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Research Thesis

MANAGING NEW PRODUCT DEVELOPMENT WITHIN THE SMEs

By

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I (We) swear that this is the original work of the author(s). All information obtained directly or indirectly from other sources has been fully acknowledged.

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DECLARATION

I, Rendani Wilson Maladzhi, declare that the contents of this thesis represent my own unaided work, and that the thesis has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.

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LIST OF ABBREVIATIONS

NPD	New Product Development
SMEs	Small and Medium Enterprises
SMEEs	Small and Medium Engineering Enterprises
USA	United States of America
SA	South Africa

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ABSTRACT

Product innovation has transformed the minds of business people because of its ability to increase productivity. Other than increased productivity it also allows companies to extend the range of the available products to consumers as well as lowering the prices consumers have to pay. Product innovation if managed correctly will create wealth and reward risk-taking by means of technological development throughout organisational processes. SMEs fail to manage product innovation because they are unable to cope with pressures exerted by external factors as well as lack business management skills. This then impacts on the level of innovation that takes place in a company. A lack of innovation and sound leadership skills often leads to very little strategic vision in the company. This influences the commitment of the workforce and often causes the downfall of a company.

Case study methodology was used to collect and analyze the data, which was drawn from an empirical study covering nine engineering companies which practices NPD (New Product Development). Observation, questionnaire and personal interviews were used to collect relevant data for analysis. In addition, the SPSS 14.0 was utilized in order to generate frequencies, tables, and in particular graphics, as the researcher believes that graphics are helpful and easy to make the analysis more understandable.

The paper aims to investigate whether SMEEs in the Western Cape are using key NPD success factors to deal with the environmental uncertainties that disturb the management of NPD. The findings of the study indicated that the principles of key NPD success factors were found to be in place in the SMEEs in the Western Cape. All the managers who took part in the survey showed determination and commitment towards the success of their organizations. Those SMEEs proved that their existence was meant to satisfy the needs of their customers. Those managers also showed that they knew exactly what their customers needed. Employees in those organizations worked as a team and produced good quality products that satisfied their customers.

Those organizations started small but grew with time as the needs of their customers continuously changed. The growth in those organizations was seen in the number of employees employed from time to time.

Key words: *New Product Development, innovative leadership, Small and Medium Engineering Enterprises, customer needs, teamwork and workforce, empowerment.*

CHAPTER ONE: INTRODUCTION

1.1 INTRODUCTION

The importance of NPD (New Product Development) has grown dramatically over the last decades, and is now the dominant driver of competition in many industries. New product introduction in today's technology-driven markets carries significant accomplishments and risks. New product failure rates can be as low as one out of every three products and as high as 90 percent of new products, which are withdrawn within a year of their introduction (Antil, 1988). Booz (1992) further stated that between 33 percent and 60 percent of all new products that reach the market place fail to generate an economic return. Rosenau (1988) added that factors like new technology, improved communications, increased profit demands and shorter product life cycles have added to the inherent risk of non sustainability of new product development. This shows that managing NPD requires total commitment from the whole organisation in meeting the organisational objectives.

Yet, without the introduction of new products, deterioration of the firm's market position is inevitable. Without new products, firms will inevitably stagnate. Initial or early entry of new products, can result in new market development, long-term market dominance, and foreclosure of competitors' responses (Crawford, 1988). It is vital for every organisation in the market to produce new products that will anticipate and meet the needs of their customers. It means that organisations must make an effort to enquire what their customers might be looking for and then respond immediately.

Kotler (1988) stated that failure to respond to competitive new product introductions with appropriate speed can result in late market entry or a permanent loss of market share and even dissipated profits. Kotler (1988) further mentioned that timely and responsive new product development has become even more critical in the highly competitive global environment. It is of vital importance for any organisation to rapidly integrate their activities, in order to respond to the market needs to keep their potential customers.

Managing product development has become a buzzword all over the world, mostly within the SMEs, but it depends on how it is put into practice. It was also discovered that many organisations do not have the know-how or sufficient resources and capabilities when they embark on product development, which is why the failure rate is so high. This kind of information was revealed after many years of research work in NPD, by researchers such as

Craig and Hart (1992), Cooper (1984), Rosenau (1988) and others. Most of this research has been done within the SMEs all around the world.

SMEs are generally regarded as creators of wealth and are seen as a stimulus of economic growth that results in the provision of jobs as well as an increase of the market share. Many studies have shown the substantial contribution that SMEs have in different countries. Oviat and Mc Dougal (1994) stated that generally, SMEs present between 82% and 99.8% of the total number of enterprises in various countries, including Britain, Singapore, and USA etc. The main reason that these countries are flourishing with SMEs is because their government has seen a need for SMEs development. These countries are convinced that if SMEs are supported and groomed, their successes will automatically improve the economy. When the government supports SMEs, flexible policies are passed to allow the SMEs to trade easily without unnecessary complications.

1.2 FUNDAMENTAL RESEARCH QUESTION ARISING FROM THE LITERATURE REVIEW

- Why are SMEs still failing to produce new products?
- How can SMEs enhance productivity and sustainability to stay innovative and competitive?

1.3 PROBLEMS FACING SMEs FOR NPD

Many studies that have been done by different researchers demonstrate without doubt that SMEs are the creators of wealth and jobs. Afuah (2001) in his studies confirmed the problem with newly launched products suffering from notoriously high failure rates reaching 50 percent or more. Afuah (2001) agreed with Crawford (1988), Craig and Hart (1992), Cooper (1984), Rosenau (1988) that the main culprit of this high failure rate was non other than failing to understand customer needs. According to the literature, failure to understand the market is not the cause but it is the result of environmental uncertainty. Gerwin and Tarondeau (1982) defined environmental uncertainty as market changes, emerging technological developments, and the evolving competitive situation. These aspects are continually changing in the market and are problematic more especially if there is no proper strategy to deal with them. Environmental uncertainties can cause confusion as to project targets and how trade-off decisions should be made. Gupta and Wilemon (1990) commented that uncertainty concerning customer requirements may result in a poor product definition. Poor product definition can now cause poor understanding of customer needs as mentioned by Rosenau (1988). Khurana and Rosenthal (1997; 1998) also contend that unresolved technical uncertainties and inadequate customer needs assessment are responsible for the

failure of many new product development projects. They also believe that the main contributor to the NPD failure is environmental uncertainty. Clark and Fujimoto (1991) also supported this by stating that market, technological and competitive uncertainty can make it difficult for a project team to launch a product concept with internal as well as external integrity. This simply means that for a NPD to succeed, organisations should put forward a strategy on how to deal with the identified environmental uncertainties.

Murray, Baskaran, Lamarre, Silber and Walters (2000) concluded that timely knowledge about customer preference requirements is the single most important area of information necessary for product development. Not knowing customers' needs brings confusion within the organisation making it difficult to know which strategy to implement and which resources are required. The results of the study compiled in the Microsoft report (2007) cited the following as main symptoms for new product failure:

- “failure to understand and meet customer needs” – 47% of respondents;
- “being late to the market” – 33% of the respondents;
- “poor pricing” – 20% of the respondents.

These observations from Microsoft (2007) confirmed the sentiments by other researchers above stressing the point of environmental uncertainty as the main cause for failure for a NPD. Management in this case is the culprit since they are responsible in the daily running of their organisations. In summary, everything that these researchers mentioned concerning NPD problems, management has to answer. It is believed that management should take responsibility to make sure that they understand their environment, their market, and their capabilities. They should have proper strategies to manage their available resources to give what their customers need. Most managers are failing to take their rightful positions because of the following:

- Lack of business skills.
- Lack of research skills and market know-how.
- Lack of education and training.

1.3.1 Lack of business skills

Business management skill is one of the principal fallbacks within the SMEs according to Jackson (2004). Barczak and Wilemon (1989) rightfully linked management with the following traits: communicator, climate setter, and planner. Each of these traits plays a vital role within the management of any organisation. It appears that most of the SMEs management only possess technical skills, without management know-how. Craig and Hart (1992) mentioned that NPD requires managers that have both technical and management skills in order to

manage effectively. Both technical and management skills enable a manager to plan properly bearing in mind the availability of the resources and the capabilities of his organisation. Lack of management skills occasionally results in improper control amongst the employees and leads into conflict and misunderstanding.

With the lack of business management skills, it becomes difficult for the managers to understand the environment that they operate in, which simply means that they cannot implement proper strategy to deal with the market. Most of them end up copying those businesses that are performing well without even knowing what is compelling them to perform the way they do. Mintzberg (1975), Porter (1996), and Thompson and Strickland (1993) rightfully mentioned that strategy is the road map that guides an organization to where it is going. This means that for any organisation to know where it is going, it should first know the environment in which it operates. Most of the SMEs are operating in the absence of any strategy, which is like a tree without roots. Any organisation operating without strategy it is likely to fail. Jackson (2004) also said that in the UK, SMEs stay small and under-perform simply because their managers and owners lack management, business skills and knowledge to grow their business.

For any organisation to grow, a well informed strategy is needed along with a leader that is future obsessed, passionate, goal oriented and somebody who is brave to take a calculated risk (Deming, 1986). With no strategy, employees are not motivated to think ahead, or dream of ideas that might bring changes in the organisation. Employees in this passive setup are likely to have low esteem and struggle to trust each other.

Most managers have no passion in what they do, and as a result employees find it difficult to follow such kind of the leader. Barczak and Wilemon (1989) stated that management must be a climate setter, which means that management must prepare a way for the employees. Employees are not motivated to work hard in the environment that does not encourage creativity. Employees with potential are not encouraged to bring forth their creativity; instead they are discouraged, because most of the managers think that if they give their employees room to express their views they will end up taking their positions. Employees in most SMEs are just waiting to be given instructions on what to do. In this kind of environment, employees do not feel a part of the organisation and become lazy. McCauley and Velsor (2004) mentioned that employees freely express their emotions and ideas in the environment where their leaders show interest in them. When employees are encouraged and motivated they gladly show their commitment and take responsibilities for their actions. The more employees take responsibility for their actions; the more they start to produce good quality products by

working as a team, knowing that everything they do adds value and is appreciated by their superiors.

Most SMEs are failing because they lack an understanding of innovation; to them business is business as long as they have a business idea. In theory innovation is divided into radical and incremental (Von Stamm, 2004). Most managements do not even know the difference and they just implement what they think is right for them. It is vital for the SMEs to know which innovation to implement based on their organisational capabilities. Any management without this vital information is likely to fail. It is highlighted that many organisations are failing because they do not know the needs of their customers and they end up giving them what they have produced hoping that they will change their minds.

1.3.2 Lack of research skills and market know-how

The shortage of research skills within the SMEs in South Africa tends to be a common problem and it is always linked to the legacy of apartheid (Chandra, 2001). Most of the SMEs have brilliant business ideas, but they fail to locate their businesses where they can be fruitful. Instead of first finding out the suitable places for their businesses they just locate them in the next available space. Organisations are failing because management does not know what is happening in the market and have no clue as to the latest technology that other companies are taking advantage of. Ogawa and Piller (2006) said that most of the firms are still stuck in the traditional way of market research of focus groups. Ogawa and Piller (2006) further stated that focus groups are not reliable indicators of the reaction of the broader population. In addition, focus groups lack realism because consumers are often given only verbal descriptions of concepts of a product.

Some companies have introduced a method called collective customer commitment, whereby customers form part of the development team and they commit themselves to buying the products. Then the organization will spend all that they have, knowing that it will not go to waste. However this kind of strategy works well for companies that are well established with loyal customers. Management should be knowledgeable if they wish to introduce this strategy. This kind will not be suitable for SMEs because it is expensive to implement without the buy-in from the customers Ogawa and Piller (2006).

Another problem has been identified in a study by Chandra (2001) revealed that if products are facing insufficient demand in the market, it is probably caused by not knowing what the customer needs were. It is proper to only produce new products that are being requested by customers and this is done through consultation with customers. Conducting a survey that

will inform an organisation of the needs of the customer, essential research skills are needed that will allow customers to honestly reveal what they truly expect. It is also helpful to know the target market for the specific product that the organisation is producing as most of these SMEs are not equipped with these skills and therefore they struggle to make it in spite of having a good business concept.

1.3.3 Lack of education and training

In the 1980s, economic growth slowed down in South Africa. This was coupled with a drop in labour production due to a skills shortage and low education level. It led to reduced profitability in investment. GDP dropped from 19 percent to 15 percent in 1990. While many people did not have proper educational training they had experience in their work. The main problems with such people were that they were not flexible to changes because they always stick to the old ways of operation. They struggle to make it because technology, as well as the needs of their customers, changes all the time (Tybout, 2000). Education and training create a platform where one can make informed decisions and is able to see opportunities as they arise. Educated employers are able to treat their workforce with respect as compared to employers who are not educated. Uneducated employers can not even control their tempers because they do not value their fellow employees. Uneducated employers always struggle to come up with new ways of doing business in a way that will motivate employees to be productive. It is even worse that many of the management and employees cannot read and write, therefore communication becomes a barrier.

