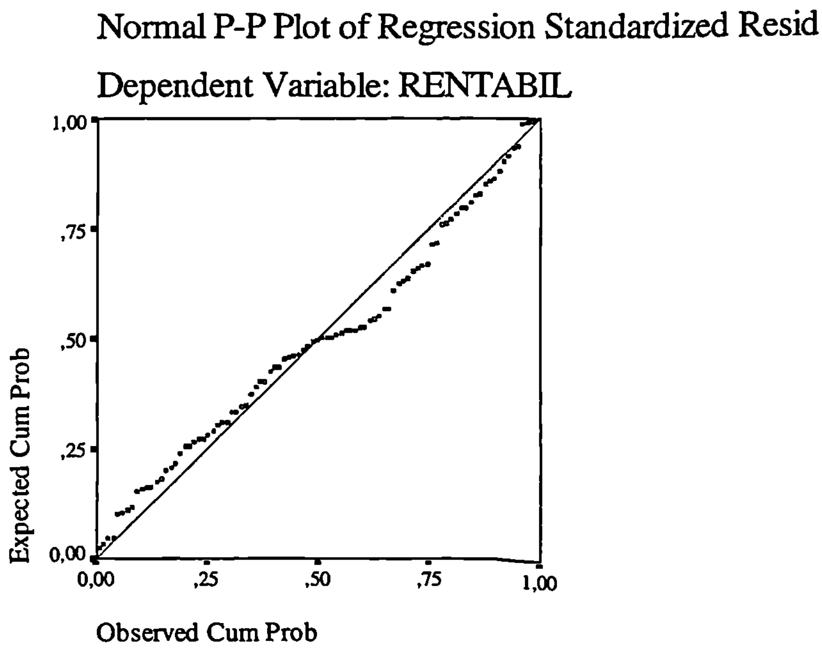
Equation Number 1 Dependent Variable.. RENTABIL

Variable	B	SE B	Beta	Tolerance	VIF	T	Sig T
DYNAMISM	-1,287645	3,217968	-,184844	**,053671**	**18,632**	-,400	,6902
PRODUCTF	,873414	1,832141	,074240	,472244	2,118	,477	,6349
OPERATF	-3,228039	2,684114	-,274383	,220030	4,545	-1,203	,2329
OFORM	,675377	,981031	,131836	,312309	3,202	,688	,4933
OHR	-,314600	,776273	-,053160	,665646	1,502	-,405	,6864
OSTR	-,171460	,339265	-,068747	,618968	1,616	-,505	,6148
OVALUES	,998201	1,288321	,116265	,508641	1,966	,775	,4409
CUSTTECF	,292268	1,472507	,024843	,731088	1,368	,198	,8432
MASSTECF	-,750357	1,473270	-,063780	,730331	1,369	-,509	,6120
INTPRODU	**2,077318**	**1,000801**	**,300092**	**,547929**	**1,825**	**2,076**	**,0414**
INTOPERA	-1,681736	1,055811	-,345077	,244025	4,098	-1,593	,1154
INTOFORM	,406308	,549852	,099711	,629001	1,590	,739	,4622
INTOHR	-,028091	,527433	-,021321	**,071470**	**13,992**	-,053	,9577
INTOSTR	-,124336	,196914	-,201653	,112293	8,905	-,631	,5297
INTVALUE	-,220706	,685034	-,103133	,111771	8,947	-,322	,7482
INTCUSTT	,382825	,940385	,058357	,557344	1,794	,407	,6851
INTMASST	,740282	1,090302	,111234	,426728	2,343	,679	,4992
(Constant)	10,923165	6,317379				1,729	,0879

End Block Number 1 All requested variables entered.

>Note # 12650
>No outliers found. No casewise plot produced.





(==)

Enter Method of Regression Analysis (GrowthF)

* * * *   M U L T I P L E   R E G R E S S I O N   * * * *

Pairwise Deletion of Missing Data

Equation Number 1 **Dependent Variable.. GROWTHF Growth Factor**

Block Number 1. Method: Enter
DYNAMISM PRODUCTF OPERATF OFORM OHR OSTR OVALUES CUSTTECF
MASSTECF INTPRODU INTOPERA INTOFORM INTOHR INTOSTR
INTVALUE INTCUSTT INTMASST

Variable(s) Entered on Step Number
1.. INTMASST
2.. CUSTTECF Customise Production Technology Factor
3.. INTPRODU
4.. OHR
5.. MASSTECF Mass Production Technology Factor
6.. OVALUES
7.. INTCUSTT
8.. OSTR
9.. INTOFORM
10.. PRODUCTF Product Oriented Strategy Factor
11.. OFORM
12.. INTOPERA
13.. OPERATF Operations Oriented Strategy
14.. INTOSTR
15.. INTVALUE
16.. INTOHR
17.. DYNAMISM

Multiple R	,50436	Analysis of Variance			
R Square	,25438		DF	Sum of Squares	Mean Square
Adjusted R Square	,08537	Regression	17	23,40272	1,37663
Standard Error	,95636	Residual	75	68,59728	,91463

F = 1,50512 Signif F = ,1162

* * * * MULTIPLE REGRESSION * * * *

Equation Number 1 Dependent Variable.. GROWTHF Growth Factor

------------------------ Variables in the Equation ------------------------

Variable	B	SE B	Beta	Tolerance	VIF	T	Sig T
DYNAMISM	-,167920	,254841	-,283591	**,053671**	**18,632**	-,659	,5120
PRODUCTF	,096490	,145093	,096490	,472244	2,118	,665	,5081
OPERATF	-,018729	,212563	-,018729	,220030	4,545	-,088	,9300
OFORM	-,039524	,077691	-,090767	,312309	3,202	-,509	,6124
OHR	,006451	,061475	,012824	,665646	1,502	,105	,9167
OSTR	,022249	,026867	,104948	,618968	1,616	,828	,4102
OVALUES	-,039040	,102026	-,053496	,508641	1,966	-,383	,7031

CUSTTECF	,035678	,116612	,035678	,731088	1,368	,306	,7605
MASSTECF	,163635	,116673	,163635	,730331	1,369	1,403	,1649
INTPRODU	,027621	,079256	,046943	,547929	1,825	,348	,7284
INTOPERA	**,165869**	**,083613**	**,400408**	**,244025**	**4,098**	**1,984**	**,0501**
INTOFORM	,043481	,043544	,125535	,629001	1,590	,999	,3212
INTOHR	,010667	,041769	,095245	**,071470**	**13,992**	,255	,7991
INTOSTR	,004151	,015594	,079198	,112293	8,905	,266	,7908
INTVALUE	,053173	,054250	,292318	,111771	8,947	,980	,3302
INTCUSTT	,125963	,074472	,225901	,557344	1,794	1,691	,0949
INTMASST	-,125258	,086344	-,221424	,426728	2,343	-1,451	,1510
(Constant)	-,029564	,500292				-,059 ,	9530

>Note # 12650
>No outliers found. No casewise plot produced.

