

Mario

THE IMPORTANCE OF GROWTH, INNOVATION AND STRATEGY IN ENGINEERING ENTREPRENEURSHIP

By

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Executive Summary

The purpose of this research dissertation is to test the hypothesis that entrepreneurial engineers are not familiar with innovation, growth and business planning strategies, or simply do not apply them. The hypothesis is investigated with the help of case studies and published works; outlining the different methods and principles employed by relatively new business ventures to ensure continued success.

The scope of this research dissertation is limited to why there is a need for well managed growth, continual innovation and the strategic positioning and planning in business.

The form of research design chosen for the experimental program is characterised and based upon the "Method of Data Collection", outlined in Cooper and Schindler: *Business Research Methods*, 7th Ed., 2001. The refined method is based upon a *Two Stage Design* incorporating a *Non probability, Convenience Sample*. The literature review of this research dissertation will be viewed as the *Exploratory Section* of the *Two Stage Design*, as outlined by Cooper and Schindler.

The results of the survey which was carried out indicate that entrepreneurial engineers have an equal chance of being familiar or not familiar with the concepts of innovation and growth. Those who were familiar with the concepts were more likely to have knowledge of the entrepreneurial strategies regarding the concepts and to implement the strategies. Entrepreneurial engineers were likely to be familiar with business strategies, and those who were familiar, were more likely to have strategic architecture and intents, but less likely to have company missions than those who were not familiar.

There seemed to be no correlation between the field of engineering or the field of business, and the likelihood of familiarity with the concepts. However, engineers who had business and management experience prior to starting

their business ventures were more likely to be familiar with the concepts, but no more likely to implement them than engineers without prior experience.

The literature review and the survey carried out agree with the initial hypothesis that entrepreneurial engineers starting relatively new business ventures either were not familiar with the concepts of innovation, growth and strategy, or simply did not apply them. However the agreement between the survey results, and the hypothesis and literature review, are not to the extent that was originally expected.



Contents

	Page
1. Introduction	6
2. Literature Review	9
3. Experimental Planning	33
4. Experimental Results of Sample Survey	44
5. Conclusions and Recommendations	50
6. References	53
7. Bibliography	55
8. Appendices	57



Expanded Contents

	Page
1. Introduction	6
1.1. General remarks	6
1.2. Purpose of the investigation	7
1.3. Scope of the investigation	8
2. Literature Review	9
2.1. Introduction	9
2.2. Innovation	10
2.3. Growth	11
2.4. Strategy	13
2.5. Entrepreneurial Strategies	13
2.5.1. Introduction	13
2.5.2. Competitor Analysis	21
2.5.3. Porter's Five Forces Model	22
2.5.4. Ansoff's Product/Market Matrix	25
2.5.5. Benchmarking	27
2.5.6. Strategic Planning	28
2.5.7. Focusing on the Core Business	30
2.6. Conclusion	31
3. Experimental Planning	33
3.1. Introduction	33
3.2. Research Design	33
3.2.1. Method of Data Collection	33
3.2.2. Two Stage Design	34
3.2.3. Non Probability Sampling	34
3.3. Development of questionnaire	35
3.4. Analysis Planning	39
3.5. Summary	42

4. Experimental Results of Sample Survey	44
4.1. Introduction	44
4.2. Summary of Results	45
4.3. Discussion of Results	48
4.4. Summary	49
5. Conclusions and Recommendations	50
5.1. Introduction	50
5.2. Findings	51
5.3. Concluding Remarks	51
5.4. Recommendations	51
6. References	53
7. Bibliography	55
8. Appendices	57
8.1. Raw Tabulated Experimental Data	58
8.2. Survey Questionnaires	60
8.3. List of Figures	81
8.4. List of Tables	81

CHAPTER 1 INTRODUCTION

1.1. General Remarks

In developing a new product or business solution and transforming it into a profitable business venture, it is vital to have an understanding of the various business mechanisms associated with each step in the product life cycle. This information allows for a more accurate and effective design, and also for the effective market placement of the product and management of the business venture. The areas of product development, marketing, logistics, finance and economics form the core of the business knowledge required.

Once the establishment of the venture has been achieved, the main focus quickly changes to survival, sustainability or growth of the business. During this period some apparently well managed business ventures fail while others continue growing regardless of economic and political climate. Some small businesses are forced out of the market by the sheer might of well established companies, while others overcome "David and Goliath" struggles to become the new market leaders. The question as to why such equally promising ventures can differ so much in their success cannot be answered by looking at their core business mechanisms and practices alone.

From the engineering perspective the study of business and management practices has been facilitated by the advent of Masters level degrees in Engineering Management at various universities in South Africa, for example, the Rand Afrikaans University and the University of Pretoria. This knowledge has enabled engineers to make better decisions regarding advanced product development, economics and marketing strategies. Despite these developments the entrepreneurial engineer is still faced with an uphill battle on the path to success.

The areas of business often overlooked by the entrepreneur in the “fog of war” are the well managed growth of the business, the formulation and execution of long term strategies, and a continual focus on innovation. These are very basic and intuitive concepts that have led companies like Microsoft and Coca Cola to worldwide market domination, and others such as Univac to total destruction. The consequence of ignorance of these concepts is that the entrepreneur will at some point find that the business is either too small to take advantage of an opportunity, that the opportunity has caught the business by surprise, or that the main product line or service offered has suddenly become obsolete.

History records how the makers of the slide rule were caught off-guard by the invention of the electronic calculator and how transistors destroyed the highly skilled vacuum tube industry. These and other examples of failure will be investigated together with cases of success and survival in an effort to determine how and why growth, innovation and strategy are so important to sustainability in the marketplace.



1.2. Purpose of the investigation

The purpose of this research dissertation is to test the hypothesis that engineering entrepreneurs are not familiar with innovation, growth and business planning strategies, or simply do not apply them. The hypothesis is investigated with the help of case studies and published works; outlining the different methods and principles employed by relatively new business ventures to ensure continued success.

It is hoped that an understanding of the methods will be developed, with the aim of providing a guide to the development and implementation of these methods in business.

1.3. Scope of the investigation

The scope and focus of this research dissertation are limited to why there is a need for well managed growth, continual innovation and strategic positioning and planning in business. As it can be argued that all new products and services require an engineering innovation, the mechanisms of these requirements and their use will be investigated from the entrepreneurial engineer's perspective, as he is often highly technically skilled and specialised, but probably the least aware and knowledgeable of advanced business methods.

The present awareness and practice of the concepts of growth, strategy and innovation in South African entrepreneurial ventures, is sampled by means of a representative survey. The representative sample consists of entrepreneurial engineers operating small ventures. Although the sample size is relatively small, it is believed to be representative. This is due to the limited purpose and scope of the survey.



CHAPTER 2 LITERATURE REVIEW

2.1. Introduction

Some of the prime concerns of the newly established business are survival, sustainability and profit. In fact, "It can be said that the goal of any business is to make a profit." (Zook and Allen, *Profit from the Core*, 2001) Charities and non profit organisations aside, regardless of mission, to survive and be sustainable; a successful business must generate a profit.

The entrepreneurial equation states that: "To make a profit a business must take a product or service from a lower energy state to higher energy state" (Zook and Allen, 2001). A certain amount of work is added to the product or service during this transformation and for this work a cost is charged. Part of this cost is the profit made by the business. Zook and Allen believe that "in order to maximise this profit, the business must charge more for the work done, pay less for the initial raw materials or improve the efficiency of the transformation process". The authors believe that charging more for the work done is the simplest but the least sustainable route to take. If the product or service does not provide increased customer satisfaction and value, sales will eventually drop as competitors take advantage of the pricing difference. Paying less for the raw materials input into the process, although an exciting prospect, is often not within the powers of the new venture. The authors come to the conclusion that the most viable and sustainable means of maximising profit is to improve the efficiency of the transformation process.

The efficiency of the transformation process can be improved in a number of ways, some of these being; the provision of new or improved products or services, by positioning the business processes to capture promising new markets, and to gain a controlling share in existing markets (Montgomery and Porter, 1991). These methods aim to increase efficiency

by maximising sales. The following sections of this chapter attempt to illustrate how efficiency is affected and maximised by the application of entrepreneurial strategies incorporating innovation, growth and strategy.

2.2. Innovation

In P. F. Drucker's *Innovation and Entrepreneurship* (1985), the author describes the practise of innovation as "a specific tool for entrepreneurs, the means by which they exploit change as an opportunity". He stresses that to be entrepreneurial; an enterprise has to have special characteristics over and above being new and small. It must create something new or different, it must transform values.

Innovation is not limited to the discovery and development of new technologies and products alone. It often takes the form of new services or service delivery concepts (Drucker, 1985). This theory can be seen in the fast food delivery concept that as an innovation, delivered something new to the customer; namely increased value and satisfaction. The very first fast food delivery was a product of innovation. The second was merely imitation.

The manufacturing processes a product undergoes or the distribution systems of a large company lend themselves very well to innovation, and are areas where significant cost savings and competitive pricing advantages can be made. In *An Analysis of Logistics Engineering in Formula 1 Grand Prix Championships*, (2003), the author investigates how constant innovation in logistics is required to remain competitive in Formula 1. The author finds that the emphasis placed on the development of new components is only equalled by the emphasis placed on getting these components to where they need to be when they need to be.

With regards to the entrepreneur, the invention is rarely the product of his own labour. The innovation can be characterised by how the entrepreneur uses this invention to improve his business processes or products. Drucker

(1985) describes how penicillin was regarded as a pest; “from which bacteriologists went to great lengths to protect their bacteria cultures”. Penicillin had no value until a use was found for it.

2.3. Growth

Growth can be defined as the change in size or magnitude from one period to another of any of the following measures: resources, output, revenue, market share and profits (Bailey, Montero, Cardozo 1991). At some point in the lifespan of the new business, usually soon after successful establishment, the business will have to be grown. If it isn't, the business will not be able to acquire a meaningful market share, leaving it forever at the mercy of competitors in terms of pricing and other market forces. A business with a small market share that is not grown is doomed to react to market forces, while organisations with controlling shares dictate the terms of business.

The benefits experienced from the growth of a business are not limited to the proportional increase in revenue from increased sales alone. The growth of a business allows the entrepreneur to make changes to the *entrepreneurial equation*, which is not possible during the initial stages. Firstly, as the business grows in terms of sales, resources and outputs, it is easy to imagine the efficiency of transforming products from the lower to higher energy state being improved. As less work is put into the process, costs are reduced and profits are increased. Furthermore, if the price of the product is decreased, increased revenue can be realised from increased sales.

What may not be so easy to imagine is the increased influence that accompanies a larger market share and buying power. As a business grows, its ability to influence the cost of the raw materials entering the transformation process, increases. This is often evident with large chain stores and retail corporations that have the necessary power and market

share to dictate the price of goods from suppliers. High tech military divisions such as the air forces and navies are probably the pinnacle of market segment control. They are supplied by highly specialised companies within strict governmental regulations, preventing their suppliers from seeking out other customers. They have limited market competition in terms of services on offer, and their services are priceless during wartime periods.

Zook and Allen (*Profit from the Core*, 2001), define sustained growth as “growth in both revenues and profits over an extended period of time while total shareholder returns exceed the cost of capital”. The authors add; “that looking at returns in the absence of growth...is as limiting as looking at growth in the absence of returns”. They contend that the failure of most companies to attain sustainable growth is as a result of their failure to identify their core business.