The person with high educational qualification views customers with different eyes as compared to those that are not educated. Technicians are qualified to perform a specific task and this means that a number of them will do a better job as compared to a few of them.

1.4 RESEARCH AIMS AND OBJECTIVES

Many SMEs lack the ability to understand and articulate their own needs, and it becomes difficult for them to deal with the environmental uncertainties. The environmental uncertainties which are the primary hindrances for NPD as mentioned above, can lead to poor product definition and inadequate customers' needs assessment. A number of researchers have studied innovative culture with emphasis on environmental uncertainties to determine factors that lead to NPD success. The following factors have been identified: management, strategy, organisational structure, new product development process, human management, customer involvement and supplier involvement.

More than 200 studies have been carried out in various industries using geographical approaches, all sharing the objective of understanding new product success and failure deriving normative implications for companies. Despite the fact that the studies point to a fairly consistent list of success factors, it seems that only few companies has implemented these identified success factors, companies are making the same mistakes they did 30 years ago (Craig & Hart (1992); Schneider, Gunnarson and Niles (1996); Amed (1998); Bass and Avolio (1994); Loforet and Tann (2006); Zhang and Doll (2001). These researchers also concluded that the NDP (New Product Development) success factors are the way to go for new products, but it depends on how they are implemented.

Therefore, the purpose of this study is to investigate if the SMEEs (Small and Medium Engineering Enterprises) in the Western Cape are using the NPD success factors to deal with the environmental uncertainty of NPD, and to determine whether these particular SMEEs are producing products.

1.5 THE IMPORTANCE OF SMES IN THE ECONOMY OF THE COUNTRY

Given their large number, SMEs are strong contributors to countries' economic wealth as mentioned before by a number of researchers such as Ovia and Mc Dougal (1994); Muzyka, De Konig and Churchill (1999); Liedholm and Mead (1987). But not only do SMEs play a significant role in shaping the economic life, they are also seen as the main conducive force that serves the social goal of equitable income distribution. They generate employment, stimulate regional development and promote indigenous entrepreneurship, which in turn influences the competitive performance of nations.

Conversely, the situations of the economy and the political forces that shape it also have a notable impact on the performance and growth pattern of the SMEs. In Africa, few would deny that macro-economic instability has adversely affected the competitive performance of firms.

Bearing this caveat in mind, new empirical evidence throws light on the effects of the state of the overall economy on the growth patterns of SMEs in different countries. Liedholm and Mead (1987) provided very interesting and plausible explanations; the point of departure of their argument was that SMEs are a major source of new jobs, either because of the expansion of existing firms or the creation of new start-ups. Job creation through expansion seems to be more desirable as it reflects a demand-drive pull and helps entrepreneurs overcome the economic burdens of 'being small'. Crawford (1988) rightfully said that for any organisation to do well in the market, new products should be produced.

To demonstrate how important SMEs are in the economy, the South African government in 1995 designed a strategy to support SMEs with the view of growing the economy, and the following objectives were laid down as a foundation (Department of Trade and Industry, 1995a):

- To facilitate greater equalisation of income, wealth and economic opportunities which are inseparable from a strengthening of the labour-absorptive process in the micro-enterprise and survivalist segments; also to redress discrimination with respect to blacks as well as women's access to economic opportunities and also the facilitation of growth in black owned small enterprises in rural areas.
- To create long term jobs that will be supported by policies that will enhance sustainability in upgrading human resource skills and as well as the usage of up and coming technologies.
- Removing and addressing every obstacle that prevents SMEs contributing to the overall growth.
- To bring about a policy that will strengthen the cohesion between SMEs to overcome their isolation by promoting the networking of the SMEs to accumulate collective efficiency and to address all their differences and just focus on the opportunities ahead of them.
- To create an environment where both large and small enterprises from either rural or urban areas will trade comfortably without any threatening experience.
- To influence the SMEs to adopt a standard that will allow them to trade globally without any reservations.

Like in other countries of the world, the South African government showed its readiness to support the SMEs by putting down the framework to stimulate entrepreneurship. This framework laid a foundation for New Product Development. The framework closely resembles the NPD success factors that have been outlined by a number of researchers, and this confirms that the South African government values the role played by the SMEs in the economic development of the nation.

Still in the issue of the SMEs contribution to the economy of the country, Goldstuck (2004) in association with Hewlett Packard and Standard Bank, conducted a survey in about 2919 SMEs in South Africa to check the level of competence within the SMEs and also the role that the government is playing in the SMEs development (see figure 1). The survey revealed that SMEs in South Africa are alive and well and they regard themselves as highly competitive. About 86 percent of SMEs that took part in the survey regarded themselves as competitive; the other 12 percent were in between being competitive and uncompetitive, while the remaining 2 percent of the SMEs declared themselves to be uncompetitive as

shown in the graph below. Goldstuck (2004) quoted Thierry Boulanger of Hewlett Packard South Africa's Solution saying that all the assumptions that have been made in recent years about SMEs being the new driving force in the South African economy are true. This current study hopes to see if this is the case with the SMEs in the Western Cape, South Africa.

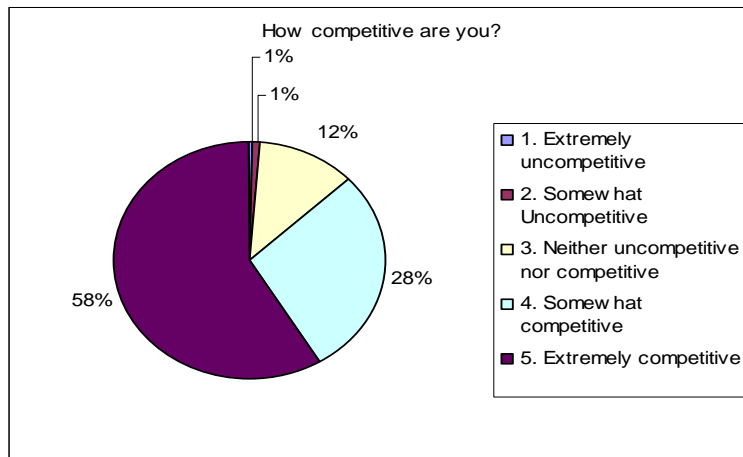


Figure 1. How competitive are you? *Source: adapted from Goldstuck (2004).*

In addition, Berstein (2004) estimated the number of SMEs in South Africa to be about 2500, of which 99 percent were represented in 1999. The study also revealed that 45 percent of people worked in the SMEs sector of which it represented 4.8 million workforces. This shows that if many SMEs can produce products and are able to sustain their competitive muscle, many people will be employed and the economy will improve drastically to match that of the developed countries.

Table 1: Role of SMEs in Some East Asian Economies

Country	Share in employment (%)	Share in number of enterprise (%)	Share in exports (%)
China	84		50
Hong Kong	63	97	>70
Korea	78	99	43
Taiwan	68	96	56
Japan	79	99	13
UK	58		
USA	53	99	29

(Source: Lall, 2000)

Internationally, governments proved to believe in the wealth brought by SMEs as they support them without any reservation. The government of Britain and Singapore are contributing a lot more to resources and investing considerable effort to make sure that their SMEs succeed. Lall (2000) shows how SMEs contributed to their economies in different countries (Table 1). As revealed in Table 1, China was leading by employing a lot of people compared to the USA, who employed only 53 percent. It shows that SMEs are regarded as

an important factor that brings about employment which should contribute towards improving the economy.

1.6 CHAPTER OUTLINE

Chapter One focuses on the problems that are faced by the SMEs in the development of new products, while Chapter Two touches on the importance of the SMEs in the economy of the country. Chapter Three focuses on the discussion of the model that will be tested in the SMEs while Chapter Four sheds more light by outlining the literature review to support the model. Although Chapter Four focuses on the research methodology, the focal point of Chapter Five is on the discussion of the results and Chapter Six brings everything to a close with concluding remarks, followed by recommendations for future research work.

1.7 CONCLUSION

In conclusion, the following three aspects are being identified as environmental uncertainties for NPD; market changes, emerging technological developments, and the evolving competitive situation. It is established that if these uncertainties are not looked after, there will be poor product definition; inadequate customer needs assessment, and consequently customer needs will not be met. Failing to meet customer needs results in losing customer loyalty and sometimes it means losing the competitive edge. Many organisations are struggling because their management has very little understanding of the business environment that the organisation is operating under. The management cannot communicate properly with its staff concerning the vision and the objectives of the organisation. The moment the communication between management and its staff fails, the organisational focus is affected.

Team vision is a shared purpose and plan of action that clarifies strategic fit and sets project targets and priorities that are consistent with the firm's design, manufacturing capabilities, and market requirements (Clark & Wheelwright, 1994; Rosenthal & March, 1988). Management that is vision oriented and not scared to take calculated risks is needed to instil a positive spirit in the team. To be successful, the whole team needs a clear vision about what the product does, what the product is, and whom the product serves (Clark & Fujimoto, 1991). The executive should possess both management and technical skills to encourage the staff by demonstrating the understanding of the functioning of the business.

SMEs all around the world are seen as creators of wealth and as such their government supports them all the way. The South African government also signalled its intent by putting

forward a strategy in 1995 that needs to be revived from time to time. The South African government began supporting the SMEs by introducing initiatives such as Ntsika, Umsobovu under the influence of Department of Trade and Industry. Countries like Britain, Singapore, China, etc. demonstrated their honest contributions to the SMEs as they believe that they contribute more to their economy. It is fact that for any SME to make a difference in the economy of the country, new products that will meet the needs of the customers should be developed.

CHAPTER TWO: LITERATURE REVIEW

2.1 INTRODUCTION

This chapter discusses the theoretical framework that forms the basis for the current study, to motivate why key NPD factors are vital in organisations that seek to produce new products.

2.2 THEORETICAL FRAMEWORK

2.2.1 Introduction

This theoretical framework was developed from the rigorous evaluation of the theory and case studies undertaken. It consists mainly of culture and climate for innovation, key NPD success factors and case studies. Culture and climate can influence innovation significantly. There are five key NPD success factors that originate from the general themes model by Craig and Hart (1992) namely the role of management in NPD, the role that strategy plays in NPD, the organisational structure and its influence in NPD, people and their involvement in NPD and the significance of NPD process within NPD. This theoretical framework was generated from NPD general themes developed by Craig and Hart (1992) and others, and also from the three case studies by Booz (1992), Zhang and Doll (2001); Laforet and Tann (2006).

2.2.2 Culture and climate for innovation

Chandler (1962) defines Innovation as the ability to get ahead and stay ahead of the competitors in terms of processes, services and products. Innovation is seen as a way forward for any business that wishes to remain competitive. Ahmed (1998) discovered that even though innovation is a tool for the future, many companies merely talk about it, and are afraid to embark on it since it involves risk. It is a fact that many organisations are not successful simply because they are afraid to take risk. Many organisations are reluctant to invest in innovation, though they know the benefits thereof.

Ahmed (1998) further said that even though innovation is debated at senior level meetings as being the lifeblood of the organisation, and accessional resources and R & D funds are thrown at it, the commitment usually ends there. However, becoming innovative demands more than debate and resources, it requires an organisational culture that consistently guides organisational members to strive for innovation and a climate that is conducive to creativity. The theory shows that innovation culture takes place where there is a commitment

from the top management as well as employees. Innovation is more than a culture or even an environment that pushes value creation (Bucker, 1997). Innovation is not something that can be touched, tasted, heard or seen; it is something that can be experienced. It is seen as a key driver of the organisation's ability to deal with its uncertainties. Culture is the main determinant of innovation and it should be maintained with the appropriate organisational context.

Schneider *et al.* (1996) highlighted four dimensions that serve as a foundation for innovation culture that embraces NPD:

- **Nature of interpersonal relationships:** it requires trust throughout the organisation. Employees should depend on each other, instead of competing against each other. The employees should have a sense of ownership of their organisation and their communication with top management should be at ease. The relationship between the organisation and their customers should be open so that queries are handled without any difficulties.
- **Nature of hierarchy:** everyone in the organisation should feel free to be part of decision making. Every employee has the right to know what is happening even though some of the decisions might be contrary to what they want. The spirit of teamwork is encouraged at all levels. All the staff should be afforded similar privileges based on their level of responsibility.
- **Nature of work:** the work should be challenging so that employees will always be on their toes, looking forward to new challenges. It is also important for the staff to note that for every effort they put into their work, they will automatically benefit and will be acknowledged for their participation. It is the responsibility of the organisation to make known the task of every employee and what is expected of them. It is also the responsibility of the organisation to ensure the availability of the resources to ensure smooth running of production.
- **Focus on support and rewards:** the organisation should introduce some form of reward system for a job well-done as well as to encourage those employees that are finding it hard to cope and to further encourage those who are doing well. The basis of hiring employees should be of high priority so that quality standards are not compromised.

These dimensions are being organised in such a way that every organisation must look back to see if all the elements are represented in their organisation as they embark on NPD.