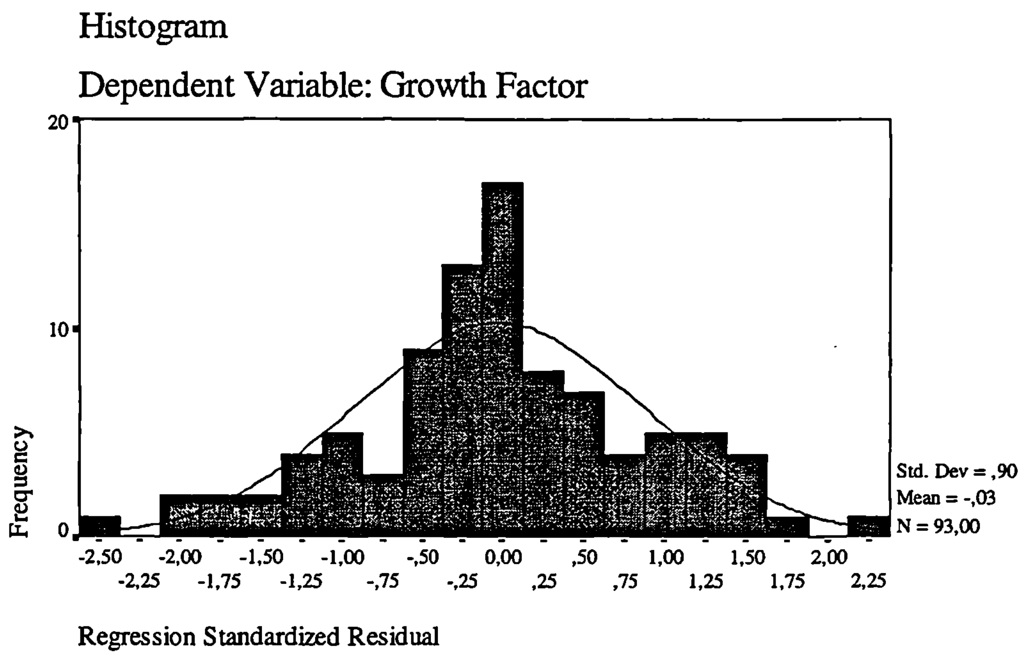
**** MULTIPLE REGRESSION ****

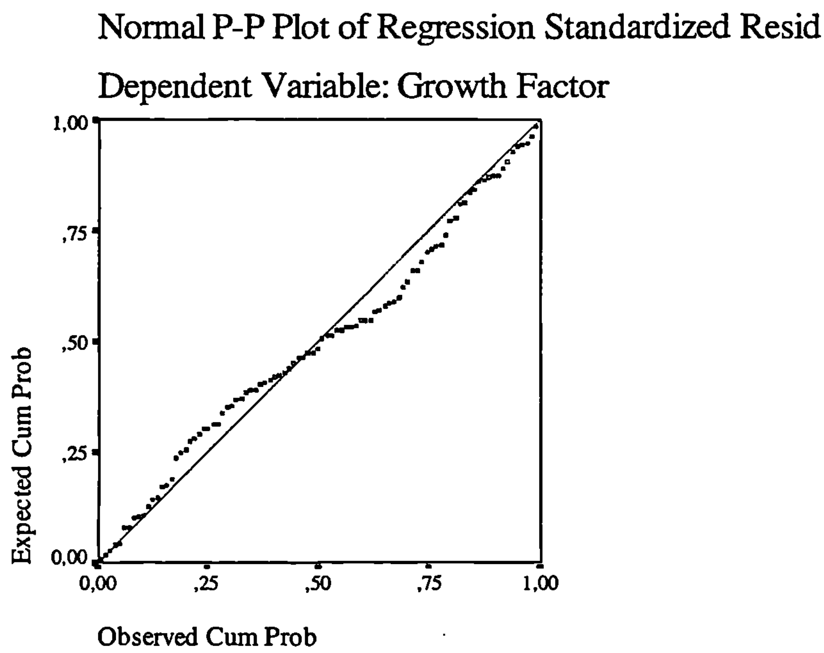
Equation Number 1 Dependent Variable.. GROWTHF Growth Factor

Residuals Statistics:

	Min	Max	Mean	Std Dev	N
*PRED	-1,5898	1,5730	-,0154	,5004	93
*RESID	-2,3107	2,1287	-,0272	,8594	93
*ZPRED	-3,1521	3,1189	-,0305	,9921	93
*ZRESID	-2,4161	2,2258	-,0284	,8986	93

Total Cases = 102


Histogram
Dependent Variable: Growth Factor
Frequency
20
10
0
-2,50 -2,00 -1,50 -1,00 -,50 0,00 ,50 1,00 1,50 2,00
-2,25 -1,75 -1,25 -,75 -,25 ,25 ,75 1,25 1,75 2,25
Std. Dev = ,90
Mean = -,03
N = 93,00
Regression Standardized Residual


Normal P-P Plot of Regression Standardized Resid
Dependent Variable: Growth Factor
Expected Cum Prob
1,00
,75
,50
,25
0,00
0,00 ,25 ,50 ,75 1,00
Observed Cum Prob

		Sample Beta Coefficients		
Description	**Indicator**	**Growth**	**ROI**	**Tolerance**
Dynamism	*Dynamism*	-0,2835	-0,1848	**0,0536**
Operations Oriented Strategy	OPERATF	-0,0187	-0,2740	0,2200
Product Oriented Strategy	PRODUCTF	0,0964	0,0742	0,4722
Formalisation	OFORM	-0,0907	0,1318	0,3123
Human Resource Emphasis	OHR	0,0128	-0,0531	0,6656
Standardisation	OSTR	0,1049	-0,0687	0,6189
Sharing of Values	OVALUES	-0,0534	0,1162	0,5086
Customised Production Technology	CUSTECF	0,0356	0,0248	0,7310
Mass Production Technology	MASSTECF	0,1636	-0,0637	0,7303
Operations Oriented Strategy X Dynamism	INTOPERA	**0,4400** *	-0,3450	0,2440
Product Oriented Strategy X Dynamism	INTPRODU	0,0469	**0,3000** *	0,5479
Formalisation X Dynamism	INTOFORM	0,1255	0,0997	0,6290
Human Resource Emphasis X Dynamism	INTOHR	0,0952	-0,0213	**0,0714**
Standardisation X Dynamism	INTOSTR	0,0791	-0,2016	0,1122
Sharing of Values X Dynamism	INTVALUE	0,2923	-0,1031	0,1117
Customised Production Technology X Dynamism	INTCUSTT	0,2259	0,0583	0,5573
Mass Production Technology X Dynamism	INTMASST	-0,2214	0,1112	0,4267
*** P<0.05 ** P<01 *** P<001**	**Rsqr**	**0,2543**	**0,1410**	

New Regression Analysis

Removed Dynamism and INTOHR variables.