In the late 1990's and the early 2000s the world saw car manufactures enter an acquisition spree. A handful of the world's largest car manufactures acquired what seemed to be every single small car manufacturer in an attempt to gain a dominating market share. Ford Motor Company bought Jaguar, Pajero, and Rover. Audi bought Lamborghini. VW bought Rolls Royce and Cosworth. BMW bought Bentley and Leyland Mini, and Daimler Benz merged with Chrysler Corporation to form Chrysler Benz. No car manufacturer was safe from acquisition. Even Formula 1 constructors such as McLaren, Williams and Stewart had controlling shares acquired by Mercedes Benz, BMW and Ford, respectively.

Whatever the reasons were for the apparent desperation to increase market share, many of these larger car manufacturers made acquisitions that would later be sold off again. Zook and Allen (2001) attribute the reasons for this type of behaviour to “the lack of a proper growth strategy” and the company “straying to far from its core business”. The lack of proper growth strategies is what allows these large and apparently stable

organisations to get caught up in acquisition sprees, allowing their focus to be shifted away from their core business.

2.4. Strategy

In examining the topics of innovation and growth, it is easy to miss the importance of the positioning of the business in its ability to take advantage of opportunities. The positioning allows the business to make radical changes in structure, product or service, with the minimum of effort (Chaffee, 1985). This positioning is attained through strategic planning.

Strategy is what allows a company to be innovative and make what can often be termed “quantum leaps” in growth. Innovation and growth are difficult to achieve without a formal strategy, indeed: “all great things achieved, must first be imagined” (Max Webber, 1947). In *Three Models of Strategy* (1985), Chaffee puts fourth that “all organisations can be said to have strategy, whether the match between the organisations resources and environment are explicitly developed or whether the match is necessarily a good one”. In short, all businesses have strategies irrespective of their benefit to the business, or whether they know it or not.

2.5. Entrepreneurial Strategies

2.5.1. Introduction

Businesses are constantly surrounded with opportunities to grow or innovate. Whether they recognise the opportunity and are able to take advantage of it depends largely on the specific strategy chosen. How the specific strategy is chosen depends on: “what the intended direction or mission of the business is, what the current position is, what the requirements are to meet the strategy in terms of resources and finances and finally the time period that is available for the new position to be

reached” (Zook and Allen, 2001). In essence, the business’ ability to take advantage of opportunities in the future is determined by the method in which the entrepreneur currently operates and manages the venture.

The ability to reach this position in the shortest amount of time is illustrative of the first of Drucker’s (1985) four entrepreneurial strategies: “*Fastest with the Mostest*”. In this strategy, the business which is able to spot the innovation the quickest and make the necessary changes to take advantage of it, is most likely to steal a lead on its competitors. This lead, if maintained long enough, or widened to such an extent that competitors cannot catch up, will ultimately provide the huge quantum jump in size that often results in market segment control.

A fairly good example of Drucker’s second entrepreneurial strategy: “*Hitting them where they ain’t*”, can be seen in the display of what Drucker refers to as: “entrepreneurial judo”. Judo is a sporting and combat discipline which is most well known for its principles of using an opponent’s strength and momentum against them. In the context of American and Japanese automobile manufacturers, Drucker explains how Japanese automobile manufacturers had puzzled their American counterparts for years by producing better build-quality vehicles at lower prices. After initially attributing the lower prices to lower labour costs in Japan, American investigations revealed the now well known Japanese model of work ethics.

The American manufacturers soon adopted and implemented what they had learned and by the 1990s build quality of American automobiles had improved greatly. The Japanese, realising that they were losing their advantage, changed their strategy to counter the new American threat.

In a perfect analogy to the martial art of Judo, Drucker explains how the Japanese manufacturers embarked on a process to encourage individualism in behaviour and even dress. This was done in an attempt to foster an environment typified by innovation, creativity and lateral thinking.

A work environment previously the domain of American and European manufactures.

Drucker's third entrepreneurial strategy; "*finding and occupying a specialised ecological niche*", consists of an organisation finding and occupying a market that is extremely unattractive and immune to competition. The strategy aims at obtaining a monopoly in an area where the cost of the product is a small percentage of the total cost of the intended market. . The product is characterised by a cost that is far less than the associated risk of not using the product. A high performance fastener on a racing car, for example, although more expensive than regular fasteners, accounts for only a small percentage of a typical annual racing budget of US\$ 246 million[†] (Indiacar.com, 2005). Substituting a more conventional fastener for the high performance fastener would constitute an unacceptably high risk for the percentage of the total budget.

The market must be immune to competition by the fact that additional competitors can only result in the reduced profits for all. In addition, the market must be small enough so as not to attract attention from potential competitors. One such company, Automotive Racing Products (ARP), supplies high performance fasteners worldwide to racing teams and "hot-rodders" alike. ARP has secured a niche market without a single competitor. The market ARP occupies is also small enough not to attract the attentions of larger manufacturers of conventional fasteners, yet supplies its product to the top Formula 1, NASCAR and NHRA racing teams (<http://www.arp-bolts.com> , 2005).

With this strategy, the domination of the market is established by the very first entrant to the market, and usually requires a specialised skill from this entrant. In South Africa, the market for machining of keyways in large motor and pump shafts is large, but is serviced by an extremely small portion of the engineering industry. The provision of this service calls for

[†] 1999 Scuderia Ferrari Team budget, Indiacar.com.

specialised skills and machinery, and large capital outlays. By way of its mundane nature, the market does not attract any attention from potential competitors, and remains dominated by a handful of companies.

Drucker's fourth entrepreneurial strategy; "*Changing the economic characteristics of a product, a market or an industry*", can be said to be the foundation of all entrepreneurship. The purpose of the strategy is to create a customer by creating utility in a product, by pricing, by adapting to the customers social and economic reality, and by delivering what represents true value to the customer.

Creating the utility is accomplished by identifying the use for the product or service and then taking advantage of it. Pick 'n Pay created utility when it initiated its grocery delivery service, and Makro created utility when it provided a website for customers to browse its product line over the internet. The innovation is simple in that the organisation provides something that the customer did not know he needed, but once used, becomes almost a necessity. A pizza outlet that does not offer some form of delivery service cannot hope to succeed in modern times. Yet it was previously expected that the customer would be the one travelling to the shop to buy groceries, tools and pizza.

Creating a customer by pricing is accomplished by providing a product at a low enough price so that the customer can afford the initial capital outlay for the product. Often the product is sold below the cost of manufacturing. The company then makes a very high profit by selling smaller components needed, in high volumes, to the customer. Obviously the product is designed to use only the manufacturer's components. Here shaving razors and ink jet printers are good examples of creating customers by pricing.

Ink jet printers and razors are sold at what is to the customer, reasonable prices, or bargains. The manufactures are willing to make a loss on the original component, as the supply of the product is a small part of the business, and accounts for very little if any of the company bottom line.

The company's main business is the manufacture and supply of the supporting components such as razor blades and ink cartridges. The customer evaluates the whole product's utility and value in terms of the price of the supporting components. Because the cost of the supporting components is small compared to the initial product, the manufacturer can put a larger percentage mark-up on these smaller components. When combined with the higher sales volumes of the supporting components, the loss made on the initial product is soon recovered.

Adapting to the customer's reality requires the entrepreneur to realise that the customer's irrational requirements are in fact the product. Satisfying a customer's unique requirements can be turned into a profitable venture. One apparently irrational customer requirement is the car buyers need for larger and larger diameter wheels in combination with lower profile tires. The customer has remained insistent even after it has been proven many times that large diameter rims and tires do not contribute to better handling of a car. On the contrary, they have been shown to affect a car's handling negatively, and increase breaking distances substantially (Truckin' Magazine, Vol. 30, No. 9, Sept 2004). Drucker quotes an old saying that; "*there are no irrational customers, only lazy manufacturers*". In this case, the wheel and tire manufactures, who know better, weren't lazy, they simply satisfied the customer's need, and made good business from it.

In *The Power of Innovation* (1995), Min Basadur uses another Japanese strategy aimed at fostering creativity and innovation, to support his theory that quality is derived from a simple equation

$$\text{Quality results} = \text{content} + \text{process} + \text{process skills}$$

From this equation, to maximize quality results, an organization must maximize the content (parts, raw materials), the process, (manufacture, marketing, and sales) as well as the process skills (human resource skills, training)

In Basadur's case study (1995), Japanese companies utilize a suggestion system whereby employees submit suggestion letters on a continual basis, suggesting methods to improve the processes in a plant. To the management of the company, the content of these suggestions is less important than the process of continual fault finding and innovation that the employees are exposed to. The organization has learned that the continual exposure to innovation and creativity results in motivated and committed employees who enjoy finding flaws in their everyday environment. The net result of the atmosphere of creativity and innovation is higher quality and lower cost products combined with greater output from streamlined processes. This is another example of how the Japanese were forced to abandon their traditional and highly valued beliefs in contentedness, not complaining and being happy with what you have.

Basadur maintains that: "many organisations attempt to extract value from suggestion letters, but the focus on the content of the suggestions yields little, if any value". Attempting to wring new ideas and higher profits from their employees and processes, without setting up the proper environment, according to Basadur, eventually leads to the suggestions decreasing in volume and the loss of interest of the employees.

Mainstreaming is a term applied most widely to the arts, but is used more and more often in the context of promoting equality in organisations such as companies, schools, government and society. If the *mainstream* refers to: "the prevailing current of thought, influence, or activity", (Dictionary.com, 2005), *mainstreaming* can be viewed as a strategy to affect change to these patterns of behaviour. It is a powerful tool used to frame policies and to change organisational cultures and structures. Lately, mainstreaming is used very successfully by companies wanting to adopt new long term strategies, and to encourage creativity in organisations. Basadur (1995) believes that mainstreaming would be a valuable alternative to the unsuccessful crash programs employed by many companies, in an attempt to position the company. He believes

these crash programs; where changes to organisational structures, goals and missions are forced upon a business, fail because nobody in the organisation really changes how they think and behave.

Basadur (1995) states that people in competitive organizations display three specific characteristics simultaneously: “efficiency, adaptability, and flexibility”. Adaptability is the most difficult to mainstream as organizations still find it difficult to meet the challenge of adapting to change, but hold the key to innovation. Among the reasons given for this difficulty are that too many companies are preoccupied with short term results, lack of a coherent long term strategy or company mission, often leading to unsustainable behaviour and choices. Other reasons given are that their employees and teams fail to pursue common goals within the company and that too few companies can move new ideas quickly and efficiently enough from the “laboratory bench to the market”. These organizations view changes in technology, customer tastes and competition as irritating disruptions to their routines.

Basadur (1995) uses the example of Procter & Gamble, who at one time were the market leaders in household cleaners. Procter & Gamble had developed a liquid cleaner, but were hesitant to embark upon the organisational restructuring and fund the new marketing campaigns that were required. A competitor subsequently entered the market with their own brand of liquid cleaner, and Procter & Gamble were left to hurriedly enter the market unprepared. Procter & Gamble managed to claim a sizable market share, but only after intense marketing and cost.

Basadur’s (1995) definition of efficiency, adaptability and flexibility is:

“Efficiency allows an organization to implement and follow routines”.

“Where efficiency implies mastering a routine, adaptability means mastering the process of changing the routine”. “Adaptability requires looking outside the organization for new technologies, ideas and methods that may improve or completely change its routine. Adaptable

organizations are willing, and able, to accept new solutions quickly. The most effective organizations are both highly efficient and adaptable”.

“Flexibility is short term and reactive. It allows the organization to react quickly to unexpected forces or disruptions without getting mired in organizational bureaucracy”. “The organization must not merely react to a competitor's product introduction, but must anticipate such change by leapfrogging. The organization must bring to the market goods for which the consumer themselves have not yet found a need for”.

As a case study, Basadur (1995) cites North American tire manufactures who were reluctant to develop and manufacture radial tires when the technology had already been proven in Europe. The American market was subsequently overwhelmed by Michelin radial tires, and the American manufactures found themselves playing catch-up when Michelin had already cornered the market.