According to Ahmed (1998), Martell (1989), Pheysey (1993), Robbins (1996) and Schuster (1986), organisational culture stimulates creativity and innovation which will eventually result in good quality products as an outcome of committed staff. Consequently, the rate of change accelerates while new knowledge, idea generation, and global fusion also increase. Chan and Mauborgne (1991); Senge, Kleiner, Roberts, Ross, Roth and Smith (1999) added that the involvement of organisational leaders create a platform that enables the workforce to participate positively. For the innovation culture to take its toll, an innovative leader, who will engrave the culture in the minds of the employees, is needed. Martins (2000) describe organisational culture and internal integration, as the socialisation of new members, creating the boundaries of the organisation and the feeling of identity amongst personnel and commitment to the organisation. Innovation culture sets the stage for NPD, because all of the NPD success factors developed by various researchers are encompassed in the dimensions of innovation culture developed by Schneider *et al.* (1996). In addition, Amabile (1988); Barron and Harrington (1981); Tierney and Farmer (2002) highlight the following as characteristics associated with innovation culture:

- persistence;
- curiosity;
- interest in complexity;
- high energy and
- self confidence.

It is believed that every staff grouping involved in the NPD environment should possess these characteristics which in themselves encourage self belief and teamwork. If all employees can grasp and understand these concepts, innovative culture will supersede all obstacles brought about by the external environment. Diliello and Houghton (2006) said that the workforce within this environment is empowered and know exactly what their responsibilities are. Every employee working in innovative culture is responsible, not needing supervision because they take ownership of what they do.

2.3 KEY NPD SUCCESS FACTORS

As highlighted before a number of researchers have developed a number of NPD success factors to try to manage NPD. Both academia and practitioners acknowledge that NPD is a crucial activity to most companies in order for them to secure long term survival and growth (Brown & Eisenhardt, 1995; Clark & Fujimoto, 1991; Craig & Hart, 1992). For any organisation to grow it has to produce products, but not just any product – products that meet the needs of their customers. These researchers have investigated factors leading to the success and failure of NPD in an effort to uncover factors that can enhance product

development success in companies. The following factors have been identified as standard and common: management, strategy, organisational structure, new product development process, human management (people), and information. All these factors are shown in the figure below (see Figure 2: NPD general themes by Craig and Hart (1992)).

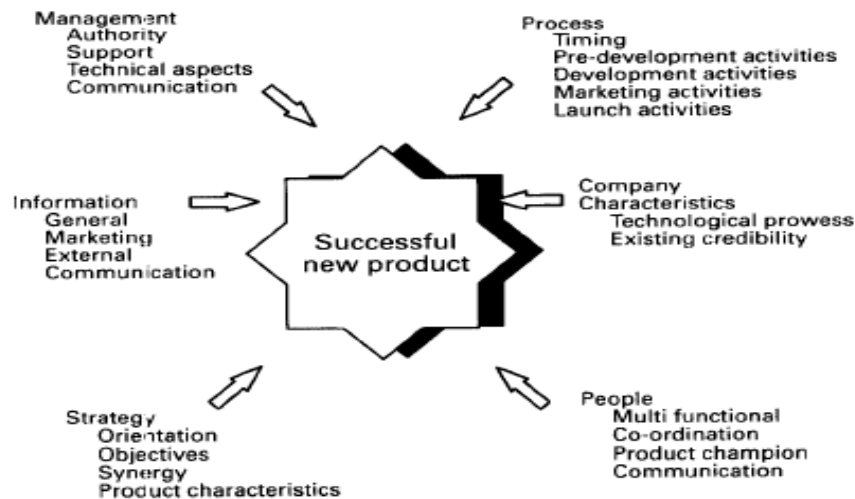


Figure 2: Shows a NPD general themes model. (Source: Craig & Hart, 1992)

2.3.1 THE ROLE OF MANAGEMENT IN NPD

2.3.1.1 The Basic Understanding of Innovation by Management

Innovation is defined as the embodiment, combination or synthesis of knowledge in its originality, with relevancy and valued new products, processes and services (Booz, 1992). In the context of this study, innovation is seen as a playing field which allows all other aspects such as knowledge generation, knowledge management which forms the basis of the information flow, coupled with an informative strategy to bring about a learning organisation (Harvard Business Essentials, 2003; Chandler, 1962; and Ahmed, 1998). As important as innovation is for any organisation, a manager with a thorough understanding of what innovation is and how it should be approached, is needed. Von Stamm (2004) felt that creating an innovative organization requires more than an understanding of the design of an efficient new product process, more than how to write innovation into a company's strategy and more than maintaining an active research and development department. Von Stamm (2004) further stated that innovation, design and creativity need to permeate every aspect of an organization. It is vital to be aware that creating a more innovative organization is more about changing one's frame of mind than it is about changing the company's processes or vision statement. Innovation, design and creativity have to do with curiosity, a taste for experimentation, dissatisfaction with the status quo, and the desire to continuously improve things. The following are considered to be the different types of NPD that need to be

understood by every management first and then by every other member of the organization (Cooper, 1993):

- new - to - the world products (products that are new to the organization - in production and the markets);
- line extension (products that are new to the markets, but not new to the organization);
- me – too – products (products that are new to the organization, but not new to the market);
- production modification (products that are neither new to the organization nor to the market);
- cost reductions (products that are designed to replace existing products in the line, but yield similar benefits and performance at lower costs).

Understanding these categories for new products will help any organization to determine which innovation type to embark on namely radical or incremental. Understanding these categories will also help management to direct resources to the correct activities. Ali (1994) suggested that because of the degree of innovativeness, managers should adjust their approach depending on the type of the project they are dealing with.

Von Stamm (2004) highlighted that incremental and radical innovation requires very different business conditions, skills, structures and processes. She also pointed out that the reason why many organizations failed was because they tried to achieve different types of innovation through the same systems and processes all at once. This simply shows that it is vital for management to know their organizational capabilities so that the right choices can be made on which innovation the organization can embark on. Understanding of innovation gives an organization an idea on how they can strategize to meet the needs of their customers. It will also give management an opportunity to organize resources in such a way that they match the existing operational activities.

Before discussing the roles of management in NPD as discussed by different researchers, it is important to first look at the definition of leadership. McCauley & Van Velsor (2004) defined leadership as the collective activities of organisational members to accomplish the tasks of setting direction, building commitment, trust and creating an alignment. This definition highlighted teamwork as the main component to achieve a common goal of the entire organization. The definition also shows that for people to work together, a leader must be there to lead the way and foster commitment. According to Anthony (1998), innovative leadership has the ability to get followers deeply committed to fulfilling the vision, objective and course of action that they believe is achievable and worthwhile. It is important to note that NPD environment requires its leadership to be innovative-minded so that employees can

feel that they are part and parcel of the organization. The definition also places an emphasis on teamwork instead of individuals and in most cases management must set a platform that will allow employees to be at ease to take responsibilities as they perform their daily duties. This definition ties in with those dimensions of innovation culture by Schneider *et al.* (1996).

It is also clear that innovative leadership is not about individual gain but organizational gain as defined by both McCauley and Van Velsor (2004) and Anthony (1998). The latter author also stated that if there was anyone who wanted to make any radical changes within the organization to stay ahead in the market, it should be a dedicated and passionate visionary who thinks and act boldly at all times. Furthermore, Anthony (1998) emphasized that innovative leadership is not about systems or procedures, rather it is about people - motivating, inspiring, directing, and developing them for peak performance. The kind of leadership required in the NPD, must possess the following characteristics to effectively play their roles: fast and action oriented, immersed in progressive change, future-obsessed, masters of motivation and passionate.

2.3.1.2 The Characteristics of Management within NPD

Fast and action oriented

Speed, responsiveness, and agility are everything to innovative leaders who analyze situations, make decisions and act on opportunities (Deming, 1986). Innovative leadership always finds shortcuts to slash red tape to benefit the organization. On top of that, they would rather make a wrong decision than 'blow' a potential opportunity by just sitting and hoping that something will happen. It is in the blood of an innovative leader to want to use the available resources to bring positive changes (Barczak & Wilemon, 1989). This feature motivates employees to always be on their feet to make things happen for their organization as they are inspired by their leader. NPD requires quick responses to the market opportunities to stay ahead of competition.

Immersed in progressive change

Innovative leaders build organizations and foster a culture of on-going, never-ending change (Deming, 1986). It is also a mission of the leader to ensure that the organization continually learns, adapts, evolves and improves. This character is of great importance since the NPD environment is unstable and customer needs change along with technology. Deming (1986) further said that the main objective of the innovative leader is to deal with turbulent change around, and then become master of that change. In the adaptation of progressive change an inquiry culture becomes second nature. Customers within NPD environment are sure of what

they want and if they do not get what they need, they simply switch their suppliers. To win in this competitive environment, leadership must always be on the move to anticipate what their customers expect and know all the changes that are likely to happen. If the leadership is always aware of what is happening in the market, employees will be motivated to do their part to follow the footsteps of their leadership. Every change that will take place will go hand in hand with the objectives of the organization since the leadership is goal oriented.

Future-obsessed

Innovative leadership has the ability to bring the future to where they are and start reaping the benefits. The beckoning horizon ahead brings excitement that makes them work even harder (Deming, 1986). Looking ahead always brings hope, which brings determination which in turn automatically brings commitment. Leadership should be able to bring out the best in its employees for the sake of their customers.

Masters of motivation and inspiration

Innovative leaders first get people excited, then committed, and finally moving swiftly. Mc Dough and Leifer (1986) said that innovative leaders are able to tap into secret chambers of the minds, hearts, and souls of people and know which “buttons to push” to activate their staff’s pride, faith, hope, drive, and perseverance. Innovative leaders make their followers feel special as if they were an elite exclusive team fulfilling some noble destiny (Barczak & Wilemon, 1989). They help their employees fulfil a deep longing for creativity and innovation by imparting a sense of invincibility, power and control over their situations. These leaders accomplish two overwhelmingly important things: they make people feel good about themselves and they make them feel good about what they are accomplishing. The employees end up having a sense of ownership and become responsible.

Passionate

Innovative leaders are incredibly driven and this rubs off onto their followers, and they express emotions freely and showcase their excitement about new ideas and change. The spirit within them makes everyone in the organization excited with what they do, inspiring them to do more (McCauley & Velsor, 2004). The excited employees demonstrate their excitement by producing quality products for their customers. A passionate leader will always drive employees to work hard so that they can be recognized. A passionate leader does not have time to think and talk about many things, but only to be a pillar of strength to the employees. If the leadership seems to understand and love what they do, employees will develop a passion for their work too.

Similarly, Barczak and Wilemon (1989) identified four crucial roles that an effective leader should play:

- establishing the appropriate climate and fostering team communication;
- setting a climate within the team that supports innovation;
- planning the project activities with reference to the overall strategic vision of the company;
- providing an interface between the project members and customers, top management and other functional units.

A good manager within the NPD environment is considered to be someone who possesses both management and technical capabilities. Employees tend to trust and prefer a manager that they can count on at all times. Argyris (1999), Meister (1998) and Senge (1990) add that managers should introduce their employees to continuous learning, so that they may understand that learning does not cease. The employees will also learn that arriving at an unexpected answer is an opportunity to discover something new (an inquiring culture). To encourage continuous learning Amabile, Conti, Coon, Lazenby and Herron (1996) suggested that it would be nice to reward employees for their effort of creativity, thereby showing them how valuable they are in the organization. Amabile *et al.* (1996) also add that employees should form part of the decision making process which would and this will make them feel part of the organization and they will automatically show commitment and responsibility. Cummings and Oldman (1997) cemented by saying that job satisfaction for employees makes them feel at ease and at the same time more productive.

The role played by innovative management becomes visible within the NPD environment when the workforce begins to participate and take ownership in the organization. It is a responsibility of any leadership to have a thorough understanding of what innovation is all about so that an organization can be pointed in the right direction.

2.3.2 THE ROLE THAT STRATEGY PLAYS IN NPD

It is believed that a strategy is a road map that an organization follows to outdo its competitors as far as market share is concerned. It provides an organization with a sense of direction on where it is going and on how it will get there (Mintzberg, 1975; Porter, 1996; Thompson, and Strickland IV, 1993). Strategy dictates how the organization will operate internally, and how it will approach the outside world. This means that the top management must know their environment very well to dictate how their organization will feature in that environment. The strategic implementation must take into consideration the capabilities of the organization in meeting the needs of their customers. Craig and Hart (1992) discovered

that the relationship between the corporate strategy and the new product development activity, the strategic orientation within the innovating company, including the fit between new and existing activities, will influence the outcome of the new product development.

According to Grant (1996), Strategy is the creation of a unique and valuable position, involving a different set of activities. From the different definitions by different researchers the following remarks are put forward: Strategy is a plan of action by any organization to offer what the market expects at the right time; it is also a weapon that is used by innovative leadership to compete with their competitors. Strategy helps management to match their resources with their capabilities to deliver good quality products that will satisfy their customers. Strategy also guides the management to always focus on their organizational objectives and not lose focus. Strategy tries to draw in employees to feel part of the organization in their daily responsibilities.