**** MULTIPLE REGRESSION ****

Pairwise Deletion of Missing Data

Equation Number 1 Dependent Variable.. **GROWTHF Growth Factor**

Block Number 1. Method: Enter
PRODUCTF OPERATF OFORM OSTR OVALUES CUSTTECF MASSTECF
INTPRODU INTOPERA INTOFORM INTOSTR INTVALUE INTCUSTT INTMASST
OHR

Variable(s) Entered on Step Number
1.. OHR
2.. INTPRODU
3.. CUSTTECF Customise Production Technology Factor
4.. INTMASST
5.. MASSTECF Mass Production Technology Factor
6.. OVALUES
7.. INTCUSTT
8.. OSTR
9.. INTOFORM
10.. PRODUCTF Product Oriented Strategy Factor
11.. OFORM
12.. INTOPERA
13.. OPERATF Operations Oriented Strategy
14.. INTOSTR
15.. INTVALUE

Multiple R	,49994	Analysis of Variance			
R Square	,24994		DF	Sum of Squares	Mean Square
Adjusted R Square	,10383	Regression	15	22,99486	1,53299
Standard Error	,94666	Residual	77	69,00514	,89617

F = 1,71060 Signif F = ,0661

**** MULTIPLE REGRESSION ****

Equation Number 1 Dependent Variable.. GROWTHF Growth Factor

---------------------------- Variables in the Equation ----------------------------

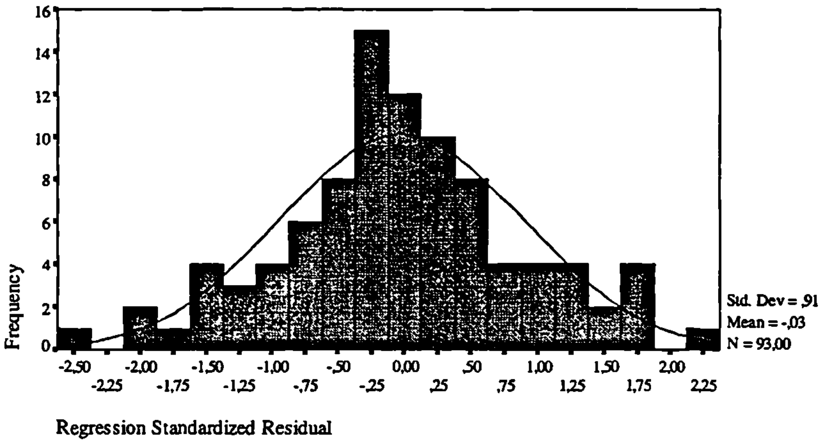
Variable	B	SE B	Beta	Tolerance	VIF	T	Sig T
PRODUCTF	,080854	,141292	,080854	,487943	2,049	,572	,5688
OPERATF	-,007380	,203130	-,007380	,236077	4,236	-,036	,9711
OFORM	-,025784	,072493	-,059214	,351457	2,845	-,356	,7231
OSTR	,025424	,025545	,119926	,670872	1,491	,995	,3227
OVALUES	-,020121	,096985	-,027572	,551534	1,813	-,207	,8362
CUSTTECF	,025166	,113855	,025166	,751443	1,331	,221	,8257
MASSTECF	,161309	,114002	,161309	,749509	1,334	1,415	,1611
INTPRODU	,018128	,076862	,030809	,570835	1,752	,236	,8142
INTOPERA	,185630	,077279	,448113	,279901	3,573	2,402	,0187
INTOFORM	,038837	,041421	,112127	,681126	1,468	,938	,3514
INTOSTR	,001541	,013168	,029401	,154313	6,480	,117	,9071
INTVALUE	,042595	,047401	,234167	,143449	6,971	,899	,3717
INTCUSTT	,133802	,070871	,239959	,602992	1,658	1,888	,0628
INTMASST	-,108303	,080375	-,191452	,482528	2,072	-1,347	,1818
OHR	,016552	,058552	,032905	,718963	1,391	,283	,7782
(Constant)	-,195395	,427936				-,457	,6492

>Note # 12650
>No outliers found. No casewise plot produced.

Durbin-Watson Test = 1,96066

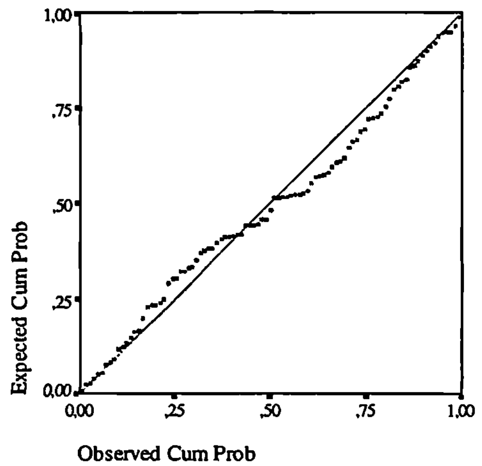
Histogram

Dependent Variable: Growth Factor



Normal P-P Plot of Regression Standardized Residual

Dependent Variable: Growth Factor



New Regression Analysis

Removed Dynamism and INTOHR variables.

**** MULTIPLE REGRESSION ****

Pairwise Deletion of Missing Data

Equation Number 1 Dependent Variable.. **RENTABIL**

Block Number 1. Method: Enter
PRODUCTF OPERATF OFORM OSTR OVALUES CUSTTECF MASSTECF
INTPRODU INTOPERA INTOFORM INTOSTR INTVALUE INTCUSTT INTMASST
OHR

Variable(s) Entered on Step Number
1.. OHR
2.. INTPRODU
3.. CUSTTECF Customise Production Technology Factor
4.. INTMASST
5.. MASSTECF Mass Production Technology Factor
6.. OVALUES
7.. INTCUSTT
8.. OSTR
9.. INTOFORM
10.. PRODUCTF Product Oriented Strategy Factor
11.. OFORM
12.. INTOPERA
13.. OPERATF Operations Oriented Strategy
14.. INTOSTR
15.. INTVALUE

Multiple R	,37159	Analysis of Variance			
R Square	,13808		DF	Sum of Squares	Mean Square
Adjusted R Square	-,02983	Regression	15	1758,23006	117,21534
Standard Error	11,93888	Residual	77	10975,33861	142,53687

F = ,82235 Signif F = ,6501

**** MULTIPLE REGRESSION ****

Equation Number 1 Dependent Variable.. RENTABIL

------------------------------ Variables in the Equation ------------------------------