Basadur (1995) uses the accelerating rate of change of technology to explain why innovation is required for a business to be competitive and remain competitive. The idea of the accelerating rate of change, expects that the present generation learns in ten years what the previous generation took a lifetime to learn. Thus companies must in a very short time acquire the knowledge their predecessors took hundreds of years to learn.

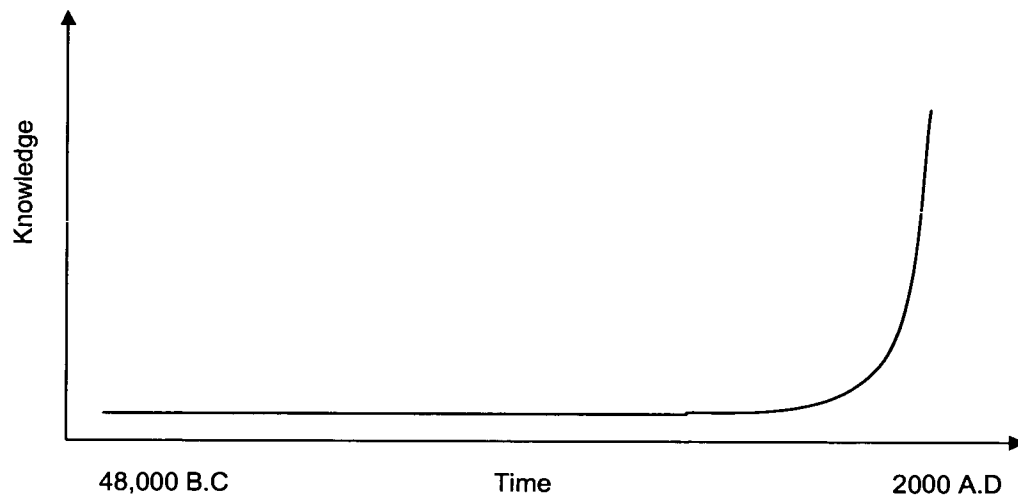


Figure 2.1: The accelerating rate of change, used by Min Basadur (1995) to explain why companies require innovation to be competitive.

2.5.2. Competitor Analysis

In the example in the previous section, the American tire manufacturers also failed to analyse their European competitors before and while they had started losing market share. Since entrepreneurial strategies are based on an intimate knowledge of a company's competitors and their strategies, this ignorance can lead to either badly chosen defensive strategies or a total lack of action.

In *The Business Growth Handbook* (Barrow, Brown and Clarke, 1992), Perrier, the suppliers of bottled mineral water had built a 50% market share in the UK bottled mineral water industry in only ten years. A comprehensive competitor analysis showed that the increase in British bottled mineral water suppliers would be the major factor standing in the way of the French company obtaining further market share. Perrier avoided the problem by acquiring one of the British bottlers, Buxton Mineral Waters, enabling the company to challenge domestic producers and reach parts of the market previously denied to it on "chauvinistic grounds".

Various analytical sources are available from which to analyse and measure a competitor's advantage, entrepreneurial strategy or industry structure. Sources such as annual reports, press releases, pricing lists, tenders, patent applications can all be used to help an entrepreneur understand his competitor's advantages and disadvantages. They provide an informed basis for decisions and help forecast a competitor's returns (Tuller, 1994). The primary questions that must be asked by such an analysis include (Tutor2U, 2004):

- Who are our competitors?
- What threats do they pose?
- What is their profile?
- What are their objectives?
- What strategies are they pursuing?
- How successful are their strategies?
- What are their strengths and weaknesses?
- How are they likely to respond to any changes in the way we do business?

2.5.3. Porter's Five Forces Model

In an industry where products are close substitutes for one another, Porter's Five Forces Model determines attractiveness and long run industry profitability.

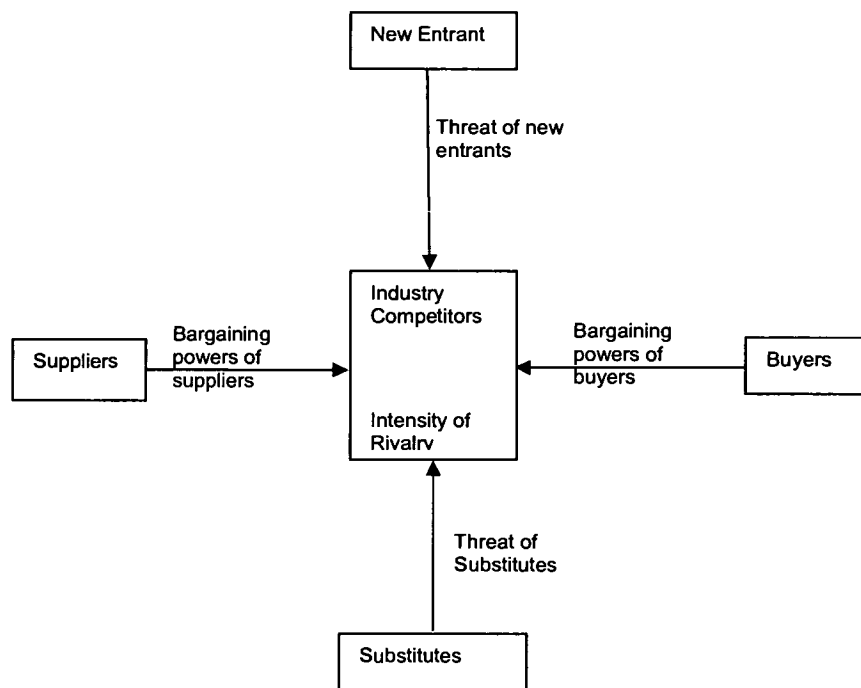


Figure 2.2: Porter's Five Forces Model to determine industry attractiveness and long run profitability (Porter, 1980).

Porter(1980), explains that there are five forces that determine industry attractiveness and long-run industry profitability. These five "competitive forces" are:

- The threat of entry of new competitors (new entrants)
- The threat of substitutes
- The bargaining power of buyers
- The bargaining power of suppliers
- The degree of rivalry between existing competitors

Threat of New Entrants

New entrants to an industry can raise the level of competition, thereby reducing its attractiveness. The threat of new entrants largely depends on the barriers to entry. High entry barriers exist in some industries (e.g. shipbuilding) whereas other industries are very easy to enter (e.g. estate agency, restaurants). Key barriers to entry include

- Economies of scale
- Capital / investment requirements
- Customer switching costs
- Access to industry distribution channels.
- The likelihood of retaliation from existing industry players.

Threat of Substitutes

The presence of substitute products can lower industry attractiveness and profitability because they limit price levels. The threat of substitute products depends on:

- Buyers' willingness to substitute.
- The relative price and performance of substitutes.
- The costs of switching to substitutes.

Bargaining Power of Suppliers

The cost of items bought from suppliers (e.g. raw materials, components) can have a significant impact on a company's profitability. If suppliers have high bargaining power over a company, then in theory the company's industry is less attractive. The bargaining power of suppliers will be high when:

- There are many buyers and few dominant suppliers.
- There are undifferentiated, highly valued products.
- Suppliers threaten to integrate forward into the industry (e.g. brand manufacturers threatening to set up their own retail outlets).
- Buyers do not threaten to integrate backwards into supply chain.
- The industry is not a key customer group to the suppliers.

Bargaining Power of Buyers

The bargaining power of buyers is greater when

- There are few dominant buyers and many sellers in the industry.
- Products are standardized.
- Buyers threaten to integrate backward into the industry.

- Suppliers do not threaten to integrate forward into the buyer's industry.
- The industry is not a key supplying group for buyers.

Intensity of Rivalry

The intensity of rivalry between competitors in an industry will depend on:

- The structure of competition - for example, rivalry is more intense where there are many small or equally sized competitors; rivalry is less when an industry has a clear market leader
- The structure of industry costs - for example, industries with high fixed costs encourage competitors to fill unused capacity by price cutting
- Degree of differentiation - industries where products are commodities (e.g. steel, coal) have greater rivalry; industries where competitors can differentiate their products have less rivalry
- switching costs - rivalry is reduced where buyers have high switching costs - i.e. there is a significant cost associated with the decision to buy a product from an alternative supplier
- Strategic objectives - when competitors are pursuing aggressive growth strategies, rivalry is more intense. Where competitors are "milking" profits in a mature industry, the degree of rivalry is less
- Exit barriers - when barriers to leaving an industry are high (e.g. the cost of closing down factories) - then competitors tend to exhibit greater rivalry.

2.5.4. Ansoff Product/Market Matrix

Ansoff's (1979) product / market matrix offers strategic choices to achieve the growth objectives of the company. The matrix suggests that a business' attempts to grow depend on whether it makes new or exiting products in new or existing markets.

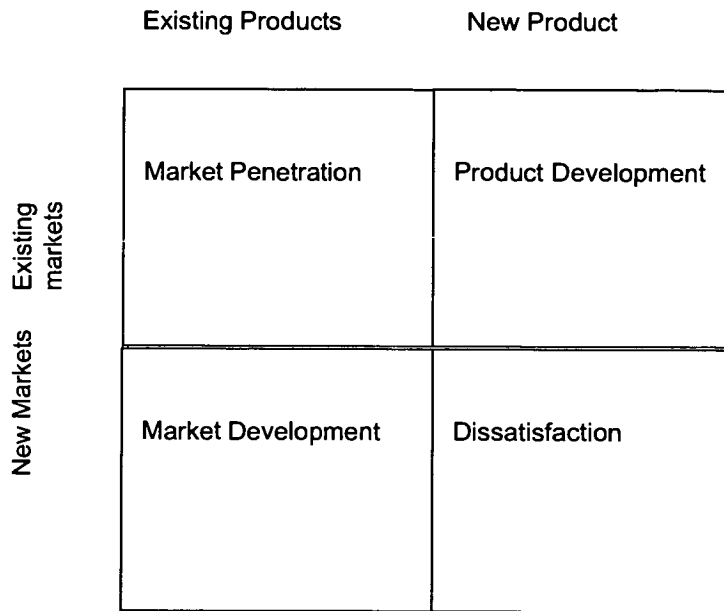


Figure 2.3: Ansoff Product / Market Matrix (Strategic management, 1979).



Market Penetration

Here existing products are marketed to existing customers. This means increasing revenue by, for example, promoting the product or repositioning the brand. However, the product is not altered and new customers are not sought.

Market Development

Here existing product ranges are marketed in a new market. This means that the product remains the same, but it is marketed to a new audience. Exporting the product, or marketing it in a new region, are examples of market development.

Product Development

This is a new product to be marketed to existing customers. Here new product offerings are developed and innovated to replace existing ones. Such products are then marketed to existing customers. This often

happens with the automobile markets where existing models are updated or replaced and then marketed to existing customers.

Diversification

This is where completely new products are marketed to new customers. There are two types of diversification, namely related and unrelated diversification. Related diversification means that the company remains in a market or industry with which it is familiar. Unrelated diversification is where the company diversifies into an area where it has neither previous industry nor market experience.

2.5.5. Benchmarking

The process of benchmarking determines who is the very best, who sets the standards, and what the standard is. The objective is to evaluate and understand the current position in relation to best practises within or outside the organisation. The process consists of looking at how others achieve their performance levels and to understand the process they use with the aim of attaining or bettering them. Benchmarking is usually performed as part of a larger effort of process re-engineering or quality improvement (Reh, F. J About.com, 2004).

Benchmarking Plus, an Australian company specialising in benchmarking services, recently undertook a study (Benchmarkingplus.co.au, 2004) to benchmark the baked food manufacturing industry in Victoria. The study was initiated by the Victorian government after a company with a major market share went out of business. The closure of the company had raised concerns about the competitiveness and profitability of the sector of industry, and it was hoped that the study would provide an assessment of profitability and viability.