For an organization to create a winning strategy the following factors, according to Schumann and Prestwood (1994) must be taken into consideration:

- understand the market in which it operates;
- understand the needs and aspirations of people in the organization;
- synthesise the needs of market, stakeholders and people into a vision;
- establish a shared vision; and
- select a mission, set goals, and develop the plan together with the organization.

Management should understand that strategy is only good for a finite amount of time; if it worked well yesterday it is not guaranteed that it will work again tomorrow - it seasonal. Schuman and Prestwood (1994) also said that the environment shifts, customers' needs change, competition gets smart, technologies improve and the organization itself evolves - all these factors requires a different strategy. It is important for management to review their strategies from time to time. Schumann and Prestwood (1994) highlighted the following as some of the roles of strategy:

- to help people feel significant;
- to establish the value of learning and competence;
- to unite people and give them a collective identity;
- to make work exciting, not by pushing, but through identification with common goals;
- to establish integrity, dedication, openness, creativity and courage in the organization;
- to encourage people to think longer term;

- to foster thinking in terms of renewal.

If these values are harvested within an organization, there will be teamwork right from the top through to the lowest level. Information sharing will be enhanced from person to person and collaboration will become part of the organizational culture. According to Schumann and Prestwood (1994) strategy puts emphasis on people as the main drivers of activities within the organization. It is a fact that if employees are happy and comfortable with how things are done, they will commit themselves to the organisation. Where there is staff commitment, productivity is automatic and consequently customer satisfaction.

2.3.3 ORGANISATIONAL STRUCTURE'S INFLUENCE IN NPD

Company characteristics are seen as a prevalent factor for the organizational future success in product innovation. The company characteristics include the credibility and technological usage in the development of the organization as a whole. The company characteristics also focus on the structure and style to pave the way for product innovation. If these are properly implemented, the organizational structure will highlight the responsibilities of top management as well as those of the product development manager. The structures considered most successful by many authors in product innovation are flat and matrix structures.

Low and Fullerton (1994) defined organizational structure as the framework within which organizations are managed successfully. They also highlighted that traditionally, many companies like Procter and Gamble used hierarchical structures where the junior person responsible for one or two projects would report to the marketing manager, who being responsible for several other projects would report to the Group Marketing Manager, who in turn would report to the Marketing Director. This type of structure relied on vertical linkages to coordinate activities between the bottom and top layers of the company. Nevertheless, such a structure may be characterised by a limited sphere of responsibility, a restricted information flow and tight control from the top. This kind of structure restricted people from freely communicating and it slowed down operational activities. This type of organisational structure would not fit well within NPD environment where people are supposed to work together as a team.

In contrast, other companies are shifting towards flatter, more horizontal structures in the hope that this type of structure will enable them to respond more effectively to the turbulent business environment in which they find themselves (Peters, 1992; Muzyka *et al.*, 1995). Flatter structures involve a shift from vertical decision making to horizontal collaboration and cross-functional cooperation (Hedlund & Rolander, 1990; George, Freeling & Court, 1994,

and McCalman, 1996). Managers learn to share information across the company and promote a culture of openness and trust (Hankinson & Hankinson, 1999). In theory at least, flatter organisational structures may be in a better position to deliver successful projects.

Besides flat structures, there is the matrix structure, which first emerged in the 1970s and 1980s. This structure is based on a dual chain of command which aims to achieve an equal balance of power between the vertical and horizontal linkages of the company. Along one axis, a company may be organised according to functions (advertising, pack design, new product development) or divisions (marketing, finance, information technology) and along the other axis, the company may be organised according to different projects. In such a structure both the project manager and the functional/divisional manager hold equal authority. A matrix structure may be of particular benefit to global companies seeking to achieve international collective responsibility (Hankinson & Hankinson, 1998).

Openness is the key to teamwork that will integrate various teams to work together to achieve the goals of the organization. It also shows that every person's input is valuable and every employee is important and this fits well in the innovation culture. It also demonstrates that there is coordination and sharing of information from top management to employees on the floor and from the bottom upwards. The most important of all is that employees are able to communicate with management and amongst each other freely. The atmosphere in this environment encourages productivity all the way. It also leads to open communication and other opportunities from different directions within the organizations. The team spirit becomes the culture of the organization as it flows from the top management throughout the innovation team.

2.3.4 PEOPLE'S INVOLVEMENT IN NPD

2.3.4.1 Employee's Involvement in Empowerment

Human management is one of the most important aspects that need to be considered by every organization that aspires to do well in the market. If human needs are met, workers are inclined to work hard, but in most cases it does not happen because most employers tend to ignore their employees and still expect them to deliver. Human management is more about creating a good working environment where employees will feel at ease to work in, as mentioned in one of Schneider *et al.* (1996) dimensions of innovative culture. The good working environment includes safe working conditions and a culture of team work. For the employees to be responsible and perform their tasks, an empowerment process is required. In this section, the empowerment process will be defined and then expanded upon to explain

how an empowered workforce can influence NPD (Maidique & Zirger, 1984; Voss 1985; Myers & Marquis 1969). For people to participate within NPD environment, the empowerment process has to be introduced to prepare individuals to enter into a new dispensation.

Honold (1997) defined empowerment as giving power to people who were previously disadvantaged; by trying to balance the continuum of power in the workplace. Employees are encouraged to believe that they can do things that they thought they could not do (Block, 1988). Sullivan (1994) and Sullivan & Howell (1996) also agree that empowerment makes people to feel confident in themselves and encourages them to see and do things differently. Empowerment processes according to the look of things boost employee's self-esteem and gives them strength to do more for the organization. Malone (1997) mentioned that empowered organizations prefer to delegate responsibilities to subordinates, thereby encouraging employees' participation as compared to a traditional setup where one manager controls many employees. This kind of empowerment allows employees to feel free to express their views and build up their confidence which strengthens their commitment.

2.3.4.2 Management's Involvement in Empowerment

Managers in an empowered setup coach employees in decision making and in turn give employees an opportunity to participate on a day to day involvement basis. In a traditional setup employees perform without fulfilment but by obligation to satisfy their supervisors (Keller & Dansereau, 1995). Vogt and Murrell (1990) supported an empowerment process where employees were prepared to participate in the operations while being monitored until a stage where they could perform on their own. A leader is seen as a driver of the empowerment process and leads by example in motivating employees to follow suit.

Empowerment should first originate as a culture of an organization with the aim of producing good quality products. Management should not see empowerment as a strategy but as a part of the organization that forms a foundation. It must be a language that is used in the organization, taught to the new staff and whoever visits the organization must see it within the staff. Empowerment should be visible in the employees as they carry on with their day to day duties (Hayes, 1988 & Long, 1996).

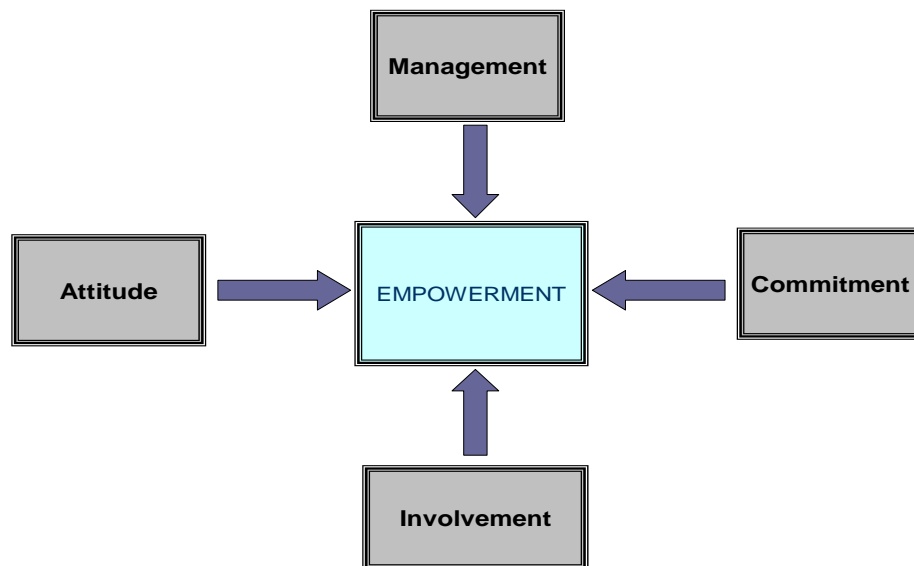


Figure 3. An empowerment process. *Source: adapted from Long (1996)*

Long (1996) contended that for the empowerment process to work, the authorities must outline the ground rules including what is expected from the side of the employees, and avail the resources to complete their tasks. He also mentioned that the most important point is to train and orientate the staff and give them reasons as to why it is important. The management must make sure that the staff is clear on all the procedures before leaving everything to them. The objective of empowerment should be highlighted clearly so that anyone can understand them and when employees are by themselves, they can be motivated enough to work hard without any supervision (Cleary, 1997). Empowerment requires the involvement of employees and management as shown in Figure 3. If the management is committed to the process, the attitude of employees who were negative will change. The involvement of both employees and employers will result in teamwork and their communication will be strengthened.

Researchers like Conger and Kanungo (1991), Keller and Danscreu (1995), Spreitzer (1996) and Thomas and Veithouse (1985) singled out the following from the literature as important aspects on the employee empowerment process:

- Leaders should focus on the development of individuals to get to understand the vision and goals of the organizations as well as adapting to the environment.
- Organizations should put emphasis on collaborative work through teamwork.
- Management should take personal responsibility to specify the job requirements, job enrichment through multi-skilling, cross training, access to information to measure ones' own performance and make good decisions allowance of risk taking.

- Structure that is decentralized, that allows flexibility for the sake of developments that are to take place as time goes by.
- Reward systems that encourage and team performance that is sustainable throughout.

After the discussion on the empowerment process it is evident that every organization practising NPD should have the empowerment process as part of the organizational culture. Empowerment process transforms individual thinking to teamwork mentality. It makes communication much easier between employees and even between management and employees.

(Table 2) Comparison between managed workforce and empowered workforce

MANAGED WORKFORCE	EMPOWERED WORKFORCE
Control	Freedom to act
Hierarchy	Democracy
Rigidity	Flexibility
Immersed focused	Customer focused

Source: *adapted from (Leykam, 1997)*

Leykam (1997) found that employees, who went through empowered organizations, have increased in job effectiveness, have a high morale and have raised career enhancing competencies. Table 2 reflects the difference between managed workforce and empowered workforce. Empowered workforce demonstrates responsibility and freedom to express their views concerning the objectives of the organization. Empowered workforce become confidence in performing their daily duties as compared to managed workforce who only wait for their managers to tell them what to do. Innovative organizations require an empowered workforce that takes pleasure in making initiatives that will benefit the organization and the following characters are part and parcel of empowered workforce:

- Empowered workforce feel like they are part and parcel of the organization.
- They are able to share information without being threatened by their subordinates.
- An empowered workforce is interested in knowing the vision of the organization and will work hard to see that their commitments become visible.
- Empowered workforce is easily trusted by their managers. Empowered workforce is flexible and works well under flexible structures.
- Empowered employees are able to collaborate easily with others as they understand that sharing information empowers how they see things.

- Empowered employees are able to do well within NPD process as it requires people to work together and depend upon each other. Empowered workforce will then be able to get involved in functional co-ordination, and R&D/marketing co-ordination. NPD process requires different departments to work together as they exchange information.

Functional co-ordination

Functional co-ordination still takes place within the NPD process but people are involved as they share their different expertises. This normally happens in the idea generation, marketing, designing and in the operation activities (Cooper & Kleinschmidt, 1990). On the other hand Maidique and Zirger (1984) identified functional co-ordination as a critical factor contributing to the development of the successful new products. Functional co-ordination shares the same benefits of reduction of the development cycle time, cost savings and closer communication to help to detect potential problems early in the process. The fundamental concept is found to be that of individuals working together to achieve the common goals in the development of new products (Cooper & Kleinschmidt, 1990; Maidique & Zirger, 1984).

2.3.5 NPD PROCESS

The NPD process begins from the time that an idea is generated until the product is commercialised. Takeuchi and Nonaka (1986) point out that as much as the NPD process is important, people cannot be separated from it because they make things happen within the process.

A number of researchers from different spheres such as marketing, management, design and engineering came up with a number of models of NPD process out of which the general model developed is composed of eight stages of NPD. The eight major stages are as follows: idea generation, screening, concept development and testing, marketing strategy, business analysis, product development, marketing testing and commercialisation. Kotler (1988) introduced the sequential process as shown in Figure 4. This is the kind of the model that has been used for many years in the NPD environment. It can be seen that for this model to be carried out, the process starts with idea generation and then a step by step approach until a product is placed in the market. All these steps must be done sequentially until to the end.