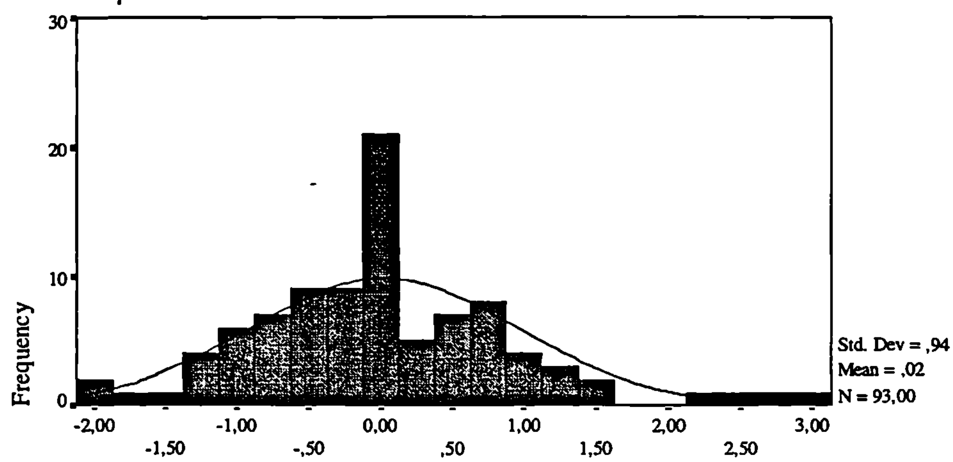
Variable	B	SE B	Beta	Tolerance	VIF	T	Sig T
PRODUCTF	,776455	1,781907	,065999	,487943	2,049	,436	,6642
OPERATF	-3,293635	2,561784	-,279959	,236077	4,236	-1,286	,2024
OFORM	,839282	,914254	,163830	,351457	2,845	,918	,3615
OSTR	-,127108	,322167	-,050964	,670872	1,491	-,395	,6943
OVALUES	1,149488	1,223126	,133886	,551534	1,813	,940	,3503
CUSTTECF	,170203	1,435891	,014467	,751443	1,331	,119	,9060
MASSTECF	-,713925	1,437743	-,060684	,749509	1,334	-,497	,6209
INTPRODU	1,975782	,969353	,285424	,570835	1,752	2,038	,0450
INTOPERA	-1,529101	,974605	-,313757	,279901	3,573	-1,569	,1208
INTOFORM	,397254	,522379	,097489	,681126	1,468	,760	,4493
INTOSTR	-,168119	,166065	-,272662	,154313	6,480	-1,012	,3145
INTVALUE	-,370806	,597798	-,173273	,143449	6,971	-,620	,5369
INTCUSTT	,397521	,893797	,060597	,602992	1,658	,445	,6577
INTMASST	,928110	1,013652	,139456	,482528	2,072	,916	,3627
OHR	-,251457	,738432	-,042490	,718963	1,391	-,341	,7344
(Constant)	9,653491	5,396935				1,789	,0776

>Note # 12650
>No outliers found. No casewise plot produced.

Durbin-Watson Test = ,86785

Histogram

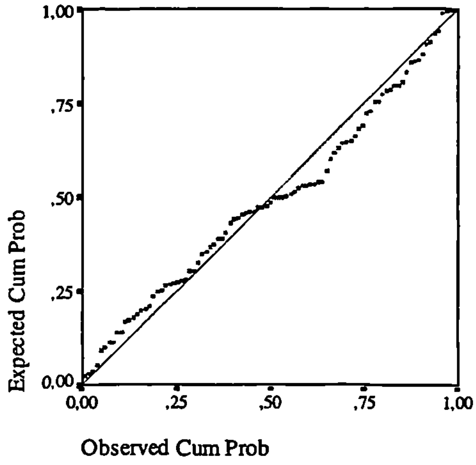
Dependent Variable: RENTABIL



Regression Standardized Residual

Normal P-P Plot of Regression Standardized Resid

Dependent Variable: RENTABIL



Description	Indicator	Sample Beta Coefficients: Growth	Sample Beta Coefficients: ROI	Tolerance
Operations Oriented Strategy	OPERATF	-0,0073	-0,2799	0,2360
Product Oriented Strategy	PRODUCTF	0,0808	0,0659	0,4879
Formalisation	OFORM	-0,0592	0,1638	0,3514
Human Resource Emphasis	OHR	0,0329	-0,0424	0,7189
Standardisation	OSTR	0,1199	-0,0509	0,6708
Sharing of Values	OVALUES	-0,0275	0,1338	0,5515
Customised Production Technology	CUSTECF	0,0252	0,0144	0,7514
Mass Production Technology	MASSTECF	0,1613	-0,0606	0,7495
Operations Oriented Strategy X Dynamism	INTOPERA	**0,4481 ****	-0,3137	0,2799
Product Oriented Strategy X Dynamism	INTPRODU	0,0308	**0,2854 ***	0,5708
Formalisation X Dynamism	INTOFORM	0,1121	0,0974	0,6811
Standardisation X Dynamism	INTOSTR	0,0294	-0,2726	0,1543
Sharing of Values X Dynamism	INTVALUE	0,2341	-0,1732	0,1434
Customised Production Technology X Dynamism	INTCUSTT	0,2399	0,0605	0,6029
Mass Production Technology X Dynamism	INTMASST	-0,1914	0,1394	0,4825
* P<0.05 ** P<01 *** P<001	Rsqr	0,2499	0,1381	

KONKURRANSEDYKTIG STRATEGI
SPØRRESKJEMA

Vi håper du vil delta i denne undersøkelsen og fylle ut dette spørreskjemaet. Vi vil gjerne at du besvarer alle spørsmålene. Selve om du ikke klare å fylle ut hele skjemaet, vil vi gjerne ha skjemaet i retur, da vi trenger et tilstrekkelig antall svar for å kunne analysere vanlige særtrekk ved norske bedrifter. Hvis det er spesielle spørsmål, som du av en eller annen grunn ikke kan svare på, vær snill å bare hoppe over dem og gå videre till de følgende spørsmålene.

De fleste spørsmålene krever ikke detaljerte tall eller opplysninger og er ikke vanskelige å besvare, men noen spørsmål krever din subjektive vurdering. Vi vil vite din vurdering av "tingenes tilstand" heller enn "hvordan det burde være". Vær snill å la ethvert svar gjenspeile hvordan det forholder seg i din bedrift.

Vi skjønner at en del av opplysningene vil være av konfidensiell art og tar alle forholdsregler for å beskytte deg og din bedrift. Alle svarene legges inn i en datafil i form av koder slik at opplysninger om en bedrift kun kan identifiseres av prosjektets medlemmer. Den enkelte bedrifts besvarelse vil ikke bli bekjentgjort i noen ekstern rapport.

Vi setter stor pris på at De har tatt Dem tid til å fylle ut spørreskjemaet. Svarene vil bli behandlet konfidensielt og individuelle svar vil ikke bli identifisert.

Navn: ______________________________

Stilling: ______________________________

Adressen, som en rapport fra undersøkelsen kan sendes til:

____

Gateadresse: ______________________________

Stedsnavn med postnummer: ______________________________

Kontaktpersoner: Professor Lars Kolvereid og Amanuensis Abbas Bakhtiar

A. Hvordan ville du karakterisere din bedrifts forretningsmiljø? Sett i hvert svar en ring rundt det tall på skalaen, som er mest i samsvar med din vurdering av miljøet. Eksempel - spørsmål 1): sett en ring rundt 1, hvis produktmarkedene i din bedrift er svært homogene, sett en ring rundt 5, hvis de er svært heterogene, rundt 3, hvis de er midt imellom etc.

(1) Markedet som dere betjener er . . .

svært homogent (f. eks. Et enkelt udifferensiert marked og meget ensartede kunder)	1 2 3 4 5 ↑ **blandet**	svært heterogent (f. eks. stor ulikhet hva det gjelder markeder, typer av kunder osv.)