The study covered the following aspects:

- Profitability and growth in profitability
- Sales growth and mix
- Efficiency of resource utilisation
- Manufacturing complexity
- Level of product innovation
- Quality
- Cost management
- Financial stability
- People and risk management

Although the benefits of benchmarking have been experienced primarily by large businesses, the same principals can be applied to small businesses. Small businesses can save on research and development costs by learning from other R&D programs and the mistakes of other companies. Benchmarking puts the entrepreneur in the ideal position to innovate using the dormant inventions of other businesses.



2.5.6. Strategic Planning

Prahalad and Hamel (1994) state that the competition between competitors is one for industry foresight, where each competitor tries to establish their company as the intellectual leader in terms of influence and the direction and slope of the industry transformation. This industry foresight when attained, allows a business the potential to get to the future first and stake out a leadership position. It also allows the business to control the evolution of the industry and thus its own destiny.

It is important to realise that industry foresight is independent of market share, as a company with a small market share is capable of achieving industry foresight. Prahalad and Hamel state: *"Its not resources that are important, but resourcefulness"*.

Important to the success of any entrepreneurial strategy is the establishment of structure which will allow the company to implement its strategy and reach its goals. The strategic architecture is a high level blueprint for the deployment of new functionalities, the acquisition of new competencies, or the migration of existing competencies, and the reconfiguring of the interface with customers. The strategic architecture is not a detailed plan, but identifies major capabilities to be built. It does not, however, detail how they should or could be built. (Prahalad and Hamel, 1994).

In *Competing for the Future* (1994), the authors describe the competition between Komatsu and Caterpillar. When Caterpillar entered the Japanese market in the 1960's, a small company called Komatsu identified the major hurdles that would have to be overcome to regain its lost market share in Japan, and eventually become the market leader with a controlling share. Komatsu set about constructing a strategic architecture outlining the steps it would follow to beating Caterpillar. The strategy was named "Maru-C".

First, Komatsu had to improve the quality of its line of small bulldozers which formed the foundation of its business in Japan. Because this market was Komatsu's foundation, it had to be protected at all costs. Secondly, Komatsu had to intercept the technology used by Caterpillar in their line of bulldozers. Komatsu set up licensing agreements with Caterpillar's direct competitors, in an effort to short-cut the development process. The third step was to capture a significant share of Caterpillar's export market in order to gain the necessary volume to match their scale of manufacturing and R&D investment. The fourth step involved building up markets in countries which were neglected by Caterpillar, namely China and the Eastern Bloc countries. The fifth step was to expand the product line in anticipation of an all out assault on the sophisticated markets traditionally controlled by Caterpillar.

By the late 1990's, Komatsu had captured the world market for bulldozers and robots used in manufacturing plants.

Where the strategic architecture provides the direction for the entrepreneurial journey, the strategic intent provides the emotional and intellectual energy. Where strategic architecture details the major capabilities required for a company to reach its goals, a company's strategic intent creates the environment in which those requirements can be fulfilled. When British Airways was privatised in 1987, its strategic intent was to become the world's favourite airline. Eskom's strategic intent is to be the pre-eminent African energy and related services business, of global stature. The fact that both statements are not quantifiable, but rather qualitative is perhaps the most prominent attribute of the strategic intent. The strategic intent is a strategy designed to capture the imagination of a company's employees as much as any strategy designed to promote creativity and innovation.

2.5.7. Focusing on the Core Business

Zook and Allen (*Profit from the Core*, 2001) define the core business as; “ A set of products, capabilities, customers, channels, and geographies that defines the essence of what the company is or aspires to be, to achieve its growth mission, that is to grow its revenue sustainably and profitably. Zook and Allen, in *Profit from the core* (2001), advocate the focusing on the core business of a company, in any growth strategy. Their advocacy of this principle is based on research that concluded among other things, that:

- Most companies that sustain value creation possess only one or two strong cores.
- Private equity companies often achieve their greatest success by buying orphan business from large, diffuse conglomerates, thereby creating focus, and
- Spin-offs usually create both focus and value.

The strategies proposed by Zook and Allen are:

Differentiating for unique market power and influence, in which successful differentiation creates a lasting market power and influence over customers and competitors. The strategy is based upon the evidence of their research which suggests that sustained-growth companies achieve leadership in their core businesses by market share, and that average returns for companies with market shares less than 30% of their major competitors were 21.6 points lower than for companies with market shares of 200% of their major competitors. These companies create market power and influence by focusing on *customer retention and loyalty*, *channel dominance*; where a company dominates a certain type of procurement or distribution of goods and services, *product development differentiation*; primarily innovation based, and *capital capturing*; where a company establishes an extremely high market value, independent of market share and profit, in order to encourage investment.

Seeking the full potential of the strong core, in which a company refocuses on the *returns from core business*, emphasising higher targets, *influencing industry reinvestment*, maximising investment in research and development within the core business, and *influencing the extended industry profit pool*, the ability to shape the profit pool and to project its power and influence into attractive adjacent businesses.

2.6. Conclusion

The Literature Review examined the impact and effect of innovation, growth and strategy on the engineering entrepreneurship. The way in which these factors are incorporated into the formal entrepreneurial strategy was investigated with particular interest in Peter Drucker's four entrepreneurial strategies. Some of the tools used in determining the best entrepreneurial strategy were the Competitor Analysis, Porters Five Forces Model, Ansoff's Product/Market Matrix, Benchmarking, Strategic Planning and Focusing on the Core Business.

The information researched in the Literature Review demonstrates the importance of innovation, growth and strategy in the engineering entrepreneurship.

The material covered in the literature review will form the basis for the Experimental Planning covered in Chapter 3. The research design and development of the survey questions will be chosen according to the information and knowledge gained in the Literature Review.



Chapter 3 Experimental Planning

3.1. Introduction

The experimental program is set up to test the author's initial hypothesis that a large percentage of the entrepreneurial engineers undertaking new ventures, are not familiar with the concept of growth, innovation and strategy. The experimental program will also seek to validate or invalidate the information gathered from the literature review supporting the author's hypothesis.

The form of research design chosen for the experimental program is characterised and based upon the "Method of Data Collection" outlined in Cooper and Schindler: *Business Research Methods*, 7th Ed., 2001. The refined method is based upon a *Two Stage Design* incorporating a *Non probability, Convenience Sample*. The literature review of this research dissertation will be viewed by the author as the *Exploratory Section* of the *Two Stage Design*, as outlined by Cooper and Schindler.

The following work will attempt to outline the design philosophy of the research method chosen.

3.2. Research Design

3.2.1. Method of Data Collection

The type of data collection used in the sample design is the *interrogation/communication study*, in which the researcher questions the subjects and collects their responses by personal means. The questions take the form of an interview of the subject or respondent. The *communication* option was chosen as opposed to the *monitoring* option based on the hypothesis that the subjects may not necessarily be familiar

with or fully understand the concepts under discussion. In this instance the researcher/ interviewer explains and familiarises the subject with the topic of discussion.

3.2.2. Two Stage Design

The *Two Stage Design* consists of an exploratory section and an experimental section. The exploratory section is compiled of a study or review of secondary data consisting of published works on the research topic. The aim of the exploratory section is for the researcher to better understand, define and develop several hypothesis of possible causes associated with the topic.

3.2.3. Non Probability Sampling

The convenience sub-option of *Non Probability Sampling* was chosen because it represented the lower cost option, and it promised a greater speed of data collection. The hypothesis that the number of entrepreneurial engineers unfamiliar with the topic; suggests that the number of subjects would be high, and thus the requirement for the availability of subjects would be met. The accuracy of the population sample could be guaranteed due to the fact that the elements (entrepreneurial engineers) and the area of interest (new ventures) of the sample are well defined.

The *convenience* option also gives the researcher the freedom to choose whomever he finds (within the target population) to include in the sample population. The *population relevance* of the sample is high due to the specificity of the target population and the topic of interest. The parameter of interest with regard to the research is the percentage of the sampling population belonging to the *area of interest*; that is, being unfamiliar with the concepts of growth, innovation and strategy in business.

3.3. Development of survey questions

In the development of the survey questions, the information that was to be obtained first had to be defined. The main objective of the survey was first; to determine the familiarity of the subjects or respondents within the sample population with the topic, and secondly; whether they were implementing or had implemented any or all of the concepts. The purpose of the main objectives was to either prove or disprove the hypothesis generated from the literature review, that is; that entrepreneurial engineers were either unfamiliar with the concepts or did not implement them.

The secondary objective of the survey was to attempt to develop a population sociological-demographic from which conclusions could be drawn about the correlations between the subject and venture type characteristics, and the instances of familiarity and implementation. The conclusions hoped to be drawn were among others:

- subject age,
- technical experience,
- technical qualifications,
- business qualifications,
- venture type,
- venture age,
- industry,
- organisational structure,

and their likelihood of falling into a certain section of the population with regards to familiarity and implementation. The survey questions would be divided into three groups starting with administrative questions, classification questions and lastly, target questions.

The aim of the administrative questions was mainly to identify the subject and determine the suitability of the subject for the survey. The suitability of the subject was limited to determining whether the subject did in fact fall into the target population. Since the target population was well defined, it was noted that the probability of influencing or biasing the survey was

extremely small. The classification questions would obtain socio-demographic variables such as age and experience that would allow for the grouping of the subjects answers and responses in anticipation of drawing the conclusions discussed above. The target questions would address the investigative questions associated with the main objective of the survey.

The administrative questions were:

- a) What is your name?
- b) What are your technical qualifications?
- c) What is your main field of engineering?
- d) What is your experience in this specific field?

The classification questions were

- e) What is your business or management experience?
- f) What are your business or management qualifications?
- g) What is your business venture type?
- h) What is the field of industry of the venture?
- i) What is the venture organisation type?
- j) What is the approximate age of the venture?

The target questions were:

- k) Are you familiar with the concepts of promoting and using innovation in business to gain an advantage on competitors?
- l) Do you know of any instance where innovation was used to gain a business advantage?
- m) Are you familiar with any entrepreneurial strategies with regards to innovation?
- n) Have you implemented any strategies to encourage or promote innovation in the venture?

- o) Are you familiar with the concept of growth in business?
- p) Do you know of any instance where growth was used to gain a business advantage?
- q) Are you familiar with any entrepreneurial strategies with regards to growth?
- r) Have you implemented any strategies to encourage or promote growth in the venture?
- s) Are you familiar with business strategies?
- t) Do you have a business strategy at present?
- u) Are you aware that his business is operating under a strategy?
- v) Does the business venture have a company mission?
- w) Does the business venture have a strategic architecture?
- x) Does the business venture have a strategic intent?

The survey questionnaire will take the form of the following questionnaire presented in Table 3.3.1.



BUSINESS INNOVATION, GROWTH AND STRATEGY SURVEY			
	Question	Answer	
a	What is your name?		
b	What are your technical qualifications?		
C	What is your main field of engineering?		
D	What is your experience in this specific field?		
E	What is your business or management experience?		
F	What are your business or management qualifications?		
G	What is your business venture type?		
H	What is the field of industry of the venture?		
I	What is the venture organisation type?		
J	What is the approximate age of the venture?		
		YES	NO
K	Are you familiar with the concepts of promoting and using innovation in business to gain an advantage on competitors?		
L	Do you know of any instance where innovation was used to gain a business advantage?		
M	Are you familiar with any entrepreneurial strategies with regards to innovation?		
N	Have you implemented any strategies to encourage or promote innovation in the venture?		
O	Are you familiar with the concept of growth in business?		
P	Do you know of any instance where growth was used to gain a business advantage?		
Q	Are you familiar with any entrepreneurial strategies with regards to growth?		
R	Have you implemented any strategies to encourage or promote growth in the venture?		
S	Are you familiar with business strategies?		
T	Do you have a business strategy at present?		
U	Are you aware that his business is operating under a strategy?		
V	Does the business venture have a company mission?		
W	Does the business venture have a strategic architecture?		
X	Does the business venture have a strategic intent?		