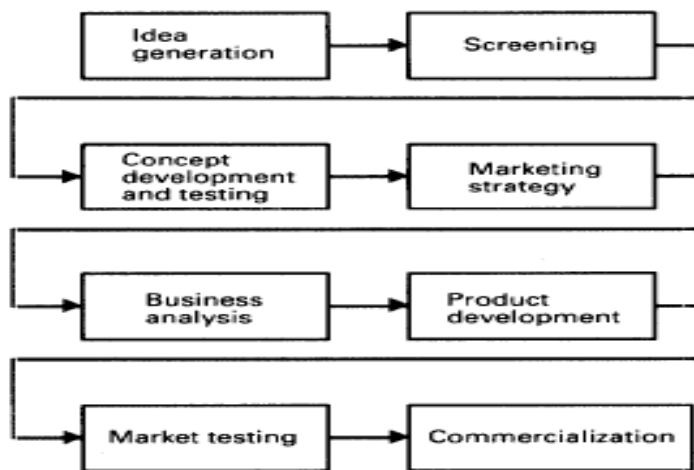


Figure 4. NPD Sequential process. (Source: Kotler, 1988)

Throughout the process, Craig and Hart (1992) discovered that evaluation activities within the process are extremely important. Evaluation activities should be carried on throughout the process and it is suggested that decision points should be set up at different stages of the project, in order for the quality and progress of the process to be checked.

Researchers such as Cooper (1979), Cooper and Kleinschmidt (1990), Peters and Waterman (1982), and National Industrial Conference Board (1964) emphasised the importance of marketing activities within the NPD process. Marketing people are closer to the customers so they need to make sure that the right methods of assessing customers needs have been used. As much as they are part of NPD team, their expertise allows them to give valuable advice before a concept decision is made. Many organizations fail to make it in the market because they are not meeting the needs of their customers. Johnne and Snelson (1998) advised companies to be novel in their market research approaches as well as to seek emerging new product opportunities and to offer more applications advice to customers so that they can create different ways of using products. Ayal and Raban (1990) mentioned that the companies that were classified as the “market guided developers” were found to be most successful. The secret behind their success as Ayal and Raban (1990) reported was the research and planning that was done early on in the development process. This method encourages organizations to go all out to find out what customers need and provide for them to show them how important they are.

2.3.5.1 The Importance of Communication within the NPD Process

Pinto and Pinto (1990) viewed cross-functional communication as the vehicle through which personnel from multiple functional areas share information that is so crucial to the successful implementation of projects. As with R&D and marketing communications the most important mode of communication is informal, with much reference being made to telephone and

informal discussions. It is noted that successful project teams spend their time solving task-related issues and tend to ignore interpersonal problems.

R&D/marketing co-ordination

Some of the earliest researchers in NPD such as Myers and Marquis (1969), found market-pull products more likely to succeed, while on the other hand, Cooper (1979) and Brockhoff and Chakrabati (1988) found technology-push and market pull products equally likely to be commercially successful. These sentiments inspired John and Snelson (1998) to call for a fusion between technology-push and market-pull perspectives. R&D Marketing integration has been recognised as a necessary predicate for successful product developments as long as the decision has been made about the appropriate level of integration between Marketing and R&D (Gupta & Wilemon, 1998). Gupta and Wilemon (1998) also said that the level of integration should be measured in terms of the extent of R&D/marketing involvement and information sharing at the various stages of the development process.

In the theoretical discussion they consider the innovation process to be aimed at reducing uncertainty and in so doing, advocate the transfer of information between R&D and marketing as stimulating the reduction of uncertainty. Marketing transfers information to R&D regarding user needs, competition and resources. R&D transfers information to marketing regarding technologies, competition and resources, each reducing the level of uncertainty perceived by the other. The transfer of information between two functions reduces uncertainty while establishing credibility (Gupta & Wilemon, 1998). In recognition of the importance of information in establishing and maintaining a credible relationship between R&D and marketing, marketing managers are advised to consider the nature of the information they provide to R&D, to provide information that is reliable, realistic, well analysed, well presented, consistent, complete and useful (Gupta & Wilemon, 1998).

The key factor in achieving R&D/marketing integration is that R&D and marketing managers must work together to solve the disharmony in their relations. Souder (1998) came up with seven principles which managers should try in order to achieve integration:

- Make personnel aware that interface problems naturally occur.
- Make personnel sensitive to the characteristics of disharmony.
- Give equal praise to both functions.
- Continuously reinforce their desire for R&D and marketing collaboration.
- Use teams of R&D and marketing personnel at every opportunity.
- Solve personality clashes as soon as possible and
- Avoid complacency – too much harmony is a bad thing.

2.3.5.2 Information Flow within the NPD Process

Information is considered one of the important factors within the NPD process as highlighted by a number of authors (Cooper, 1979, 1987; National Industrial Conference Board, 1964; Rothwell, 1972, 1977; Myers & Marquis, 1969). Information allows activities to take place, while people of different functional groups communicate with each other to make NPD work. Information also helps in decision making so that an informed decision can be taken. The most important thing about information flow is the kind of information that is being transferred: is the information valuable, is it correct or is it valid for its course?

In order to reduce uncertainty, it is not sufficient that information be processed; it also has to be transferred between different functions (Moenaert & Souder, 1990; Bonnet, 1986). In this way, the uncertainty perceived by particular functions can be reduced. Many organizations fail to produce products because of the uncertainties that are there. At the same time the efficient transfer of quality information between different functions encourages their coordination (Moenaert & Souder, 1990). Information sharing enhances communication throughout the organization. Information sharing makes it possible for staff in different departments to know what the objectives of the organization are. Employees will then act based on what they know and this will help them to commit and be responsible. Management will also know on time if they will be able to meet the target put forward to meet the needs of the organization.

2.3.5.3 Customer involvement within the NPD process

Lengnick-Hall (1996) thought that customers cannot only receive what an organization produces and delivers; they also can directly and indirectly influence the operations and outcomes of an enterprise. This gives customers an opportunity to share their expectations, but in the meantime it is also a good thing for the organization to use all they have for their customers. From an input-transformation-output system perspective, two customer roles are at the input, or upstream side of organizational activity: the customer as resource and the customer as co-producer. Three roles cluster at the downstream or output side of the system: the customer as buyer, the customer as user, and the customer as product (Lengnick-Hall, 1996). Therefore customer involvement can reduce uncertainty from the input and output side of product development. This can be disastrous if customers change their minds and want something else.

Customer orientation means organizational commitment to customers such that customers and firms share interdependence, values, and strategies over the long term. To do this, firms foster direct customer contact, collect information from customers about their needs, and use customer-supplied information to design and deliver products and services (Bowen, Clark,

Holloway, & Wheelwright, 1994). Customers' sophistication and knowledge are increasing. As expectations rise, customers' attention to detail and ability to articulate gaps between expectations and experiences increases. Therefore, customers are viewed as important potential co-designer and co-producer, since they can make an effective contribution to production activities (Chase & Tansik, 1983; Lengnick-Hall, 1996). As customers are the final stakeholders and arbiters of product, involving customers in product design and production can reduce uncertainty from customers. Otherwise, the firm may produce perfect products but will not be able to guarantee their sale. Every organization produces products hoping that customers will like them, but the fact remains that an organization should always produce a product.

2.3.5.4 Supplier involvement in the NPD process

Handfield and Pannesi (1995) found some support that supplier involvement in design can reduce the uncertainty from the material quality, the timing of material arrival, and supplier design and manufacturing capabilities so as to speed the product development. Malhotra, Grover and Desilvio (1996) suggest that suppliers are critical team members who assist through initial product design suggestions, technological contributions, and quality assurance considerations; all of which contribute to efficient manufacturability and minimisation of the design to make market cycle time.

In industrial systems, suppliers were looked upon with suspicion and a broad supplier base was retained to assure competition and low prices. Suppliers, being considered as outsiders, were only given as little information as possible and only got involved in the development process after product design and specifications were determined. This was in accord with the overall sequential product development process. As the environmental uncertainty increases, suppliers get involved early during the development process (Doll & Vonderembse, 1991) and it is not uncommon for suppliers to be responsible for the development of whole sub-assemblies for their customers. Few suppliers are used but they are viewed as long-term partners.

In the Japanese system, suppliers are an integral part of the development process: they are involved early, assume significant responsibilities and communicate extensively and directly with product and process engineers. The ability of the Japanese firm to operate efficiently while using a larger fraction of unique parts is due in significant part to the capability of the supplier network (Clark & Wheelwright, 1994). Responsibilities for the Japanese supplier include product and process design and in some cases prototype development (Clark & Fujimoto, 1991). Collaborative supplier relations are seen as the way to reduce uncertainty, speed the pace of new product introduction and sustainable long-term performance. This is

really a tricky situation, but it depends on the relationship between these people. If the relationship is not strong, it can be easy for a supplier to expose the idea to its competitor.

2.3.5.5 Strategic shift from sequential process to Parallel process

It has been established that by following all the traditional steps of NPD, product development and production time are extended and consequently it leads to late market product introduction. Johne and Snelson (1998) and Davis (1988) also indicated that there is always a price for late market entry: either repetition or losing customer loyalty. Evans (1990) also emphasised the aspect of extending development time, pointing out that delaying launch time by six months could also equal a loss of 33 percent in profits over five years. This has compelled other researchers such as Schilling and Hill (1998) to either consider simultaneous NPD process activities or parallel process instead of sequential process (see Figure 5).

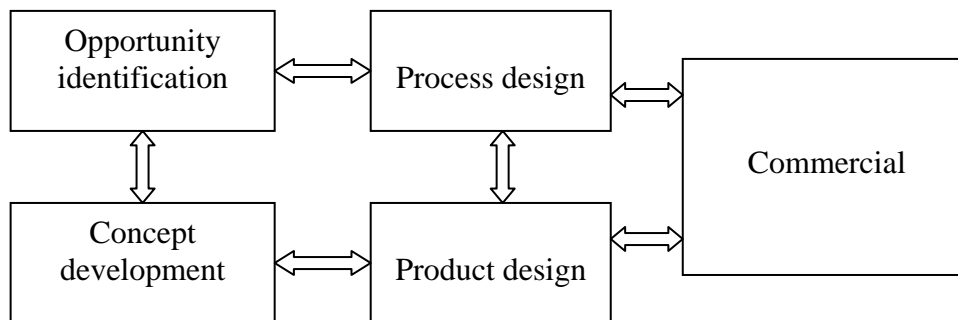


Figure 5. The NPD parallel process. *Source: adapted from Schilling & Hill (1998)*

2.3.5.6 Concurrent Engineering of the NPD process activities

In recognition of the time pressures facing those developing new products, Cooper (1988) suggested that there should be ‘parallel processing’ because it allowed all the activities to be performed concurrently. In parallel processing, the stages overlap instead of being sequential as in the traditional process as indicated in Figure 5.

Takeuchi and Nonaka (1986) highlighted that there are advantages that form part of the parallel process such as shared responsibility, co-operation, involvement, and commitment, sharpened problem solving focus, initiative, diversified skills and heightened sensitivity towards market conditions. Cooper (1988) suggested that by making the NPD process parallel, the entire new product process becomes multifunctional and multidisciplinary meaning that the marketing team, R&D, engineering and manufacturing come to share their expertise for the benefit of the organization as a whole. NPD culture encourages team work through out the organisation.

2.4 PREVIOUS EMPIRICAL STUDIES FOR NPD SUCCESS FACTORS

2.4.1 CASE STUDY 1

Booz (1982) conducted an empirical study investigating new product practices in seven hundred firms. The study identified the following characteristics contributing to the higher success of new product development:

- product fit with market needs;
- product fit with internal functional strengths;
- technological superiority of the product;
- top management support;
- use of a formal new product process;
- favourable competitive environment and
- structure of the new product organization.

Booz (1982) used the above factors to distinguish between the successful and unsuccessful firms. The findings of the study were as follows:

1. *Operating philosophy:* Successful companies were found to be more committed to growth through new products developed internally. They had a formal new product development process in place for a longer period of time. They also had strategic plans that included company growth for new products. They always pre-screened their new ideas more thoroughly, considering almost 10 times fewer new product ideas per successful new product as unsuccessful companies.
2. *Organizational structure:* successful companies housed the new product organization in R&D or engineering, and were more likely to allow the marketing and R&D functions to have greater influence on the new product process. They also kept the senior product executive in place for a longer period of time.
3. *The experience effect:* Experience in introducing new products enabled companies to improve new product performance. The study provided information to show that the more you do something, the more efficient you become at doing it. For the 13000 new product introductions studied in these 700 firms over a five-year period, the experience effect yielded a 71 percent cost curve.
4. *Management styles:* Successful companies appeared not only to select a management style appropriate to immediate new product development needs, but

also to revise and tailor that approach to changing new product opportunities and three styles were identified:

- An entrepreneurial approach, associated primarily with new-to-the-world products;
- A collegial approach, associated with entering new business and adding new items to existing lines;
- A managerial approach, most often associated with developing new products that are closely linked to existing business.