(2) Produksjonen og markedsføringen i din bedrift er geografisk . . .

svært konsentrerte (f.eks. i en enkelt region i Norge)	1 2 3 4 5 ↑ **Blandet**	svært vidt fordelte (f. eks. globalt både mht. produksjon og markedsføring)

(3) Den salgsfremmende strategien som din bedrift bruker er vanligvis . . .

meget begrenset (f. eks. i et eneste område i landet)	1 2 3 4 5	meget spredt (hva gjelder prisfastsetting, annonsering rabatt osv.) bedrift vanligvis å ha kontroll over konkurransesituasjonen

(4) På markedene som dere betjener lanseres nye produkter og tekniske innovasjoner

meget sjelden 1 2 3 4 5 meget ofte

(5) På markedene, som din bedrift betjener, forekommer uforutsigbare forandringer i etterspørsel :

svært sjelden 1 2 3 4 5 svært ofte

(6) På markedene, som din bedrift betjener, forekommer uforutsigbare forandringer i salget :

svært sjelden 1 2 3 4 5 svært ofte

(7) I din bedrift , forekommer uforutsigbare forandringer i produksjons verdiøkning (Value-Added) :

svært sjelden 1 2 3 4 5

svært ofte

(8) I din bedrift , forekommer forandringer i antall ansatte :

svært sjelden 1 2 3 4 5 svært ofte

(9) I det siste 5 år på markedene som din bedrift betjener, salget har:

gått ned kraftig 1 2 3 4 5 økt kraftig

(10) I det siste 5 år antall ansatte i din bedrift har:

gått ned kraftig 1 2 3 4 5 økt kraftig

(11) I det siste 5 år verdiøkning (Value-Added) i produksjon i din bedrift var:

svært redusert 1 2 3 4 5 økt kraftig

B. Her følger en liste over forskjellige produksjonsteknologier eller -metoder som er i bruk. I hvilken utstrekning blir enhver av disse metoder benyttet i din bedrift?

	brukes ikke				brukes i stor utstrekning
1. Skreddersyddteknologi (produksjon eller tilvirkning av en enkelt eller noen få produktenheter for spesielle kundebehov slik som kjoler laget på bestilling, spesialutstyr osv.)	1	2	3	4	5
2. Småserieteknologi (Small batch) (Produksjon av en liten serie med artikler av samme slag, som f. eks. av motekjoler, verktøy, farger osv.)	1	2	3	4	5
3. Storserieteknologi (Large batch) (brukt f. eks. ved framstilling av store serier av medisiner og kjemikalier, reservedeler, bokser og flasker, garn osv.)	1	2	3	4	5
4. Masseproduksjonsteknologi (f. eks. brukt i masseproduksjon av biler, apparater o.s.v)	1	2	3	4	5
5. Teknologi for fortløpende prosesser (f. eks. brukt i oljeraffineri og andre automatiserte industrier med kontinuerlig produksjon)	1	2	3	4	5

C-1. I hvilken grad er påstandene (1-22) nedenfor korrekte beskrivelser av strategier og underliggende verdisyn i din bedrift? Sett en ring rundt det riktige tall.

	helt feil	litt feil	vanskelig å si	litt riktig	helt riktig
1) Din bedrift søker hele tiden stor markedsandel.	1	2	3	4	5
2) Din bedrift utnytter fordelen av å være en "etterfølger" og prøver å mest mulig unngå riskene ved å utvikle nye produkter og/eller opprette nye markeder.	1	2	3	4	5
3) Din bedrift konsentrerer ressurser i noen få strategiske markedssegment.	1	2	3	4	5
4) Det å etterstrebe fordeler for aksjonærene blir sett på som den viktigste delen av din bedrifts sosiale ansvar.	1	2	3	4	5
5) Din bedrift konkurrerer direkte med andre konkurrenter.	1	2	3	4	5
6) Din bedrift nøler ikke med å trekke seg unna fra tvilsomme forretninger.	1	2	3	4	5
7) Diversifiseringsmålene er begrenset til de produktene som står i nær relasjon til den gjeldende teknologien.	1	2	3	4	5
8) Din bedrift selekterer markedssegmentene hvor den har fordeler og etterstreber sameksistens med konkurrenter.	1	2	3	4	5
9) Din bedrift har aktivt drivet og opprettet markeder i utlandet.	1	2	3	4	5
10) Strategiutforming er i din bedrift basert på systematiske forskningsresultat og sofistikerte analytiske metoder.	1	2	3	4	5
11) Din bedrift innfører alltid forandringer og tar aktivt risker hva gjelder utvikling av nye produkter eller oppretting av nye markeder.	1	2	3	4	5
12) Din bedrift har aktivt skaffet seg nye oppgaver .	1	2	3	4	5
13) Rekrutteringen av personale i ledende stillinger og teknologisk ekspertise er basert på langtids-planlegging heller enn på presserende behov.	1	2	3	4	5

	helt feil	litt feil	vanskelig å si	litt riktig	helt riktig
14)Diversifiseringsmålene er begrenset til de produkter på hvilke markedskreftene kan anvendes.	1	2	3	4	5
15)Man søker informasjon i stor utstrekning også på markeder som ikke er tilknyttet den nåværende virksomhet.	1	2	3	4	5
16)Din bedrift tar sikte på å produsere varer med høy kvalitet og høy markedsverdi og stole på ikke prisrelaterte markedsføringsstrategier.	1	2	3	4	5
17) Din bedrift legger vekt på å utvikle en mangfoldig ekspertise mer enn den satser på å gjøre bruk av den som finnes allerede.	1	2	3	4	5
18) Det går ikke å skille den grunnleggende strategien i din bedrift fra det unike verdisynet til administrerende direktør eller bedriftens grunnleggere.	1	2	3	4	5
19) Oppfyllelsen av forskjellige sosiale forpliktelser er tydelig innlemmet i din bedrifts foretagsstrategi.	1	2	3	4	5
20) Din bedrift har aktivt investert i utenlandske datterselskap for produksjon.	1	2	3	4	5
21) Anbefalinger på eget initiativ fra ledere på et lavere nivå blir ofte fulgt av overordnede sjefer.	1	2	3	4	5
22) Erfarne lederes umiddelbare vurdering spiller en viktig rolle for strategiutvikling.	1	2	3	4	5

C-2. Hvor viktige er de følgende strategiene i den delen av forretningsvirk- somheten som står for den største prosentandelen av avsetningen i din bedrift (f. eks. primærhandelen)? <u>1 - minst betydningsfull til 5 - mest betydningsfull</u>.