Table 3.3.1: Survey Questionnaire

3.4. Analysis Planning

For each question falling under the target question section of the survey, a subject can either answer YES or NO.

For question k), a subject can answer YES if he is familiar with the concepts of innovation. The researcher can continue with questions l) to n). If the subject answers NO, the researcher can continue, but must not ask question m). The reasoning behind this logic is that a subject may not be familiar with the concept of innovation with regards to business practise, but may be aware of instances where innovation was used. The subject may have promoted innovation in his venture without a clear grasp of the concept of promoting innovation, thus question n) is asked. If the subject has answered NO to question k), it is logical to assume that he does not have knowledge of entrepreneurial strategies regarding innovation.

The questions regarding growth in business (questions o) to r)) use the same logic as applied to innovation.

The questions regarding business strategy (questions s) to x)) are viewed by the author as independent of each other, and thus the researcher continues asking the remaining questions whether the subject answers YES or NO.

Based upon the subject's answers with regard to innovation, growth and strategy, they will fall into two distinct groups for each area of interest; those who are familiar with the area of interest, and those who are not. Those who are familiar are classified as Group A elements. Those who are not familiar are classified as Group B elements. Thus there will exist a Group A and a Group B for each area of interest, namely innovation, growth and strategy.

For the areas of innovation and growth, Group A elements will be subdivided into smaller groups encompassing elements who are familiar and have knowledge of instances where the concept was applied to gain a business advantage, and those elements who are familiar, but don't have knowledge. Further sub groups will make up Group A elements who answer Yes or NO to the remaining questions. Group B elements will be subdivided according to the same logic with the exception of question m) and question q), as explained earlier.

For the area of business strategy, the subject's answers will simply be classified as a percentage of either Group A elements or Group B elements.

A **possible** survey result of five subjects could take the form of the following example,

Example survey result and analysis

	Subject				
	1	2	3	4	5
k	Y	Y	N	N	Y
l	N	N	Y	N	Y
m	Y	Y	-	-	N
n	Y	Y	Y	Y	N
o	Y	N	Y	N	Y
p	Y	N	Y	N	Y
q	N	N	Y	N	N
r	N	N	Y	Y	N
s	Y	Y	N	Y	Y
t	Y	Y	N	Y	N
u	Y	Y	N	Y	N
v	N	N	N	Y	Y
w	N	N	N	Y	Y
x	N	Y	Y	Y	Y

Table 3.4.1: Illustrative, example survey results.

Subjects 1 and 2 could be mechanical engineers with no business experience or qualifications, operating in the manufacturing industry. Subjects 3 and 4 could be civil engineers in the civil consulting industry

with business and management qualifications but no experience. Subject 5 could be an electrical engineer with business and management qualifications and experience, operating as a consultant for 3 years.

Analysis of this example sample result would reveal that,

	Group A	Group B
Innovation		
k	60	40
l	33	50
m	66	
n	66	100
Growth		
o	60	40
p	100	100
q	33	
r	33	50
Strategy		
s	80	20
t	75	0
u	75	0
v	50	0
w	50	0
x	75	100

Table 3.4.2: Processed illustrative results

Regarding innovation (For illustrative purposes only, this does not form part of experimental result):

- 60% of subjects surveyed were familiar with the concepts of innovation and thus made up Group A.
- 33% of subjects in Group A who were familiar with the concepts of innovation had knowledge of an instance where innovation was used to gain a business advantage.

- 66% of subjects in Group A were familiar with entrepreneurial strategies regarding innovation.
- 66% of subjects in Group A had implemented strategies to encourage or promote innovation.
- 40% of subjects surveyed were not familiar with the concepts of innovation, and thus made up Group B.
- 50% of subjects in Group B had knowledge of an instance where innovation was used to gain a business advantage.
- 100% of subjects in Group B had implemented strategies to promote or encourage innovation.

Analysing the result by examining subject characteristic would also reveal that:

- Mechanical and electrical engineers in the sample were more likely to be familiar with the concepts of innovation.
- Mechanical and civil engineers in the sample were more likely to have implemented strategies to encourage and promote innovation.
- Although electrical engineers in the sample were more likely to be familiar with the concept of innovation, they were least likely to be aware of entrepreneurial strategies and the least likely to implement strategies to encourage and promote innovation.

3.5 Summary

The experimental program was set up to test the author's initial hypothesis that a large percentage of the entrepreneurial engineers undertaking new ventures, are not familiar with the concept of growth, innovation and strategy.

The form of research design chosen for the experimental program is characterised and based upon the "Method of Data Collection" outlined in

Cooper and Schindler: *Business Research Methods*, 7th Ed., 2001. The refined method was based upon a *Two Stage Design* incorporating a *Non probability, Convenience Sample*. The literature review of this research dissertation will be viewed by the author as the *Exploratory Section* of the *Two Stage Design*, as outlined by Cooper and Schindler.

The type of data collection used in the sample design is the *interrogation/communication study*.

In *Chapter 4, Experimental Results of the Survey Sample*, the method outlined here will be used to analyse the results obtained from the survey.



Chapter 4 Experimental Results of Sample Survey

4.1. Introduction

The objective of the research experiment was to test the hypothesis set out in the introduction of this report and substantiated in the literature review. The hypothesis is that engineering entrepreneurs in general, are either not familiar with, or simply do not apply innovation, growth and business strategies. The sample population was planned to consist of between 25 and 30 subjects, but the actual sample consists of only 22 subjects. The difference between the planned and actual samples is due to the lower than expected number of subjects falling into the target population, and an error in the assumption on the availability to the author of subjects falling into the target population.

The information was obtained by means of a survey carried out in the form of an interview. The research design, survey questions and analysis planning have been detailed in *Chapter 3, Experimental Planning*.

The form of research design chosen for the experimental program is characterised and based upon the "Method of Data Collection" outlined in Cooper and Schindler: *Business Research Methods*, 7th Ed., 2001. The refined method was based upon a *Two Stage Design* incorporating a *Non probability, Convenience Sample*.

The type of data collection used in the sample design is the *interrogation/communication study*.

Some of the analysis results for the limited sample are presented in this chapter.

4.2. Summary of results

BUSINESS INNOVATION, GROWTH AND STRATEGY SURVEY		
	Question	Answer
a	Subject #1	
b	What are your technical qualifications?	B.Eng. (Electrical)
c	What is your main field of engineering?	Electrical Power Systems
d	What is your experience in this specific field?	9 years
e	What is your business or management experience?	2 Years management
f	What are your business or management qualifications?	None
g	What is your business venture type?	Demand side management
h	What is the field of industry of the venture?	Electrical industry
i	What is the venture organisation type?	Close corporation
j	What is the approximate age of the venture?	1 Year
		YES NO
k	Are you familiar with the concepts of promoting and using innovation in business to gain an advantage on competitors?	X
l	Do you know of any instance where innovation was used to gain a business advantage?	X
m	Are you familiar with any entrepreneurial strategies with regards to innovation?	
n	Have you implemented any strategies to encourage or promote innovation in the venture?	X
o	Are you familiar with the concept of growth in business?	X
p	Do you know of any instance where growth was used to gain a business advantage?	X
q	Are you familiar with any entrepreneurial strategies with regards to growth?	X
r	Have you implemented any strategies to encourage or promote growth in the venture?	X
s	Are you familiar with business strategies?	X
t	Do you have a business strategy at present?	X
u	Are you aware that his business is operating under a strategy?	X
v	Does the business venture have a company mission?	X
w	Does the business venture have a strategic architecture?	X
x	Does the business venture have a strategic intent?	X

Table 4.2.1: Survey questionnaire for subject #1

The processing of the results obtained from the completed survey questionnaires in Appendix 8.2 results in the data shown in Table 4.2.2.

	Group A	Group B
Innovation		
k	50	50
l	90	40
m	70	0
n	70	90
Growth		
o	50	50
p	60	10
q	20	20
r	30	20
Strategy		
s	75	25
t	80	100
u	87	60
v	33	80
w	60	20
x	67	40

Table 4.2.2: Processed raw data from Appendix 8.2

Table 4.2.2 was generated using a Microsoft Excel spreadsheet. Row “k”, “o” and ‘s” correspond to the percentage of subjects who answered “yes” for Group A and “no” for Group B respectively. 50% of subjects answered yes to question “k” and 75% of subjects answered yes for question “s”. Questions “l” to “n” refer to the percentage of subjects from either Group A or Group B who answered “yes”. Analysis of Table 4.2.2. illustrates the following findings:

Regarding innovation

- k. 50% of subjects were familiar with the concept of using innovation to gain a business advantage, (Group A).
- l. These subjects were more likely (90%) to have knowledge of successful application of innovation than Group B subjects,
- m. were more likely (70%) to be familiar with entrepreneurial strategies regarding innovation, and

- n. were more likely (70%) to have implemented strategies to encourage or promote innovation in their own business ventures.

Group B subjects were less likely to know of any instance where innovation was used, and were less likely to be familiar with strategies regarding innovation. Group B subjects were however more likely (90%) to have implemented strategies regarding innovation in their businesses once made aware of the concept of innovation.

Regarding growth:

- o. 50% of subjects were familiar with the concept of using growth of a business to gain a business advantage, (Group A).
- p. These subjects were more likely (60%) to have knowledge of successful application of the concept,
- q. were less likely (20%) of being familiar with entrepreneurial strategies regarding growth, and
- r. were less likely (30%) to have implemented the concept of growth in their business ventures.

Group B subjects were less likely to know of any instance where growth was used, were less likely to be familiar with strategies regarding growth, were less likely to be familiar with entrepreneurial strategies regarding growth, and were less likely to have implemented growth strategies in their businesses, even when made aware of the concept of growth.

Regarding business strategies:

- s. 75% of subjects were familiar with business strategies, (Group A),
- t. and were more likely (80%) to have business strategies for their own ventures.
- v. These subjects were less likely (33%) to have company missions,
- w. but were more likely (60%) to have strategic architectures, and
- x. strategic intents (67%) for their ventures.

Group A were more likely to have business strategies and thus would obviously be aware of their strategies.

Group B subjects were more likely (100%) to have business strategies in place even though they were not familiar with formal strategies, were more likely (80%) to have company missions, were less likely (20%) to have strategic architecture in place, and were less likely (40%) to have strategic intents.

No correlation could be identified between the field of engineering or the field of business, and the likelihood of familiarity with the concepts. Engineers who had business and management experience prior to starting their business ventures were more likely to be familiar with the concepts, but no more likely to implement them than engineers without prior experience.

4.3 Discussion of Results



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The survey result indicates that subjects who were familiar with the concepts of innovation growth and strategy were more likely to have knowledge of the successful implementation of the concept and were more likely to have implemented strategies to encourage innovation, growth and develop strategies in their own ventures, than those who were not familiar with the concepts.

Those subjects who were not familiar with the concepts still managed to implement some strategies even though they were not aware of it. However, the literature study indicates that those subjects who analysed the environment they were operating in. and then consciously implemented strategies, would be more successful than those who implemented strategies without understanding either.

Field of engineering or business could not be correlated to any pattern of answers. Prior management or business experience of subjects favoured familiarity with the concepts in question.