Concluding remarks on the Study

- *Commitment:* firms must make a long commitment to new products. They must look inward for their future product opportunities, and be committed to internal product development as the major source of growth. They must be willing to mount well-defined new products efforts that are driven by corporate objectives and strategies. They must support these efforts with consistent commitments of the necessary funds, as well as management and technical skills.
- *Strategy:* At the core of a company specific approach to a sound new product programme is a well-defined new product strategy. A new product strategy links the new product process to company objectives, and provides focus for idea/concept generation and guidelines for establishing appropriate screening criteria. The outcome of new product strategic planning is a set of strategic roles, used not to generate specific new product ideas, but to help identify markets for which new products will be developed.
- *Process:* The multi-step new product process is an essential ingredient in successful new product development. There is a new step in this process, namely strategy formulation. This revised new product process focuses on the search for ideas, reduces the attrition rate of ideas, and contributes to a higher success rate.

The study by Booz (1982) put more emphasis on new product development process as an essential element that allowed internal resources to be used maximally. The study also emphasizes the fact that the organizational strategy directly supported the development of new products. New product development strategy was aligned to the corporate organizational strategy. This simply shows that every staff member in the organization was able to relate to where the organization was going. Co-operation within the NPD team allowed them to work as a unit internally to access all those ideas that focused on the needs of their customers. All ideas were pre-screened before they could be regarded for concept development. The management style was found to be suitable for NPD, because of its entrepreneurial spirit, and was always seeking opportunities for development that links with

the organizational objectives. The management of the successful organization proved to be innovative simply because their staff was motivated to work as a team through the NPD process. The management seemed to have clearly defined the objectives of the organizations as well as the responsibilities of their staff. It also shows that the management could have started by knowing their market and then aligning it with their organizational capabilities.

The results of this study put emphasis on strategy, NPD growth, organizational structure, NPD team and organizational support.

2.4.2 CASE STUDY 2

Laforet and Tann (2006) conducted a study on NPD success factors showing how they contributed to the success of new product innovation in small manufacturing firms. The study was conducted amongst 1000 Birmingham and the West Midlands-based manufacturing firms. The success factors highlighted in this study amongst other things were:

- corporate culture;
- organizational structure;
- technological development;
- strategic orientation;
- investing in people;
- analyzing competitors and
- functional integration.

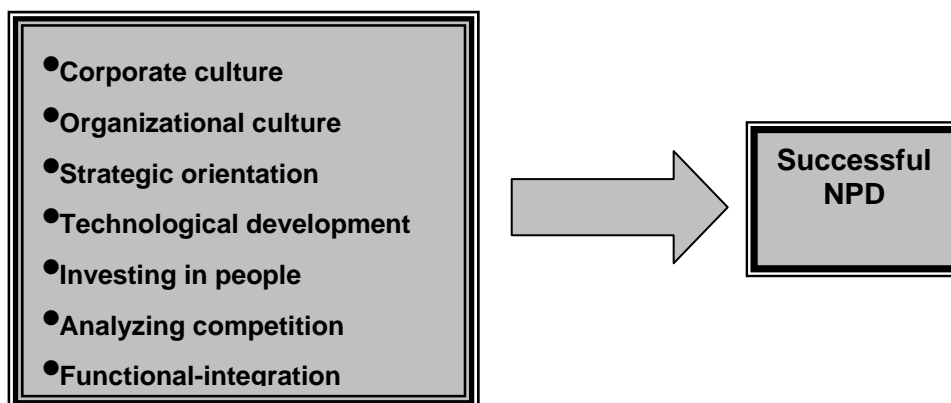


Figure 6. NPD success factors. *Source: adapted from Laforet & Tann (2006).*

The study revealed that SMEs that took part had committed leaders with vision, enthusiasm, and future-orientation who exploited external opportunities for inward investment and

information gathering. This shows that the involvement of an innovative leadership, who is vision-oriented within an organization guarantees results, as shown in the literature.

In support of Laforet and Tann's study (2006), other studies also showed the extent to which small businesses innovate successfully would depend on their capacity to plan ahead and to have a clear strategy. This shows that many people all over have realized that commitment by management to organizational strategy is of grave importance to NPD.

The results of this study are categorized as follows: more innovative companies are companies that are effectively practising NPD success factors and less innovative companies are companies that are not practising NPD success factors.

The findings on risk-taking were also confirmed by a study conducted among American SMEs (Blumentritt, 2004), showing that the most innovative firms were competitively aggressive and willing to take on a greater degree of risk. This shows that management has an understanding of the market and has a proper plan to face the competitors. In addition, another finding related to this theme by Barnet and Storey (2000) was the emphasis on process and product innovation by SMEs. Both processes require total commitment of the staff and management. This is the demonstration of complete understanding of the organizational capabilities in relation to the needs of the customers. Blumentritt (2004) in his study found that US SMEs pursued process innovation more than developing new products. He said further that SMEs spent more time developing new ways of producing products or services and as well as new ways of delivering them to their customers. It is evident that people may have similar strategies but they can implement them differently. The best way to do this is to stick with what one is good at instead of copying what other people are doing.

Culture and ways of working

The results showed that more innovative companies had higher commitment to innovation than less innovative companies. In more innovative companies, the CEO/owner was found to be more involved in developing new products, processes and ways of working than in less innovative companies. More innovative companies were found to have a clear sense of mission and purpose and were strongly committed to innovation; their CEO shows a strong personal commitment to innovation (Pavitt, 1991 and Heunks, 1998).

The findings also showed that more innovative companies empowered their employees and studied their market place regularly and provided more training for their managers than in less innovative companies. Making it in the NPD environment requires an attitude of an individual as well as proper support from the top management. The findings also showed that

culture requires change of mind since NPD environment changes with customer requirements.

Process innovation

The results showed that more innovative companies had better technological systems in place than less innovative companies. The effectiveness of innovation goes well with the management's understanding of the organizational focus relative to the available resources. It is of vital importance for any management to know where the organization is heading and which innovation type to choose.

Comments on the study

The results in general showed no support for new product innovations. The results reflected that at least half of the manufacturing companies did not develop new products by themselves; specifications for new products were provided by their customers. For instance, food manufacturers tend to make incremental product changes instead of developing entirely new products. The results of the survey also showed that SMEs perceived time and money as main barriers for developing new products and a number of less innovative companies perceived no demand for new products. However, Storey (1994) found that many small companies had no ambitions to grow; similarly they perceive more risks in developing new products therefore were often content with their existing products and customers regardless of market changes. According to Mosey, Clare and Wood cock (2002) developing new products are the way forward for small manufacturing firms. His study suggested that companies with aggressive growth ambitions repeatedly introduced innovative new products that opened up new market niches.

Little team integration and group orientation was also found in SMEs. The results showed that only one-third of more innovative SMEs used cross-functional teams. In most cases, the CEO/owner was found to be project-champion (75 per cent). The CEO/owner was found to evaluate new ideas for products and the new product development team evaluated processes. Shop floor personnel contribution to new ideas was found to be low compared to strategic managers. Nevertheless, this contradicts Barnes' (2000) findings on strategic planning in manufacturing strategy that was unlikely to be determined through a top-down planning process linked to a business planning regime. Barnes (2000) further asserted that manufacturing actions were often not systematically linked to business strategy and for many SMEs, goals existed unlike formalized plans.

A good level of training was found in more innovative companies. Apart from blue-collar workers who had on-job training, supervisors, middle and senior managers received outside and in house training. However, training was more limited in less innovative SMEs; only about one-third of the companies surveyed sent their supervisors, middle and senior managers to outside and in-house courses compared to two-thirds of more innovative companies.

Strategic orientation: the findings showed that in more innovative companies, innovation was goal oriented and part of the company objectives. This seems consistent with literature highlighting the importance of company strategic orientation, including market orientation and organizational learning which was shown to increase company innovative performance (Salavou, Baltas & Lioukas, 2004).

Conclusion remarks

The results of this study give an impression that having all the NPD success factors in the organization does not guarantee success. The less innovative companies did not have a drive to grow which means they did not care about meeting the needs of their customers. They were not ambitious as they had nothing to prove. The management was not innovative enough to face their uncertainty head on. Employees had no motivation to work hard; possibly the objectives of the organization were not known to them. It might happen that these organizations did not even have strategies.

Looking at the more innovative companies shows they had success on their side even though they did not stretch themselves to the limit. They were complacent with what they had achieved. If they want to stay ahead in this game they need to aim high and use their available resources to the extreme. They did not take advantage of all the principles on NPD success factors they had. There is much more that one can achieve from cross-functional teams. With cross- functional teams, different expertise put together can achieve much more. Team spirit influences everyone to do even more. The top management did not seem to have innovative leadership; rather it had characters who settled for second best.

2.4.3 CASE STUDY 3

Zhang & Doll (2001) conducted a study to investigate why companies fail to deal with the environmental uncertainties that lead to NPD failure. In their study, they have evaluated NPD success factors that have been developed by a number of researchers such as Brown and Eisenhardt (1995), Clark and Fujimoto (1991), Craig and Hart (1992) which are as follows:

- team vision;
- strategic orientation;
- heavy manager;
- concurrent engineering;
- customer involvement;
- supplier involvement and
- platform products.

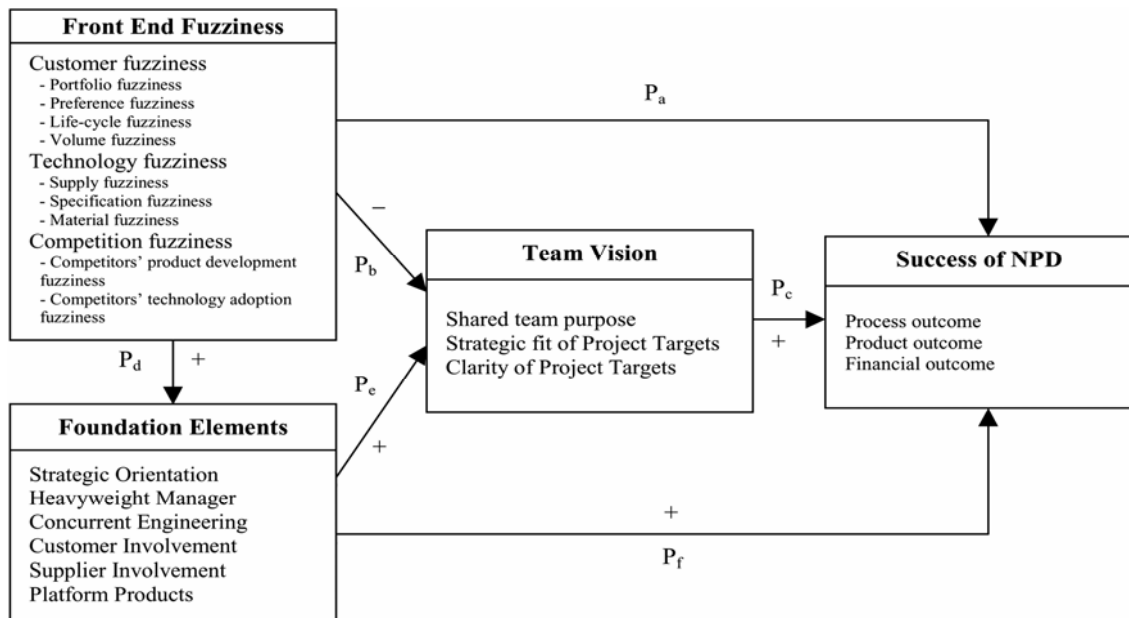


Figure 7. Causal model. (Source: Zhang & Doll, 2001)

The findings of their studies reflected that the difficulties and uncertainties associated with new product development are increasing along with the pressure to develop more new products (Gupta & Wilemon, 1990). To succeed, companies are finding that they need to develop better products (high quality, low cost and differentiation) and they need to do it faster (speed and flexibility). Thus, a firm's competitiveness in world markets depends on its ability to develop quickly and market new products that add to customers' value.

Most importantly, in order to cope with uncertainties, the organization must focus more on managing NPD programme issues besides building specific, clear team vision. The NPD success factors cut across projects and provide a basis for the project team to build clear vision. Strategic orientation can help teams focus on collecting and sharing knowledge about customer, technology, and competitors. The heavyweight manager can coordinate and infuse concepts, and assure consistency of product design and conformance to concepts and plans (Clark & Fujimoto, 1991). Platform products foster organizational learning, since the process is repeated with greater frequency. Likewise, concurrent engineering, customer involvement, and supplier involvement facilitate to share knowledge and further align purpose. Although all the foundation elements are important for team vision building and the success of NPD, which is the most critical factor is a question that needs to be explored the future research.

The study demonstrated that the success of NPD in any organization depends on the team vision and the management that drives it. The study highlighted that if people work together they are able to support each other to succeed in their common goals. The study also revealed that people are able to work side by side in protecting the interests of their customers. The NPD team was able to work tirelessly in the NPD process right from the idea generation until commercialisation. The team was able to co-operate their team vision with the organizational objectives. The NPD process used was concurrent engineering as compared to sequential (traditional) process. They were able to do things simultaneously instead of waiting for one process to finish before the other one commenced. It was easy for the team to know what their customer needs were because they were part of the NPD team. When customers are part of the NPD team, the marketing team does not have to run around searching for information.