	minst betydningsfull				mest betydningsfull
1. Produktstrategi (produktplanlegging, markedsundersøkelser for nye produkter, F&U, osv.)	1	2	3	4	5
2. Salgsfremmende strategi (styring av salg, personlig salg, annonsering og andre markedsføringsstrategier)	1	2	3	4	5

	minst betydningsful				mest betydningsful
3. Distribusjonsstrategi (valg av distribusjonskanal, program for distribusjon og varebeholdning m.m.)	1	2	3	4	5
4. Prisstrategi (retningslinjer for fastsetting av priser osv.)	1	2	3	4	5
5. Produksjonsstrategi (Stordriftfordeler, kostnadsreduksjon, fleksibilitet i produksjons-systemet osv.)	1	2	3	4	5

C-3. Hvor viktige er følgende mål før din bedrift?	ikke viktig				meget viktig
1. Kapitalavkastning	1	2	3	4	5
2. Økning av markedsandel	1	2	3	4	5
3. Antall nye produkter i forhold til det totale antallet produkter	1	2	3	4	5
4. Kapitalgevinst for aksjonær (dvs. økning av aksjeprisene)	1	2	3	4	5
5. Effektivitet av produksjon og distribusjon	1	2	3	4	5
6. Forhold mellom egenkapital og gjeld	1	2	3	4	5
7. Forbedring av produktportefølje	1	2	3	4	5
8. Forbedring av arbeidsforholdene	1	2	3	4	5
9. Forbedring av bedriftens anseelse hos allmennheten	1	2	3	4	5

C-4 Hvor mye innflytelse har hver av de følgende avdelingene når de sammen tar beslutninger som kan komme til å bestemme den totale innsatsen i din bedrift? Sett en ring rundt det tall som best representerer graden av innflytelse fra hver avdeling.

	liten eller ingen innflytelse	en viss innflytelse	en ikke uanselig innflytelse	stor innflytelse	en veldig stor innflytelse
(1) Salg og markedsføring	1	2	3	4	5
(2) Forskning og utvikling	1	2	3	4	5
(3) Produksjon	1	2	3	4	5
(4) Økonomistyring og finans	1	2	3	4	5
(5) Personale, personalpolitikk	1	2	3	4	5
(6) Administrasjon for bedriftsplanlegging	1	2	3	4	5
(7) Innkjøp	1	2	3	4	5

C-5. Hvor mye innflytelse har hver av de følgende personene eller gruppene på beslutninger som angår anskaffelser og/eller utvikling av nye produkt, tap av eksisterende produkter, fornyelse av viktig utstyr etc.?

	liten eller ingen innflytelse	en viss innflytelse	en ikke uanselig innflytelse	stor innflytelse	en veldig stor innflytelse
1. Administrerende direktør av konsernet	1	2	3	4	5
2. Komite med aksjeselskapet overordnede sjefer	1	2	3	4	5
3. Administrerende direktører i en bedriftsgruppe/ divisjon	1	2	3	4	5
4. Administrerende direktører i en bedriftsenhet	1	2	3	4	5
5. Overordnede avdelingssjefer (f.eks. produksjo-nssjefer, marketsførings-sjefer etc.)	1	2	3	4	5
6. Komiteer i en avdelinger	1	2	3	4	5

D-1. Blir noen av følgende ledelses- eller planleggingssystem eller organisatoriske innretninger brukt for øyeblikket i din bedrift.(flere svar)

1. Formalisert arbeidsbeskrivelse	Ja	Nei
2. Standardsystem for regnskapsmessige kostnader	Ja	Nei
3. Fleksibelt budsjettkontrollsystem	Ja	Nei
4. Prestasjonsevalueringssystem	Ja	Nei
5. Månedlig virksomhetsrapportsystem	Ja	Nei
6. Målstyrt ledelse (MBO)	Ja	Nei
7. Objektive kriterier for forfremmelse	Ja	Nei
8. Internationalt opplæringsprogram for ledere	Ja	Nei
9. Objektive foreskrifter for bestemmelse av lønn	Ja	Nei
10. System for finansanalyse av fast realkapital	Ja	Nei
11. Salgsprognosesystem	Ja	Nei
12. Salgsoversikt- og analysesystem	Ja	Nei
13. System for vurdering av utnytting av salgskrafter	Ja	Nei
14. Konkurranseanalyse-system	Ja	Nei
15. Planleggingssystem for PR og reklame	Ja	Nei

16. Kortsiktig planleggingssystem [Ja | Nei]

17. System for/med normaltidsplanlegging [Ja | Nei]

18. Strategiplanleggingssystem [Ja | Nei]

19. Pengestrømsplanleggings-system [Ja | Nei]

20. Kapitalbudsjetteringssystem [Ja | Nei]

21. Analysesystem for økonomisk investering [Ja | Nei]

22. Planleggings-programmerings-budsjetteringssystem (PPBS) [Ja | Nei]

23. Beredskapsplans-system [Ja | Nei]

24. Strategisystem for bedriftsenheter [Ja | Nei]

25. Prosjektledelsesystem [Ja | Nei]

26. Produktsjefsystem [Ja | Nei]

27. Matriseorganisasjon [Ja | Nei]

28. Ledelsesinformasjonssyste m (MIS) [Ja | Nei]

D-2. I hvilken utstrekning beskriver hvert og et av følgende påstander (1-38) på en riktig måte kjennetegnene for organiseringen av din bedrift? Markere det alternativ som passer best for hvert påstand, på 5-punktsskalaen.

1. " helt feil"
2. " til dels feil"
3. " vanskelig å si"
4. " til dels riktig"
5. " helt riktig"

	helt feil				helt riktig
1) Enhver leders eller direktørs myndighet og ansvar er klart og tydelig definert i din bedrift.	**1**	**2**	**3**	**4**	**5**
2) Det er lagd vekt på planlagt jobrotasjon for lederne som et ledd i deres kompetanseutvikling.	**1**	**2**	**3**	**4**	**5**
3) I din bedrift er det meningen at de overordnede sjefer skal fastsette måten problemer skal løses på, mens selve problemløsningen delegeres til deres underordnede.	**1**	**2**	**3**	**4**	**5**
4) I din bedrift blir den enkelte sjefs initiativ satt høyere enn harmoni på det mellommenneskelige planet.	**1**	**2**	**3**	**4**	**5**
5) Karriereveier for spesialister, såvel som for ledende personale, er klart definerte	**1**	**2**	**3**	**4**	**5**
6) Det blir lagd sterk vekt på samstemmighet hva gjelder beslutninger og handling innen hver beslutningsenhet.	**1**	**2**	**3**	**4**	**5**
7) Konflikter mellom ledere på forskjellig nivå blir hurtig løst vha. Overordnedes autoritet.	**1**	**2**	**3**	**4**	**5**

	helt feil				helt riktig
8) Arbeidsinstruksen for ledere er generelt formulert og blir derfor tillempet med stor fleksibilitet.	1	2	3	4	5
9) Innsatsen til hver leder blir evaluert over en periode på 5 til 10 år slik at hans/hennes potensielle evner kan taes hensyn til.	1	2	3	4	5
10)Viktig informasjon blir vanligvis utvekslet mellom ledere.på forskjellige nivåer.	1	2	3	4	5
11)Når det er uoverensstemmelse hva gjelder synspunkter og vurdering mellom ledere på forskjellige nivåer, søker de alltid å finne et midlertidig kompromiss heller enn å tvinge frem en endelig avgjørelse.	1	2	3	4	5
12)De fleste ledere på forskjellige nivåer har ikke noen tidligere arbeidserfaring utenfor denne bedrift.	1	2	3	4	5
13)Overordnete sjefer samler selv aktivt informasjon om aktuelle begivenheter i og utenfor bedriften og om situasjoner	1	2	3	4	5
14)Ansattes og lederes bevegelser blir styrt av regler og av overordnede.	1	2	3	4	5
15)Mange overordnede sjefer har blitt forfremmet innen bedriften.	1	2	3	4	5
16)Det er typisk for organisasjonen å oppmuntre til og følge opp en hver forandring.	1	2	3	4	5
17)Overordnede sjefer er strenge med belønninger og straff .	1	2	3	4	5
18)Ledere diskuterer nøye seg imellom forskjeller i synspunkter og vurdering selv om slike diskusjoner er tidkrevende .	1	2	3	4	5