4.4 Summary

An experimental survey was carried out on a sample of twenty subjects to prove or disprove the hypothesis that engineers were either not familiar with the concepts of innovation, growth and strategy regarding the business ventures, or simply did not apply them. The result indicated that the sample subjects were equally likely to be familiar or not familiar with the concepts of innovation and growth, and were more likely to be familiar with the concepts of strategy. The subjects who were familiar with the concepts, were more likely to have knowledge of or implemented the concepts than their counterparts who were not familiar. The sample survey result proves the hypothesis set out in the beginning of the experiment.

In *Chapter 5, Conclusions and Recommendations*, conclusions will be drawn regarding the experiment and literature study carried out. Recommendations will also be made regarding further research on this topic.

Chapter 5 Conclusions and Recommendations

5.1. Introduction

After establishing a new business venture, the focus of the entrepreneur quickly changes to survival, sustainability and growth of the business. Some ventures succeed while others fail, regardless of business and economic environment. The hypothesis of this research report is that many entrepreneurs, especially engineering entrepreneurs in relatively new ventures, are not familiar with the concepts which are very important to the success of the new venture, or simply don't apply the concepts. The concepts researched in the report are innovation and strategy in business.

The purpose of the research dissertation was to investigate and test the hypothesis by means of a literature study and survey of a representative sample. The literature study revealed that companies employing and promoting the concepts of innovation, growth and strategy, were more likely to succeed in the modern economy, in gaining large or controlling market share, and increasing returns with sustained growth.

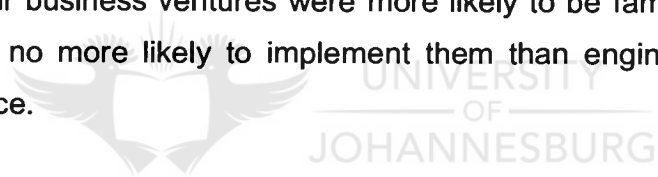
The scope of the research dissertation was limited to establishing the need for the concepts of innovation, growth and strategy in business. The mechanisms of the entrepreneurial strategies that utilise these concepts were explained using examples obtained from research sources.

The initial hypothesis and information obtain from the literature review was tested by means of a sample survey of engineering entrepreneurs currently involved in new ventures. The experimental planning and data collection was carried out according to methods outlined in Cooper and Schindler: *Business Research Methods*, 7th Ed., 2001.

5.2. Findings

The results of the survey carried out indicate that sampled entrepreneurial engineers have an equal chance of being familiar or not familiar with the concepts of innovation and growth. Those who were familiar with the concepts were more likely to be familiar with entrepreneurial strategies regarding the concepts and to implement the strategies. Entrepreneurial engineers were more likely to be familiar with business strategies, and those who were familiar, were more likely to have strategic architecture and intents, but less likely to have company missions than those who were not familiar.

There appeared to be no correlation between the field of engineering or the field of business, and the likelihood of familiarity with the concepts. However, engineers who had business and management experience prior to starting their business ventures were more likely to be familiar with the concepts, but no more likely to implement them than engineers without prior experience.



5.3. Concluding Remarks

The literature review and the survey carried out agree (at least quantifiably with the sample addressed) with the initial hypothesis that entrepreneurial engineers starting relatively new business ventures either were not familiar with the concepts of innovation, growth and strategy, or simply did not apply them. However the agreement between the survey results, and the hypothesis and literature review, are not to the extent that was originally expected. This can be reviewed in further research on the subject.

5.4 Recommendations

The level of agreement between the survey result and the literature study should be investigated further. Further research on the subject with an

expanded sample size would prove valuable in validating or contradicting the experimental data gathered in this report.



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Chapter 8 Appendices

8.1. Raw Tabulated Experimental Data	Page 58
8.2. Survey Questionnaires	Page 60
8.3. List of Figures	Page 81
8.4. List of Tables	Page 81





8.1 Raw Tabulated Experimental Data

OF
JOHANNESBURG

8.1 Raw Tabulated Experimental Data

	Subject																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
k	N	Y	Y	N	Y	Y	Y	N	N	N	Y	N	N	Y	N	Y	Y	Y	N	N
l	N	N	Y	N	Y	Y	Y	Y	Y	N	N	N	N	Y	N	Y	Y	Y	Y	Y
m		Y	Y		N	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	Y	Y	Y	Y
n	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	N	Y	N	Y	Y	Y	Y
o	Y	Y	Y	N	Y	Y	N	N	N	Y	Y	Y	N	N	N	Y	Y	Y	N	N
p	N	N	Y	N	Y	Y	N	N	N	N	Y	N	N	Y	N	Y	Y	Y	N	N
q	N	Y	Y	N	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	N	N
r	N	N	N	Y	N	Y	N	N	N	N	N	Y	N	N	Y	N	Y	N	N	N
s	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y
t	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y
u	N	Y	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
v	N	N	Y	N	Y	Y	Y	N	N	N	Y	N	N	Y	N	Y	Y	Y	N	N
w	N	N	N	Y	Y	Y	N	N	Y	Y	N	N	N	Y	Y	Y	Y	N	N	Y
x	N	Y	Y	N	Y	N	N	Y	Y	Y	Y	N	Y	Y	N	Y	N	N	Y	Y

Table 8.1. Tabulation of results obtained from the survey.



10.2 Survey Questionnaires
OF
JOHANNESBURG

BUSINESS INNOVATION, GROWTH AND STRATEGY SURVEY

Question		Answer	
a	Subject #1		
b	What are your technical qualifications? B.Engineering (Electrical)		
c	What is your main field of engineering? Electrical Power Systems		
d	What is your experience in this specific field? 9 years		
e	What is your business or management experience? 2 Years management		
f	What are your business or management qualifications? None		
g	What is your business venture type? Demand side management		
h	What is the field of industry of the venture? Electrical industry		
i	What is the venture organisation type? Close corporation		
j	What is the approximate age of the venture? 1 Year		
		YES	NO
k	Are you familiar with the concepts of promoting and using innovation in business to gain an advantage on competitors?		x
l	Do you know of any instance where innovation was used to gain a business advantage?		x
m	Are you familiar with any entrepreneurial strategies with regards to innovation?		
n	Have you implemented any strategies to encourage or promote innovation in the venture?	x	
o	Are you familiar with the concept of growth in business?	x	
p	Do you know of any instance where growth was used to gain a business advantage?		x
q	Are you familiar with any entrepreneurial strategies with regards to growth?		x
r	Have you implemented any strategies to encourage or promote growth in the venture?		x
s	Are you familiar with business strategies?		x
t	Do you have a business strategy at present?	x	
u	Are you aware that his business is operating under a strategy?		x
v	Does the business venture have a company mission?		x
w	Does the business venture have a strategic architecture?		x
x	Does the business venture have a strategic intent?		x

BUSINESS INNOVATION, GROWTH AND STRATEGY SURVEY

Question		Answer	
a	Subject #2		
b	What are your technical qualifications? M.SC (Civil)		
c	What is your main field of engineering? Civil Engineering		
d	What is your experience in this specific field? 1 years		
e	What is your business or management experience? 2 Years management		
f	What are your business or management qualifications? M.Eng		
g	What is your business venture type? Sheiving Installation		
h	What is the field of industry of the venture? Home Improvement		
i	What is the venture organisation type? Sole Propriety		
j	What is the approximate age of the venture? 3 Years		
		YES	NO
k	Are you familiar with the concepts of promoting and using innovation in business to gain an advantage on competitors?		x
l	Do you know of any instance where innovation was used to gain a business advantage?	x	
m	Are you familiar with any entrepreneurial strategies with regards to innovation?		
n	Have you implemented any strategies to encourage or promote innovation in the venture?	x	
o	Are you familiar with the concept of growth in business?		x
p	Do you know of any instance where growth was used to gain a business advantage?		x
q	Are you familiar with any entrepreneurial strategies with regards to growth?		x
r	Have you implemented any strategies to encourage or promote growth in the venture?		x
s	Are you familiar with business strategies?	x	
t	Do you have a business strategy at present?	x	
u	Are you aware that his business is operating under a strategy?	x	
v	Does the business venture have a company mission?		x
w	Does the business venture have a strategic architecture?	x	
x	Does the business venture have a strategic intent?	x	

BUSINESS INNOVATION, GROWTH AND STRATEGY SURVEY

Question		Answer	
a	Subject #3		
b	What are your technical qualifications? B.Eng (Electrical), M.Sc. (Civil Design)		
c	What is your main field of engineering? Civil And Building		
d	What is your experience in this specific field? 11 years		
e	What is your business or management experience? 2 Years management		
f	What are your business or management qualifications? None		
g	What is your business venture type? Civil Design Consulting		
h	What is the field of industry of the venture? Building Industry		
i	What is the venture organisation type? Close corporation		
j	What is the approximate age of the venture? 3 Years		
		YES	NO
k	Are you familiar with the concepts of promoting and using innovation in business to gain an advantage on competitors?	x	
l	Do you know of any instance where innovation was used to gain a business advantage?		x
m	Are you familiar with any entrepreneurial strategies with regards to innovation?	x	
n	Have you implemented any strategies to encourage or promote innovation in the venture?	x	
o	Are you familiar with the concept of growth in business?	x	
p	Do you know of any instance where growth was used to gain a business advantage?		x
q	Are you familiar with any entrepreneurial strategies with regards to growth?	x	
r	Have you implemented any strategies to encourage or promote growth in the venture?		x
s	Are you familiar with business strategies?	x	
t	Do you have a business strategy at present?	x	
u	Are you aware that his business is operating under a strategy?	x	
v	Does the business venture have a company mission?		x
w	Does the business venture have a strategic architecture?		x
x	Does the business venture have a strategic intent?	x	

BUSINESS INNOVATION, GROWTH AND STRATEGY SURVEY

Question		Answer	
a	Subject #4		
b	What are your technical qualifications? B.Tech (Mechanical Engineering)		
c	What is your main field of engineering? Water Supply		
d	What is your experience in this specific field? 12 years		
e	What is your business or management experience? None		
f	What are your business or management qualifications? None		
g	What is your business venture type? Town House Rental		
h	What is the field of industry of the venture? Real Estate		
i	What is the venture organisation type? Sole Propriety		
j	What is the approximate age of the venture? 2 Years		
		YES	NO
k	Are you familiar with the concepts of promoting and using innovation in business to gain an advantage on competitors?		x
l	Do you know of any instance where innovation was used to gain a business advantage?		x
m	Are you familiar with any entrepreneurial strategies with regards to innovation?		
n	Have you implemented any strategies to encourage or promote innovation in the venture?		x
o	Are you familiar with the concept of growth in business?	x	
p	Do you know of any instance where growth was used to gain a business advantage?		x
q	Are you familiar with any entrepreneurial strategies with regards to growth?		x
r	Have you implemented any strategies to encourage or promote growth in the venture?		x
s	Are you familiar with business strategies?	x	
t	Do you have a business strategy at present?	x	
u	Are you aware that his business is operating under a strategy?	x	
v	Does the business venture have a company mission?		x
w	Does the business venture have a strategic architecture?		x
x	Does the business venture have a strategic intent?	x	