2.4.4 THEROTICAL FRAMEWORK SUMMARY

Below are the theories around each NPD success factor that are extracted from the preliminary studies and it will be used in the current studies:

2.4.4.1 Management/leadership

- Anthony (1998) emphasised on innovative leadership personality.
- Argyris (1999); Meister (1998); Senge (1990); Anthony (1998); Deming (1986); Barczak and Wilemon (1989) highlighted the importance of safe working environment that enforce creativity within NPD process.

2.4.4.2 Strategy

- Mintzberg (1975); Porter (1996); Thompson and Strickland IV (1993) indicated that strategy provides an organisation with a sense of direction
- Schumann and Prestwood (1994) insisted that strategy should emphasis on people; the strategy should be flexible.

2.4.4.3 Organizational structure

- Low and Fullerton (1994); Peters (1992); Muzyka *et al.* (1995); Hedlund and Rolander (1990); George *et al.* (1994); McCalman (1996); Hankinson and Hankinson (1999) argued that organisational structure allows top management and employees to work together in the usage of their resources to meet the needs of their customers. They believe that organisational structure if implemented correctly promote the culture of trust and openness.

2.4.4.4 NPD process

- Cooper (1979, 1990); National Industrial Conference Board (1964); Peters and Waterman (1982); Ayal and Raban (1990); Lengnick (1996) and Cooper (1988) emphasised that marketing people need to be closer to the customers, so that they can meet the customer's needs. They also highlighted that cross functional collaboration is of vital important.

2.4.4.5 People

- Scheider *et al's* (1996) stressed that innovative culture is the foundation for human management.
- Conger and Kanugo (1988); Keller and Danscreu (1995); Spreitzer (1996); Thomas and Veithouse (1985) believe in developing employees through empowerment process.

2.5 CONCLUSION

The literature survey reflected that for NPD to succeed, innovative culture should form part of the organization. It simply means that every staff member in the organization should speak the same language with the top management. The environment itself should reflect the newness of minds in a way things are done. It was highlighted before that the primary focus was on the six NPD factors that were covered in the general themes model by Craig and

Hart (1992). The sixth key NPD success factor which is known as information as is seen in Figure 2, has been integrated within strategy, organizational structure and NPD process. The reason for its integration is that the visibility of all other NPD success factors requires the flow of information. It is common in the entire NPD process.

Each case was treated according to its uniqueness, but the focus was more on the application of those factors in relation to the theory. The assumption is that the correct application of each factor should yield positive results. All the NPD success factors were represented in all the cases, but in some instances different names were used, e.g. instead of management, others used heavy management or even leadership.

In all the cases management showed character in taking the authority to lead their organisations to success. The integrity of the leadership was also displayed where leaders allowed their employees to trust them, resulting in their employees eventually committing themselves to the organizational activities. The leadership also concentrated on their organizational objectives and they did not lose sight of where they were going. They successfully used their strategies to manage their resources. Integrative mechanism was common amongst the cases within new product development process. They worked as a team instead of as individuals. In most cases, instead of traditional processing (sequence) they opted for concurrent engineering where activities were operated simultaneously. People supported each other even though they were from different departments. They understood each other's function and learned from each other instead of competing.

Companies that were unsuccessful showed that they were not committed and did not want to change. Most of them did not take the initiative to understand the needs of their customers. They did not work as a team; they were competing against each other. Management opted to do things by themselves instead of sharing with their employees.

The most common problem of NPD from the case studies was that most of the organisations did not take initiative to know the needs of their customers. As a result it becomes difficult to meet their expectations. If the organization does not know the needs of their customers, they will definitely supply what their customers do not need. This simply means that the relationship between the business and their customers is affected. The successful organisations in those case studies preferred to involve their customers in the NPD process as was recommended by the literature. The findings from the case studies were of vital significance in relation to the theories. The evaluation and validation of the cases where the best case that qualifies for the current study is chosen, is discussed in the next chapter.

CHAPTER THREE: EVALUATION AND VALIDATION OF CASE STUDIES

3.1 INTRODUCTION

This chapter discusses the selection of the best case study that effectively covers the NPD success factors detailed in the literature as is seen in Figure 2. Note that information which is the sixth and most common key NPD success factor has been integrated within other factors:

1. The role of management within NPD.
2. The role that strategy plays in NPD.
3. Organizational structure and its influence in NPD.
4. People and their involvement in NPD process.
5. NPD process and its influence within NPD.

The evaluation of each case study was based on the key NPD success factors and theories as indicated in Table 3.

3.2 THE SELECTION OF THE CASE STUDIES

To get some form of measuring tool, assumptions were made that each success factor equates 20% if it fully fulfils the theory and if it does not fully satisfy the theory, it is 10%.

1. Management = 20%,
2. Strategy = 20 %,
3. Organizational structure = 20%,
4. People = 20%,
5. NPD process = 20%.

3.2.1 Case study 1

As can be seen from the validation of the case studies table (see Table 3) case study 1 covered all the elements on the theory, namely management, strategy, organizational structure, people and new product development process. All the key success factors of NPD were covered successfully showing how important they are in any organization pursuing NPD. The study demonstrated how important it is to be able to balance the key success factors accordingly; from the understanding of the environment by the management to how information is communicated right down to the operational staff. The management had good understanding of their roles, the position of their organization and was knowledgeable of the available resources so it became easy for them to put together a strategy that was suitable for their staff and met the needs of their customers. There was a proper linkage from

management, strategy, organizational structure, people and new product development process. Everyone in the organization was committed to their responsibilities as was evident in their organizational performance. The ranking for this case was as follows as it is also shown in figure 8: management = 20%, strategy = 20%, Organizational structure = 20%, People = 20%, NPD process = 20%

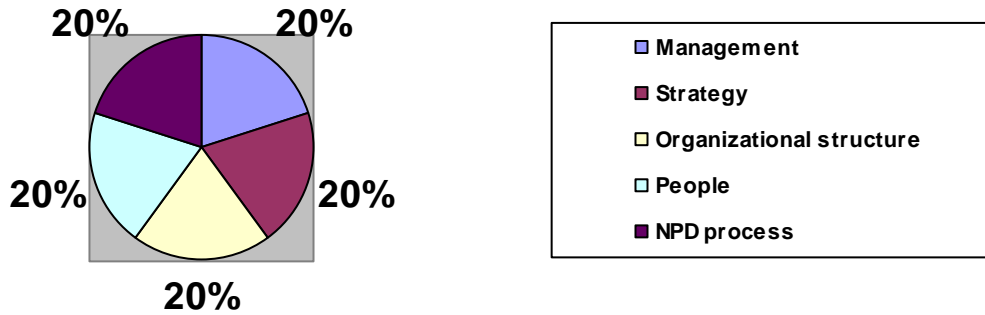


Figure 8. Ranking of case study 1

3.2.2 Case study 2

Looking at the validation table (see Table 3), case study 2 had not thoroughly covered all the appropriate key success factors, and the results were not satisfactory. More innovative companies showed that all the key success factors concerning the theory were covered, but much more could have been done. The study showed that management could have achieved better results if it had not settled for the second best. The study revealed that management was comfortable with the results they got, with the organization showing unused resources. This fact indicates that if the management was future oriented, they could have tapped into other markets to strengthen their capabilities.

The study also showed that management struggled to encourage staff participation, communication was not flowing smoothly and staff struggled to collaborate especially in less innovative companies. They even struggled to get to know their customers' needs and preferred to consult the magazines and newspapers instead of involving their customers. Their strategies were well structured even though they lacked staff to run with it. This shows that good strategy alone is not good enough; it needs innovative staff that will implement it so that it can benefit the organization. The staff in this case was not ambitious; this showed that they did not have a vision and goals to look ahead to.

The ranking for this case was as follows as it is also shown in figure 9: management = 10%, strategy = 10%, Organizational structure = 10%, People = 10%, NPD process = 10%

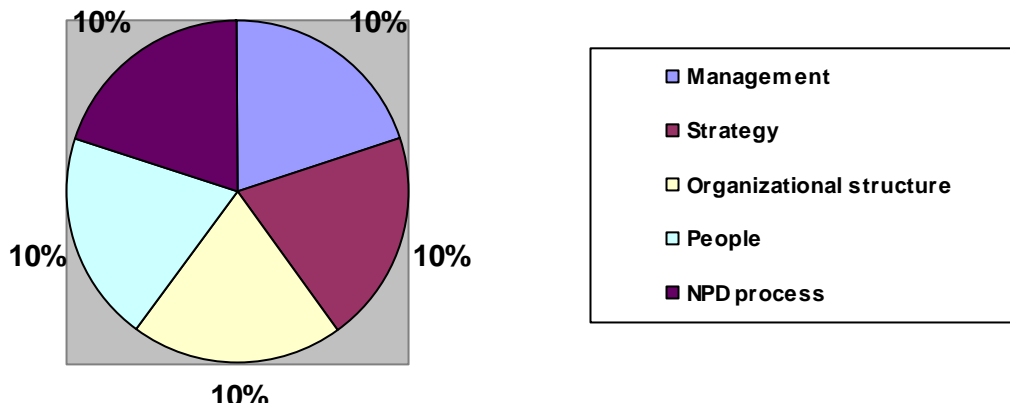


Figure 9: Ranking of case study 2

3.2.3 Case study 3

For case study 3, as is shown in the validation table (see Table 3) management was organized; it had performed its duties according to the theory. Management showed commitment and adhered to the organizational objectives. Management insisted on team vision and staff participation was as required. Management took it upon itself to instil organizational vision. Management had a thorough understanding of the environment, but lacked in terms of progressive change. The focus was more on what they were doing; they did not consider seeking more opportunities. Strategically, the organization was on the ball. The communication within the organization was not bad since they embraced team work.

The organizational structure was not flat enough because management was still taking control; staff did not have a say. Staff was conformable enough to produce even though they had some limitations because of the management that took control. The NPD process was concurrent and yielded good results, but it could have done much better if management participation was positive.

The ranking for this case was as follows as it is also shown in figure 10: management = 20%, strategy = 20%, Organizational structure = 10%, People = 20%, NPD process = 10%

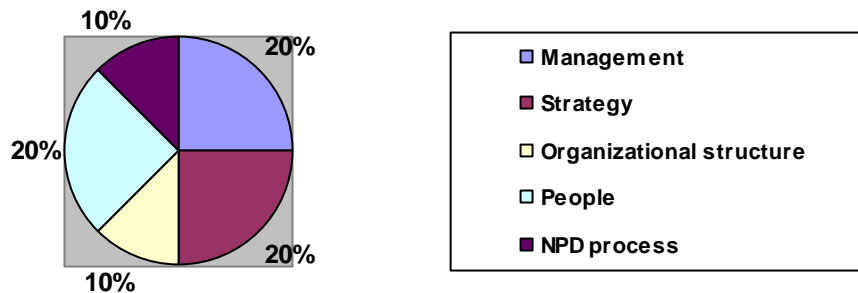


Figure 10: Ranking of case study 3

Table 3: Validation of the case studies

NB: The paraphrased information under the section Case Studies is from three different cases.

Key success factors	Management/leadership
Theory	Anthony (1998) emphasised on innovative leadership personality. Argyris (1999); Meister (1998); Senge (1990); Anthony (1998); Deming (1986); Barczak and Wilemon (1989) highlighted the importance of safe working environment that enforce creativity within NPD process.
Case Study 1	Management in this case had encouraged its staff to develop products that are closely linked to the existing business. They new exactly what their customer needs were and they also aligned their resources and activities to match their capabilities. The leadership or management were driven by the organizational objectives and steered everyone to follow on its footsteps. The management successfully defined the new product programs and aligned them with the new product strategy that fits in the organizational strategy. Management had the entrepreneurial spirit, always seeking new opportunities and bringing new products to the world that put them ahead on the market. The management did not only depend on what was in the market, they also researched what the market was not getting and provided it to the market. Management were eager to make a difference and took calculated risks that put them ahead of their competitors. These organizations were successful because their management were prepared to engage their staff in all the organizational activities. It is evidence from the study that the management were participative in style such that their staff became committed in their responsibilities. The attitude of the staff proved that empowerment processes were used by management to develop staff so that it can be integrative in nature.