TAKK FOR AT DU TOK DEG TID TIL Å BESVARE DETTE SPØRRESKJEMA - DET VIL VÆRE OSS TIL STOR HJELP!

Bodø Graduate School of Business

COMPARISON OF MANAGEMENT SYSTEMS

QUESTIONNAIRE

We hope you are willing to participate in this research study by filling out this questionnaire. Although the completion of this questionnaire in its entirety will be very much appreciated, if you find it impossible to fill it out, even the selective completion of this questionnaire will be appreciated as well because we need a sufficient number of responses in order to analyse general characteristics of Norwegian firms. If you cannot answer some specific questions for any reasons, please leave them blank and proceed to the next questions.

Most of the questions do not require detailed figures or data and are not difficult to answer, although some questions require your subjective judgement. We would like to know your judgement on "how things actually are" rather than "how things ought to be." Please respond to each question, reflecting the way it is in your company.

We understand that some of the information is confidential and are taking every precaution to protect you and your company. All responses are entered in the data file in coded form with company identities known only to the members of the project. The responses of any individual company will not be disclosed in any external report except for the restatement of responses sent back to each respondent.

Your name (please Print)
Your Position
The address to which a summary report should be mailed:

Street
City
Zip Code

Contact persons: Professor Lars Kolvereid and Amanuensis Abbas Bakhtiar

How would you characterise the business environment of your company? Please circle the number on the scale that best represents your judgement about each aspect of the environment. In question (1), for example, please circle 1 if your product-markets are very homogeneous, circle 7 if they are very heterogeneous. If neither extreme represents your judgement, circle an appropriate number in between, considering the distances from the descriptions at both extremes and , if any, at midpoint, 4.

(1) The market that you serve are ...

very homogeneous (e.g., a single undifferentiated market and very similar customers)	**1 2 3 4 5 6 7** mixed (4)	very heterogeneous(e.g.,a great diversity of markets, types of customers, etc.)

(2) The production and marketing operations of your company are geographically ...

very concentrated (e.g., in a single region of Norway	**1 2 3 4 5 6 7** mixed (e.g., somewhat international) (4)	very widely dispersed (e.g., global both in production and marketing)

(3) The promotional strategy your company utilises is generally ...

very limited (e.g., in a single region of the country	**1 2 3 4 5 6 7**	very diverse (e.g., pricing advertising, rebates, etc., are all utilised)

(4) In the market that you serve, new products and technical innovation are introduced

very seldom **1 2 3 4 5 6 7** often

(5) In the market that you serve, unexpected changes in demand takes place

very seldom **1 2 3 4 5 6 7** often

(6) In the market that you serve, unexpected changes in sales takes place

very seldom **1 2 3 4 5 6 7** often

(7) In your company unexpected changes in value-adding in manufacturing takes place

very seldom **1 2 3 4 5 6 7** often

(8) In your company changes in the number of employees takes place

very seldom **1 2 3 4 5 6 7** often

(8) In your company changes in the number of employees takes place

very seldom 1 2 3 4 5 6 7 often

(9) In the past 5 years your company's sales has:

strongly decreased 1 2 3 4 5 6 7 strongly increased

(10) In the past 5 years your company's number of employees has:

strongly decreased 1 2 3 4 5 6 7 strongly increased

(11) In the past 5 years your company's value adding in production has:

strongly decreased 1 2 3 4 5 6 7 strongly increased

B. Listed bellow are different production technologies or methods available. To what extent is each technology utilised in your company ? Please indicate rough percentage of output of each technology to total production.

	Is not used				Used frequently
1. Custom technology (production or fabrication of single unit or few units of products to customer specifications or needs, such as made-to-order dresses, specialised equipment, etc.)	1	2	3	4	5
2. Small batch, job shop technology (creation of a small batch of similar units, such as fashionable dresses, tools and dies, etc.) ___%	1	2	3	4	5
3. Large batch technology (e.g., used in manufacturing large batches of drugs and chemicals, parts, cans and bottles, yarns, etc.)	1	2	3	4	5
4. Mass production technology (e.g., used in mass production of autos, appliances, etc.)	1	2	3	4	5
5. Continuos process technology (e.g., used in oil refineries and other automated industries in which output is produced continuously rather than in batch or shift)	1	2	3	4	5

C-1. To what extent does each statement listed bellow (1-22) correctly describe your company's strategies and underlying value and belief ? Please circle the appropriate number:

1. "definitely incorrect"
2. "somewhat incorrect"
3. "can not say one way or the other"
4. "somewhat true"
5. "definitely true"

	definitely incorrect				definitely true
(1) Your company consistently seeks high market share and tries to take advantage of cost efficiencies in every market.	1	2	3	4	5
(2) Your company exploits the advantage of being a "follower" and tries to reduce risks on the development of new products and or market	1	2	3	4	5
(3) Your company concentrates resources in a few strategic market segments.	1	2	3	4	5
(4) The pursuit of stockholder benefits is thought to be the most important social responsibility of your company.	1	2	3	4	5
(5) Your company competes head-on with competitors.	1	2	3	4	5
(6) Your company does not hesitate to divest from questionable business.	1	2	3	4	5
(7) The diversification targets are restricted to those product lines which have close commonality with the existing technological base.	1	2	3	4	5
(8) Your company selects the market segments in which it has advantages and pursues coexistence with competitors.	1	2	3	4	5
(9) Your company has been actively developing foreign markets.	1	2	3	4	5
(10) Strategy formulation in your company is based upon systematic research data and sophisticated analytical methods.	1	2	3	4	5
(11) Your company is always an innovator which actively takes risks on the development of new product and/ or market.	1	2	3	4	5

	definitely incorrect				definitely true
(12) Your company has actively acquired new businesses.	1	2	3	4	5
(13) The recruitment of managerial personnel and technological experts are based upon long-range personnel planning rather than immediate needs.	1	2	3	4	5
(14) The diversification targets are restricted to those product lines in which existing strengths in marketing can be applied.	1	2	3	4	5
(15) Information is sought extensively even on markets unrelated to present business.	1	2	3	4	5
(16) Your company aims to produce high quality products with high value added and to rely on non-price marketing strategies.	1	2	3	4	5
(17) Your company emphasises accumulating diverse base of know-how more than making better use of existing know-how.	1	2	3	4	5
(18) The basic strategy of your company is inseparable from the unique value and belief of the present C.E.O or the original founder.	1	2	3	4	5
(19) The fulfilment of various social responsibilities is clearly built into the corporate strategy of your company.	1	2	3	4	5
(20) Your company has been actively investing in foreign production subsidiaries.	1	2	3	4	5
(21) Voluntary recommendation made by lower-level managers are frequently followed by senior executives.	1	2	3	4	5
(22) The intuitive judgement of experienced executives plays a major role in formulating strategy.	1	2	3	4	5