BUSINESS INNOVATION, GROWTH AND STRATEGY SURVEY

Question		Answer	
a	Subject #5		
b	What are your technical qualifications? B.Engineering (Mechanical)		
c	What is your main field of engineering? Mechanical Design		
d	What is your experience in this specific field? 6 years		
e	What is your business or management experience? 2 Years management		
f	What are your business or management qualifications? None		
g	What is your business venture type? Insurance		
h	What is the field of industry of the venture? Non Engineering		
i	What is the venture organisation type? Close corporation		
j	What is the approximate age of the venture? 1 Year		
		YES	NO
k	Are you familiar with the concepts of promoting and using innovation in business to gain an advantage on competitors?	x	
l	Do you know of any instance where innovation was used to gain a business advantage?	x	
m	Are you familiar with any entrepreneurial strategies with regards to innovation?	x	
n	Have you implemented any strategies to encourage or promote innovation in the venture?	x	
o	Are you familiar with the concept of growth in business?	x	
p	Do you know of any instance where growth was used to gain a business advantage?	x	
q	Are you familiar with any entrepreneurial strategies with regards to growth?	x	
r	Have you implemented any strategies to encourage or promote growth in the venture?	x	
s	Are you familiar with business strategies?	x	
t	Do you have a business strategy at present?	x	
u	Are you aware that his business is operating under a strategy?		x
v	Does the business venture have a company mission?	x	
w	Does the business venture have a strategic architecture?		x
x	Does the business venture have a strategic intent?	x	

BUSINESS INNOVATION, GROWTH AND STRATEGY SURVEY

Question		Answer	
a	Subject #6		
b	What are your technical qualifications? B.Engineering (civil)		
c	What is your main field of engineering? Civil Construction		
d	What is your experience in this specific field? 6 years		
e	What is your business or management experience? None		
f	What are your business or management qualifications? P.B.L.		
g	What is your business venture type? Civil Consulting		
h	What is the field of industry of the venture? Civil and Building		
i	What is the venture organisation type? Sole Propriety		
j	What is the approximate age of the venture? 2 Years		
		YES	NO
k	Are you familiar with the concepts of promoting and using innovation in business to gain an advantage on competitors?		x
l	Do you know of any instance where innovation was used to gain a business advantage?		x
m	Are you familiar with any entrepreneurial strategies with regards to innovation?		
n	Have you implemented any strategies to encourage or promote innovation in the venture?	x	
o	Are you familiar with the concept of growth in business?		x
p	Do you know of any instance where growth was used to gain a business advantage?		x
q	Are you familiar with any entrepreneurial strategies with regards to growth?		x
r	Have you implemented any strategies to encourage or promote growth in the venture?	x	
s	Are you familiar with business strategies?	x	
t	Do you have a business strategy at present?	x	
u	Are you aware that his business is operating under a strategy?	x	
v	Does the business venture have a company mission?		x
w	Does the business venture have a strategic architecture?	x	
x	Does the business venture have a strategic intent?		x

BUSINESS INNOVATION, GROWTH AND STRATEGY SURVEY

Question		Answer	
a	Subject #7		
b	What are your technical qualifications? B.Engineering (Mechanical)		
c	What is your main field of engineering? Civil Construction		
d	What is your experience in this specific field? 4 years		
e	What is your business or management experience? 4 Years management		
f	What are your business or management qualifications? None		
g	What is your business venture type? Civil Contracting		
h	What is the field of industry of the venture? Telecoms and Water		
i	What is the venture organisation type? Partnership		
j	What is the approximate age of the venture? 6 Year		
		YES	NO
k	Are you familiar with the concepts of promoting and using innovation in business to gain an advantage on competitors?	x	
l	Do you know of any instance where innovation was used to gain a business advantage?	x	
m	Are you familiar with any entrepreneurial strategies with regards to innovation?		x
n	Have you implemented any strategies to encourage or promote innovation in the venture?		x
o	Are you familiar with the concept of growth in business?	x	
p	Do you know of any instance where growth was used to gain a business advantage?	x	
q	Are you familiar with any entrepreneurial strategies with regards to growth?		x
r	Have you implemented any strategies to encourage or promote growth in the venture?		x
s	Are you familiar with business strategies?	x	
t	Do you have a business strategy at present?		x
u	Are you aware that his business is operating under a strategy?		x
v	Does the business venture have a company mission?	x	
w	Does the business venture have a strategic architecture?	x	
x	Does the business venture have a strategic intent?	x	

BUSINESS INNOVATION, GROWTH AND STRATEGY SURVEY

Question		Answer	
a	Subject #8		
b	What are your technical qualifications? B.Tech (Quantity Surveying)		
c	What is your main field of engineering? Civil		
d	What is your experience in this specific field? 7 years		
e	What is your business or management experience? 2 Years management		
f	What are your business or management qualifications? P.B.L.		
g	What is your business venture type? Civil Consulting		
h	What is the field of industry of the venture? Civil Consulting		
i	What is the venture organisation type? Close corporation		
j	What is the approximate age of the venture? 2 Years		
		YES	NO
k	Are you familiar with the concepts of promoting and using innovation in business to gain an advantage on competitors?	x	
l	Do you know of any instance where innovation was used to gain a business advantage?	x	
m	Are you familiar with any entrepreneurial strategies with regards to innovation?	x	
n	Have you implemented any strategies to encourage or promote innovation in the venture?	x	
o	Are you familiar with the concept of growth in business?	x	
p	Do you know of any instance where growth was used to gain a business advantage?	x	
q	Are you familiar with any entrepreneurial strategies with regards to growth?	x	
r	Have you implemented any strategies to encourage or promote growth in the venture?		x
s	Are you familiar with business strategies?	x	
t	Do you have a business strategy at present?	x	
u	Are you aware that his business is operating under a strategy?	x	
v	Does the business venture have a company mission?	x	
w	Does the business venture have a strategic architecture?	x	
x	Does the business venture have a strategic intent?		x

BUSINESS INNOVATION, GROWTH AND STRATEGY SURVEY

Question		Answer	
a	Subject #9		
b	What are your technical qualifications? B.Engineering (Electrical)		
c	What is your main field of engineering? ElectricalEngineering		
d	What is your experience in this specific field? 4 years		
e	What is your business or management experience? None		
f	What are your business or management qualifications? None		
g	What is your business venture type? Electrical Consulting		
h	What is the field of industry of the venture? Electrical industry		
i	What is the venture organisation type? Close corporation		
j	What is the approximate age of the venture? 1 Year		
		YES	NO
k	Are you familiar with the concepts of promoting and using innovation in business to gain an advantage on competitors?	x	
l	Do you know of any instance where innovation was used to gain a business advantage?	x	
m	Are you familiar with any entrepreneurial strategies with regards to innovation?	x	
n	Have you implemented any strategies to encourage or promote innovation in the venture?	x	
o	Are you familiar with the concept of growth in business?		x
p	Do you know of any instance where growth was used to gain a business advantage?		x
q	Are you familiar with any entrepreneurial strategies with regards to growth?		x
r	Have you implemented any strategies to encourage or promote growth in the venture?		x
s	Are you familiar with business strategies?		x
t	Do you have a business strategy at present?	x	
u	Are you aware that his business is operating under a strategy?	x	
v	Does the business venture have a company mission?	x	
w	Does the business venture have a strategic architecture?		x
x	Does the business venture have a strategic intent?		x

BUSINESS INNOVATION, GROWTH AND STRATEGY SURVEY

Question		Answer	
a	Subject #10		
b	What are your technical qualifications? B.Tech (Mech)		
c	What is your main field of engineering? Mechanical Maintenance		
d	What is your experience in this specific field? 7 years		
e	What is your business or management experience? 2 Years management		
f	What are your business or management qualifications? None		
g	What is your business venture type? Mechanical Contracting		
h	What is the field of industry of the venture? Electricity industry		
i	What is the venture organisation type? PTY LTD		
j	What is the approximate age of the venture? 3 Year		
		YES	NO
k	Are you familiar with the concepts of promoting and using innovation in business to gain an advantage on competitors?		x
l	Do you know of any instance where innovation was used to gain a business advantage?	x	
m	Are you familiar with any entrepreneurial strategies with regards to innovation?		
n	Have you implemented any strategies to encourage or promote innovation in the venture?	x	
o	Are you familiar with the concept of growth in business?		x
p	Do you know of any instance where growth was used to gain a business advantage?		x
q	Are you familiar with any entrepreneurial strategies with regards to growth?		x
r	Have you implemented any strategies to encourage or promote growth in the venture?		x
s	Are you familiar with business strategies?	x	
t	Do you have a business strategy at present?	x	
u	Are you aware that his business is operating under a strategy?	x	
v	Does the business venture have a company mission?		x
w	Does the business venture have a strategic architecture?		x
x	Does the business venture have a strategic intent?	x	

BUSINESS INNOVATION, GROWTH AND STRATEGY SURVEY

Question		Answer	
a	Subject #11		
b	What are your technical qualifications? B.Engineering (Chem Eng)		
c	What is your main field of engineering? Environmental Protection		
d	What is your experience in this specific field? 4 years		
e	What is your business or management experience? 2 Years management		
f	What are your business or management qualifications? None		
g	What is your business venture type? Catering		
h	What is the field of industry of the venture? Catering		
i	What is the venture organisation type? Partnership		
j	What is the approximate age of the venture? 3 Year		
		YES	NO
k	Are you familiar with the concepts of promoting and using innovation in business to gain an advantage on competitors?	x	
l	Do you know of any instance where innovation was used to gain a business advantage?	x	
m	Are you familiar with any entrepreneurial strategies with regards to innovation?	x	
n	Have you implemented any strategies to encourage or promote innovation in the venture?	x	
o	Are you familiar with the concept of growth in business?	x	
p	Do you know of any instance where growth was used to gain a business advantage?	x	
q	Are you familiar with any entrepreneurial strategies with regards to growth?		x
r	Have you implemented any strategies to encourage or promote growth in the venture?		x
s	Are you familiar with business strategies?	x	
t	Do you have a business strategy at present?	x	
u	Are you aware that his business is operating under a strategy?	x	
v	Does the business venture have a company mission?	x	
w	Does the business venture have a strategic architecture?	x	
x	Does the business venture have a strategic intent?	x	

BUSINESS INNOVATION, GROWTH AND STRATEGY SURVEY

Question		Answer	
a	Subject #12		
b	What are your technical qualifications? B.Engineering (Electromechanical)		
c	What is your main field of engineering? Power Production		
d	What is your experience in this specific field? 7 years		
e	What is your business or management experience? 2 Years management		
f	What are your business or management qualifications? Project Management		
g	What is your business venture type? Manufacturing		
h	What is the field of industry of the venture? Agriculture		
i	What is the venture organisation type? Partnership		
j	What is the approximate age of the venture? 2 Year		
		YES	NO
k	Are you familiar with the concepts of promoting and using innovation in business to gain an advantage on competitors?		x
l	Do you know of any instance where innovation was used to gain a business advantage?	x	
m	Are you familiar with any entrepreneurial strategies with regards to innovation?		
n	Have you implemented any strategies to encourage or promote innovation in the venture?	x	
o	Are you familiar with the concept of growth in business?		x
p	Do you know of any instance where growth was used to gain a business advantage?		x
q	Are you familiar with any entrepreneurial strategies with regards to growth?		x
r	Have you implemented any strategies to encourage or promote growth in the venture?		x
s	Are you familiar with business strategies?	x	
t	Do you have a business strategy at present?	x	
u	Are you aware that his business is operating under a strategy?	x	
v	Does the business venture have a company mission?		x
w	Does the business venture have a strategic architecture?	x	
x	Does the business venture have a strategic intent?	x	