C-2. How important are the following strategies in the business that account for the largest percentage of your sales (i.e., your primary business) ? Please rank the strategies in order of present and future importance:

1- least important
5- most important

	least important				most important
1) **Product strategy** (product planning, market research for new products, R&D, etc.)	1	2	3	4	5
2) **Promotional strategy** (sales management and personal selling, advertising, and other marketing communication strategies.)	1	2	3	4	5
3) **Distribution strategy** (choice of distribution channel, distribution and inventory program, etc.)	1	2	3	4	5
4) **Pricing strategy** (price policy, pricing decision, etc.)	1	2	3	4	5
5) **Production strategy** (economy of scale, cost reduction, flexibility of production system, etc..)	1	2	3	4	5

C-3. How important are the following goals for your company ? Please select three important goals and rank them in order of importance:

1 - Little or no influence to *5 - a very strong influence*

	Little or no influence				very strong influence
1. Return on investment	1	2	3	4	5
2. Increase in market share	1	2	3	4	5
3. New product ratio	1	2	3	4	5
4. Capital gain for stockholder (i.e., increase in share price)	1	2	3	4	5
5. Efficiency of production and physical distribution	1	2	3	4	5
6. Equity/debt ratio	1	2	3	4	5
7. Improvement of product portfolio	1	2	3	4	5
8. Improvement in quality of working conditions	1	2	3	4	5
9. Improvement in public image of the company	1	2	3	4	5

C-4. How much influence has each of the following departments when making joint decisions that may determine the overall performance of your company ? Please circle the number which best represents the amount of influence of each department.

	little or no influence	some influence	quite a bit of influence	a great deal of influence	a very great deal of influence
(1) Sales and marketing	1	2	3	4	5
(2) R & D	1	2	3	4	5
(3) Production	1	2	3	4	5
(4) Control and finance	1	2	3	4	5
(5) Personnel, labour relations	1	2	3	4	5
(6) Corporate planning staff	1	2	3	4	5
(7) Purchasing, procurement	1	2	3	4	5

C-5. How much influence has each of the following persons or groups on making decisions relating to the acquisitions and /or development of new product lines, the divestment of existing product lines, the renewal of major facilities, etc. ?

	little or no influence	some influence	quite a bit of influence	a great deal of influence	a very great deal of influence
1. Chief executive officer	1	2	3	4	5
2. Committee of corporate senior executives	1	2	3	4	5
3. General managers of business group	1	2	3	4	5
4. General managers of business unit	1	2	3	4	5
5. Chief functional managers (e.g., production managers, marketing managers, etc.)	1	2	3	4	5
6. Committees in functional department	1	2	3	4	5

D-1. Are any of the following management or planning systems or organisational devices currently being utilised in your company ? (multiple answers)

1. Formalised job description | Yes | No
2. Standard cost accounting system | Yes | No
3. Flexible budgetary control system | Yes | No
4. Performance evaluation system | Yes | No
5. Monthly operation reporting system | Yes | No
6. Management by objectives (MBO) | Yes | No
7. Objective promotion criteria | Yes | No
8. Internal training program for managers | Yes | No
9. Objective formula for wage/salary determination | Yes | No
10. Fixed assets investment analysis system | Yes | No
11. Sales forecasting system | Yes | No
12. Sales review and analysis system | Yes | No
13. Sales force performance appraisal system | Yes | No
14. Competition analysis system | Yes | No
15. Planning system for PR and advertisement | Yes | No
16. Short-range planning system | Yes | No
17. Middle-range planning system | Yes | No
18. Strategic planning system | Yes | No
19. Cash-flow planning system | Yes | No
20. Capital budgeting system | Yes | No
21. Financial investment analysis system | Yes | No
22. Planning-programming-budgeting system (PPBS) | Yes | No
23. Contingency planning system | Yes | No
24. Strategic business unit system | Yes | No
25. Project management system | Yes | No
26. Product or brand manager system | Yes | No
27. Matrix organisation | Yes | No
28. Management information system (MIS) | Yes | No

D-2. To what extent does each statement listed bellow correctly describe the characteristics of your company's organisation ? Please circle the 5-point scale approximately:

1. "definitely incorrect"
2. "somewhat incorrect"
3. "can not say one way or the other"
4. "somewhat true"
5. "definitely true"

	definitely incorrect				definitely true
(1) The authority and responsibility of every executive or manager are clearly and concretely defined in your company.	1	2	3	4	5
(2) Planned job rotation of managers is emphasised as a device for developing their capabilities.	1	2	3	4	5
(3) In your company the function of senior executives is thought to set the way of thinking about problems, therefore, the actual problem-solving is delegated to their subordinates.	1	2	3	4	5
(4) In your company individual managers' initiative is valued more than harmony of human relations.	1	2	3	4	5
(5) Career paths for specialists as well as managerial personnel are clearly defined.	1	2	3	4	5
(6) Consensus is heavily emphasised in the decisions and actions of each decision units.	1	2	3	4	5
(7) The conflict among executives and managers are promptly resolved based upon superiors' authority.	1	2	3	4	5
(8) The job descriptions for executives and managers are general and, therefore, applied very flexibly.	1	2	3	4	5
(9) The performance of each manager is evaluated over 5 to 10 years term so that his/her potential capabilities can be taken into account.	1	2	3	4	5
(10) Important information is usually exchanged informally among executives and managers.	1	2	3	4	5
(11) When there is a difference in opinion and judgement among executives and managers, they always seek to find a temporary compromise rather than to impose a final decision.	1	2	3	4	5
(12) Most executives and managers have no prior job experience outside this company.	1	2	3	4	5
(13) Senior executives actively gather information by themselves about relevant events in and out of your company and about situations on the line.	1	2	3	4	5

	definitely incorrect				definitely true
(14) Employees' and managers' actions are strictly controlled by rules and by their superiors.	1	2	3	4	5
(15) Most senior executives have been promoted from within.	1	2	3	4	5
(16) The organisation's climate is to pursue and challenge any change.	1	2	3	4	5
(17) Senior executives are strict in applying rewards and punishments.	1	2	3	4	5
(18) Executives and managers thoroughly discuss differences in opinion and judgement among themselves even though such discussions are time consuming.	1	2	3	4	5

THANK YOU VERY MUCH FOR YOUR THOUGHTFUL CO-OPERATION

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