BUSINESS INNOVATION, GROWTH AND STRATEGY SURVEY

Question		Answer	
a	Subject #13		
b	What are your technical qualifications? B.Engineering (Civil)		
c	What is your main field of engineering? Civil Design		
d	What is your experience in this specific field? 5 years		
e	What is your business or management experience? Project management		
f	What are your business or management qualifications? None		
g	What is your business venture type? Auto Valet		
h	What is the field of industry of the venture? Auto industry		
i	What is the venture organisation type? Partnership		
j	What is the approximate age of the venture? 1 Year		
		YES	NO
k	Are you familiar with the concepts of promoting and using innovation in business to gain an advantage on competitors?		x
l	Do you know of any instance where innovation was used to gain a business advantage?	x	
m	Are you familiar with any entrepreneurial strategies with regards to innovation?		
n	Have you implemented any strategies to encourage or promote innovation in the venture?	x	
o	Are you familiar with the concept of growth in business?		x
p	Do you know of any instance where growth was used to gain a business advantage?		x
q	Are you familiar with any entrepreneurial strategies with regards to growth?		x
r	Have you implemented any strategies to encourage or promote growth in the venture?		x
s	Are you familiar with business strategies?	x	
t	Do you have a business strategy at present?	x	
u	Are you aware that his business is operating under a strategy?	x	
v	Does the business venture have a company mission?		x
w	Does the business venture have a strategic architecture?		x
x	Does the business venture have a strategic intent?	x	

BUSINESS INNOVATION, GROWTH AND STRATEGY SURVEY

Question		Answer	
a	Subject #14		
b	What are your technical qualifications? B.Engineering (Chemical)		
c	What is your main field of engineering? Chemical Engineering		
d	What is your experience in this specific field? 4 years		
e	What is your business or management experience? None		
f	What are your business or management qualifications? Engineering Management		
g	What is your business venture type? Chicken Licken Outlet		
h	What is the field of industry of the venture? Fast Food		
i	What is the venture organisation type? Partnership		
j	What is the approximate age of the venture? 3 Year		
		YES	NO
k	Are you familiar with the concepts of promoting and using innovation in business to gain an advantage on competitors?	x	
l	Do you know of any instance where innovation was used to gain a business advantage?	x	
m	Are you familiar with any entrepreneurial strategies with regards to innovation?	x	
n	Have you implemented any strategies to encourage or promote innovation in the venture?	x	
o	Are you familiar with the concept of growth in business?		x
p	Do you know of any instance where growth was used to gain a business advantage?		x
q	Are you familiar with any entrepreneurial strategies with regards to growth?		x
r	Have you implemented any strategies to encourage or promote growth in the venture?		x
s	Are you familiar with business strategies?		x
t	Do you have a business strategy at present?	x	
u	Are you aware that his business is operating under a strategy?	x	
v	Does the business venture have a company mission?	x	
w	Does the business venture have a strategic architecture?		x
x	Does the business venture have a strategic intent?		x

BUSINESS INNOVATION, GROWTH AND STRATEGY SURVEY

Question		Answer	
a	Subject #15		
b	What are your technical qualifications? B.Engineering (Mechanical)		
c	What is your main field of engineering? Mechanical Maintenance		
d	What is your experience in this specific field? 5 years		
e	What is your business or management experience? 2 Years management		
f	What are your business or management qualifications? Management Courses		
g	What is your business venture type? Fruit and Beg Retail		
h	What is the field of industry of the venture? Retail		
i	What is the venture organisation type? Partnership		
j	What is the approximate age of the venture? 4 Year		
		YES	NO
k	Are you familiar with the concepts of promoting and using innovation in business to gain an advantage on competitors?	x	
l	Do you know of any instance where innovation was used to gain a business advantage?	x	
m	Are you familiar with any entrepreneurial strategies with regards to innovation?	x	
n	Have you implemented any strategies to encourage or promote innovation in the venture?	x	
o	Are you familiar with the concept of growth in business?	x	
p	Do you know of any instance where growth was used to gain a business advantage?		x
q	Are you familiar with any entrepreneurial strategies with regards to growth?	x	
r	Have you implemented any strategies to encourage or promote growth in the venture?	x	
s	Are you familiar with business strategies?	x	
t	Do you have a business strategy at present?	x	
u	Are you aware that his business is operating under a strategy?	x	
v	Does the business venture have a company mission?	x	
w	Does the business venture have a strategic architecture?	x	
x	Does the business venture have a strategic intent?	x	

BUSINESS INNOVATION, GROWTH AND STRATEGY SURVEY

Question		Answer	
a	Subject #16		
b	What are your technical qualifications? B.Tech (Mech)		
c	What is your main field of engineering? Mechanical		
d	What is your experience in this specific field? 8 years		
e	What is your business or management experience? Project management		
f	What are your business or management qualifications? None		
g	What is your business venture type? Taxis		
h	What is the field of industry of the venture? Public Transport		
i	What is the venture organisation type? Close corporation		
j	What is the approximate age of the venture? 3 Year		
		YES	NO
k	Are you familiar with the concepts of promoting and using innovation in business to gain an advantage on competitors?	x	
l	Do you know of any instance where innovation was used to gain a business advantage?	x	
m	Are you familiar with any entrepreneurial strategies with regards to innovation?		x
n	Have you implemented any strategies to encourage or promote innovation in the venture?		x
o	Are you familiar with the concept of growth in business?	x	
p	Do you know of any instance where growth was used to gain a business advantage?	x	
q	Are you familiar with any entrepreneurial strategies with regards to growth?		x
r	Have you implemented any strategies to encourage or promote growth in the venture?		x
s	Are you familiar with business strategies?	x	
t	Do you have a business strategy at present?		x
u	Are you aware that his business is operating under a strategy?		x
v	Does the business venture have a company mission?	x	
w	Does the business venture have a strategic architecture?	x	
x	Does the business venture have a strategic intent?	x	

BUSINESS INNOVATION, GROWTH AND STRATEGY SURVEY

Question		Answer	
a	Subject #17		
b	What are your technical qualifications? B.Engineering (Civil)		
c	What is your main field of engineering? Civil Engineering		
d	What is your experience in this specific field? 4 years		
e	What is your business or management experience? None		
f	What are your business or management qualifications? None		
g	What is your business venture type? Flat Rental		
h	What is the field of industry of the venture? Real Estate		
i	What is the venture organisation type? Sole Propriety		
j	What is the approximate age of the venture? 2 Year		
		YES	NO
k	Are you familiar with the concepts of promoting and using innovation in business to gain an advantage on competitors?		x
l	Do you know of any instance where innovation was used to gain a business advantage?		x
m	Are you familiar with any entrepreneurial strategies with regards to innovation?		
n	Have you implemented any strategies to encourage or promote innovation in the venture?	x	
o	Are you familiar with the concept of growth in business?	x	
p	Do you know of any instance where growth was used to gain a business advantage?		x
q	Are you familiar with any entrepreneurial strategies with regards to growth?	x	
r	Have you implemented any strategies to encourage or promote growth in the venture?	x	
s	Are you familiar with business strategies?	x	
t	Do you have a business strategy at present?		x
u	Are you aware that his business is operating under a strategy?	x	
v	Does the business venture have a company mission?		x
w	Does the business venture have a strategic architecture?		x
x	Does the business venture have a strategic intent?		x

BUSINESS INNOVATION, GROWTH AND STRATEGY SURVEY

Question		Answer	
a	Subject #18		
b	What are your technical qualifications? B.Engineering (Electrical)		
c	What is your main field of engineering? Electrical Heavy Current		
d	What is your experience in this specific field? 5 years		
e	What is your business or management experience? 1 Years management		
f	What are your business or management qualifications? None		
g	What is your business venture type?		
h	What is the field of industry of the venture?		
i	What is the venture organisation type?		
j	What is the approximate age of the venture?		
		YES	NO
k	Are you familiar with the concepts of promoting and using innovation in business to gain an advantage on competitors?		x
l	Do you know of any instance where innovation was used to gain a business advantage?		x
m	Are you familiar with any entrepreneurial strategies with regards to innovation?		
n	Have you implemented any strategies to encourage or promote innovation in the venture?	x	
o	Are you familiar with the concept of growth in business?		x
p	Do you know of any instance where growth was used to gain a business advantage?		x
q	Are you familiar with any entrepreneurial strategies with regards to growth?	x	
r	Have you implemented any strategies to encourage or promote growth in the venture?		x
s	Are you familiar with business strategies?	x	
t	Do you have a business strategy at present?	x	
u	Are you aware that his business is operating under a strategy?	x	
v	Does the business venture have a company mission?		x
w	Does the business venture have a strategic architecture?		x
x	Does the business venture have a strategic intent?	x	

BUSINESS INNOVATION, GROWTH AND STRATEGY SURVEY

Question		Answer	
a	Subject #19		
b	What are your technical qualifications? B.Engineering (Civil)		
c	What is your main field of engineering? Civil Engineering		
d	What is your experience in this specific field? 3 years		
e	What is your business or management experience? None		
f	What are your business or management qualifications? G.D.E.		
g	What is your business venture type? Consulting		
h	What is the field of industry of the venture? Construction / Environmental		
i	What is the venture organisation type? Close corporation		
j	What is the approximate age of the venture? 1 Year		
		YES	NO
k	Are you familiar with the concepts of promoting and using innovation in business to gain an advantage on competitors?	x	
l	Do you know of any instance where innovation was used to gain a business advantage?	x	
m	Are you familiar with any entrepreneurial strategies with regards to innovation?		x
n	Have you implemented any strategies to encourage or promote innovation in the venture?		x
o	Are you familiar with the concept of growth in business?		x
p	Do you know of any instance where growth was used to gain a business advantage?	x	
q	Are you familiar with any entrepreneurial strategies with regards to growth?		x
r	Have you implemented any strategies to encourage or promote growth in the venture?		x
s	Are you familiar with business strategies?		x
t	Do you have a business strategy at present?	x	
u	Are you aware that his business is operating under a strategy?	x	
v	Does the business venture have a company mission?	x	
w	Does the business venture have a strategic architecture?	x	
x	Does the business venture have a strategic intent?	x	

BUSINESS INNOVATION, GROWTH AND STRATEGY SURVEY

Question		Answer	
a	Subject #20		
b	What are your technical qualifications? B.Engineering (Mechanical)		
c	What is your main field of engineering? Mechanical Engineering		
d	What is your experience in this specific field? 4 years		
e	What is your business or management experience? 1 Years Business		
f	What are your business or management qualifications? None		
g	What is your business venture type? Auto repair and Parts Retail		
h	What is the field of industry of the venture? Auto industry		
i	What is the venture organisation type? Partnership		
j	What is the approximate age of the venture? 5 Year		
		YES	NO
k	Are you familiar with the concepts of promoting and using innovation in business to gain an advantage on competitors?		x
l	Do you know of any instance where innovation was used to gain a business advantage?		x
m	Are you familiar with any entrepreneurial strategies with regards to innovation?		
n	Have you implemented any strategies to encourage or promote innovation in the venture?	x	
o	Are you familiar with the concept of growth in business?		x
p	Do you know of any instance where growth was used to gain a business advantage?		x
q	Are you familiar with any entrepreneurial strategies with regards to growth?		x
r	Have you implemented any strategies to encourage or promote growth in the venture?	x	
s	Are you familiar with business strategies?	x	
t	Do you have a business strategy at present?	x	
u	Are you aware that his business is operating under a strategy?	x	
v	Does the business venture have a company mission?		x
w	Does the business venture have a strategic architecture?	x	
x	Does the business venture have a strategic intent?		x

8.3 List of Figures

- Figure 2.1: The accelerating rate of change, used by Min Basadur (1995) to explain why companies require innovation to be competitive. **21.**
- Figure 2.2: Porter's Five Forces Model to determine industry attractiveness and long run profitability (Porter, 1980). **23.**
- Figure 2.3: Ansoff Product / Market Matrix (Strategic management, 1979). **26.**

8.4 List of Tables

- Table 3.3.1: Survey Questionnaire **38**
- Table 3.4.1 Illustrative example survey results. **40**
- Table 3.4.2 Processed illustrative results **41**
- Table 4.2.1 Survey questionnaire for subject #1 **45**
- Table 4.2.2 Processed raw data from Appendix 8.2 **46**