Case Study 2	<p>The results showed that more innovative companies had higher commitment to innovation than in less innovative companies, but management took the lead instead on the entire team. The extent of the innovativeness of the organization depended upon the management; this simply means that management of the more innovative companies had better understanding of innovation than in less innovative companies. In more innovative companies, the CEO/owners were found more involved in developing new products, processes and ways of working than in less innovative companies. More innovative companies found to have a clear sense of mission and purpose and strongly committing to innovation and their CEO's showed a strong personal commitment to innovation.</p> <p>The findings on management risk-taking showed that most innovative firms were competitively aggressive and willing to take on greater degree of risk. This shows that management has an understanding of the market and had a proper plan to face their competitors.</p> <p>The study also showed those successful organizations pursued process innovation more than developing new products. The study also revealed that SMEs spent more time developing new ways of producing products or services and as well as new ways of delivering them to their customers. It is evidence that people may have similar strategy but they can implement them differently. The best way to do this is to stick with what one is good at instead of copying what other people are doing.</p>
Case Study 3	<p>The heavyweight manager managed to coordinate and infuse concept, and assure consistency of product design and conformance to concepts and plans. This shows that the manager has an understanding of the environment where the organization is operating and was able to positively motivate the staff.</p> <p>The manager concentrated on insisting in team vision, so people worked together as a team and accomplished as a team. This shows that the management was influential and stood by his beliefs of putting his objectives ahead and encouraged everybody in the organization to follow suit. It also showed that the manager was passionate about getting results and made show that every staff understands the organizational vision.</p>
Key success factors	Strategy
Theory	<p>Mintzberg (1975); Porter (1996); Thompson and Strickland IV (1993) indicated that strategy provides an organisation with a sense of direction</p> <p>Schumann and Prestwood (1994) insisted that strategy should emphasis on people; the strategy should be flexible.</p>
Case Study 1	<p>The new product strategy was linked to the product process that was automatically linked to the organizational strategy. The results of the study showed that successful organizations had strategic plans that included company growth for new products. The results also showed that they pre-screened every idea before it was conceptualized proving that every idea was valued first and assessed based on the availability or resources and organizational capabilities. Their workers were aware of what the entire plans of the organizations were and were comfortable</p>

	<p>to commit. They were always eager to try something different every time to suit their customers evolving needs.</p> <p>The success of these organizations demonstrated the satisfaction of their employees. It shows that they had higher regard for their employees and they took care of their needs to keep them happy. The fact that they were able to successfully collaborate their functions showed that they were good with each other and were well empowered.</p>
Case Study 2	<p>Strategic orientation, the findings showed that in more innovative companies, innovation was goal oriented and part of the company objectives. This seems consistent with literature highlighting the importance of company strategic orientation, including market orientation and organizational learning which was shown to increase company innovative performance (Salavou <i>et al.</i>, 2004). They were very aware that their successes were on how different their approaches were to the market. They took advantage of the technologies and were aware of what their customers wanted and were able to give it to them. It was also highlighted that the less innovative companies did not show interest in what the market wanted. The successful organizations proved to be goal getters as long as their customers were happy.</p> <p>The findings also showed that more innovative companies empowered their employees and studied their market place regularly and provided more training for their managers than in less innovative companies. Making it in the NPD environment takes an attitude of an individual as well as proper support from the top management. The findings also showed that culture requires change of mind since NPD environment changes with customer requirements.</p> <p>Where as in less innovative companies, people were not given much room to prove themselves. They had no ambitions for growth and they did not have dreams and expectations.</p>
Case Study 3	<p>To succeed, companies were found to believe that they needed to develop better new products (high quality, low cost and differentiation) and they needed to do it faster (speed and flexibility). Thus, a firm's competitiveness in the world markets depends on its ability to develop quickly and market new products that has customers value. This gives an indication that this organization new its environment very well and was conformable to serve in that environment.</p> <p>The results unfolded as follows, in customer uncertainty categories, a team has to collect information about customer-valued characteristics; for portfolio uncertainty, a team has to know what combination of products it needs to provide; for volume uncertainty, a team has to know how many products it can sell so as to justify its investment, and so on. For technology uncertainty, a team has to monitor technological changes and know clearly suppliers' and its own internal capability. For competitor uncertainty, a team has to have knowledge about degree of competition and possible competitors' actions. The information given above demonstrated that this organization had everything planned and was determined to see its customers happy. They discovered the secret that if they keep their employees happy, customers will definitely get what ever they wanted.</p>

Key success factors	Organizational structure
Theory	Low and Fullerton (1994); Peters (1992); Muzyka <i>et al.</i> (1995); Hedlund and Rolander (1990); George <i>et al.</i> (1994); McCalman (1996); Hankinson and Hankinson (1999) argued that organisational structure allows top management and employees to work together in the usage of their resources to meet the needs of their customers. They believe that organisational structure if implemented correctly promote the culture of trust and openness.
Case Study 1	<p>There was collaboration between R&D and marketing. The reason was that all the customer concerns should be taken into consideration when making a decision on the product to be developed. The structure proved to be flatter simply because of the communication that was there between different departments. They were able to corporately decide on the ideas that were to add value to the organizations.</p> <p>The results showed that management was open enough to share their intensions with their employees concerning the future of their organizations.</p>
Case Study 2	<p>Little team integration and collaboration more especially within less innovative companies. Where as in more innovative companies they worked as a team and management was also part of their decision making.</p> <p>Managers proved to be the champions and information sharing between management and staff was minimal more especially on less innovative companies.</p> <p>It is safe to say that for more innovative companies they embraced flat structures as compared to less innovative companies.</p>
Case Study 3	The success of this organization was based on team vision, which simply means that they had coordination going on between the management and staff. It also shows that communication was flowing accordingly without any stumbling block.
Key success factors	People's involvement in NPD
Theory	<p>Scheider <i>et al's</i> (1996) stressed that innovative culture is the foundation for human management.</p> <p>Conger and Kanugo (1988); Keller and Danscreu (1995); Spreitzer (1996); Thomas and Veithouse (1985) believe in developing employees through empowerment process.</p>
Case Study 1	<p>The employees in these organizations showed that they were in a good working environment that encouraged them to work together. They were able to make corporate decision about which ideas to follow that would add value to the organization.</p> <p>The employees also demonstrated commitment on their side to show that they were happy and encouraged to perform their daily duties.</p> <p>The employees also demonstrated that their management empowered them to use their different expertise to add value in each other's career. They showed dedication that proved that their management could have defined their business vision and goals.</p>

Case Study 2	<p>Little team integration and group orientation was found in less innovative companies.</p> <p>The results showed that only one-third of more innovative SMEs used cross-functional teams. In most cases, the CEO/owner was found to be project-champion (75 per cent). The CEO/owner was found to evaluate new ideas for products and the new product development team evaluated processes. Shop floor personnel contribution to new ideas was found to be low compared to strategic managers. These results proved that people were not fully participated in their organizational activities.</p> <p>Even though there was some form of integration in more innovative companies, they were fully committed that showed that results can still be found though people are not giving their best potential.</p> <p>A good level of training was found in more innovative companies. Apart from blue-collar workers who had on-job training, supervisors, middle and senior managers received outside and in house training. However, training was more limited in less innovative SMEs, only about one-third of the companies surveyed sent their supervisors, middle and senior managers to outside and in-house courses compared to two-thirds of more innovative companies.</p>
Case Study 3	<p>The results revealed that, the successful organizations were successful because of the team vision. Employees were motivated in such a way that they used their diverse knowledge to collaborate in the interest of their customers.</p> <p>Their success also proves that they were empowered enough so that they could work together instead of working against each other. Their quality products also showed dedication of their teams. They had a shared team purpose and they all embraced that without undermining their superiors. The most important thing was that they combined their skills and used that as their strength against their competitors.</p> <p>Where there was a problem, they were able to correct it as a team without blaming each other, what a team spirit.</p>
Key success factors	NPD PROCESS
Theory	<p>Cooper (1979, 1990); National Industrial Conference Board (1964); Peters and Waterman (1982); Ayal and Raban (1990); Lengnick (1996) and Cooper (1988) emphasised that marketing people need to be closer to the customers, so that they can meet the customer's needs. They also highlighted that cross functional collaboration is of vital important.</p>
Case Study 1	<p>The results showed that the NPD team was comprised of different people with different expertise and most importantly the needs of their customers were their primary focus.</p> <p>The results also showed that all their ideas were pre-screened thoroughly considering the availability of the resources and the capabilities of the organizations.</p>

	<p>These organizations were also depending more on the internal strength of their diverse staff. The results proved that the management was confidence about their environment which simply showed that they new had information about their customers before. This was shown on their NPD strategy that was aligned with the organizational objectives.</p> <p>For the fact that they had collaborative functional group proved that everything was done parallel instead of sequentially. Sequentially normally is done one step after another that requires individual process.</p>
Case Study 2	<p>The study demonstrated that the success in NPD depended on the vision and the management that drives it. The study also highlighted that if people work together they are able to support each other to succeed in their common goals. The study also revealed that people are able to work side by side in protecting the interests of their customers. The NPD team was able to work tirelessly in the NPD process right from the idea generation until commercialization. The team was able to co-operate their team vision with the organizational objectives.</p>
Case Study 3	<p>The NPD process used was concurrent engineering as compared to sequential (traditional) process. They were able to do things simultaneously instead of waiting for one process to finish for the other one to commence. It was easy for the team to know what their customer needs were because they were part of the NPD team. When customers are part of the NPD team, the marketing team does not have to run around searching for information.</p>

3.3 CONCLUSION

Considering the evaluation of the cases against the theory as seen above, case study 1 comes first followed by case study 3 and case study 2 seems to be lagging behind. Looking at case study 2, all the key NPD success factors were covered but not fully. This shows that an organization may embrace all the NPD success factors, but the problem can be in the implementation. It becomes difficult if one is just implementing them without the checklist. That is why it is important to always refer to the theory. Copper (1993) provided a checklist for NPD success factors, (see Appendix C). The literature provided some guidelines as to what each key NPD success factor should contain to demonstrate its validity. Case study 3 also represents all the key NPD success factors, but management, strategy and people satisfy the guide lines. It comes back to a point that having all the success factors does not mean that the organization stands to succeed; the most important thing is the implementation of each factor. That is why it is important to have a checklist that will validate the relevancy.

This leaves us with case study 1, which covers all the key NPD success factors satisfactorily with regard to the theory; the only thing that can be checked against is the checklist in the Appendix C. This means that our case study to be used in our current study is case study 1 where the concentration was on balancing all five key NPD success factors based on their

significance. The management focused closely on the environment they were operating in and developed a well structured strategy to complement the needs of their customers. They kept on training their staff to keep up with the advancement of technology. Commitment by staff gave courage to their customers to be part of the NPD team. It is believed that they had their eyes on the checklist so as not to lose sight. It is the conclusion that management in case study 1 did not neglect to evaluate their strategies from time to time.

Case study 2 and case study 3 were not bad at all; it simply means that all other success factors need to be balanced based on their viabilities. The lesson learned from these two case studies is that seeing results does not mean that an organization has arrived. It is just an indication that it is on the right track, but still needs to do more to produce better results. Management and their staff need not think that they know everything and there is no need to get feedback from their customers. Looking at the results from the case studies and the theory, it is fair to say that management, strategy, NPD process and people are factors worth evaluating in the current study. These four factors were appropriately supported by the evidence gathered from the three previous case studies with regard to the literature. The evaluation of the previous case studies with regard to the literature put forward the following four key NPD success factors; management, strategy, NPD process and people. These four key NPD factors were covered very well by both the case studies and the theory and it will make sense to evaluate these four key NPD success factors in the current study. The results will also be checked against the previous case studies for validity. The chapter below demonstrates how information was collected and analyzed to evaluate these four key NPD factors.

CHAPTER FOUR: RESEARCH METHODOLOGY

4.1 INTRODUCTION

This chapter covers the approach and the instrument used for data collection and data coding that leads to data analysis. The purpose of the research is to evaluate if the organisations in the Western Cape are using NPD success factors in dealing with their uncertainties of their organisations. After a thorough evaluation of the theory and the previous case study, the following key NPD success factors as justified in the previous chapter were selected for the current study: management, strategy, NPD process and people.

The literature review which included previous case studies revealed that many organisations fail to produce products because of the uncertainty of NPD. It was established that environmental uncertainty causes organisations not to address problems at hand, such as knowing what their customers needs are, failing to identify the core business as well as failing to understand the environment they operate in. The literature revealed that management lack research skills to identify the needs of their customers and they also do not have interpersonal skills to handle and motivate their workforce. Consequently, it becomes difficult for engineering management to allocate resources properly to their respective operations. The literature rightfully demonstrated that for NPD to succeed an innovative culture must flow through the organisation. The literature also stated that the leadership in organisations that pursue NPD must be innovatively minded so that all the employees could follow the example of their management. The nature of the current research matches the characters of case study methodology, whereby a number of cases are selected to demonstrate the relevance of this work to the literature and previous empirical studies.

4.2 THE CASE STUDY METHODOLOGY

To collect and analyse data, the case study methodology was found to be relevant because of its characteristics. Case studies emphasise detailed contextual analysis of a limited number of events or conditions and their relationships. Researchers have used the case study research method for many years across a variety of disciplines. Social scientists, in particular, have made wide use of this qualitative research method to examine contemporary real-life situations and provide the basis for the application of ideas and extension of methods (Stake, 1995). Yin (1984) defines the case study research method as an empirical

inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used. It is for this reason that the case study method is preferred in this research study.

It is the purpose of this study to evaluate if the SMEEs in the Western Cape, Republic of South Africa are practising NPD success factors to deal with their environmental uncertainties and also to establish if they are producing new products to boost the economy of the country. The literature highlighted a number of NPD success factors that are likely to bring success in NPD and some of these factors have already been put to the test and the results are positive. This work included three previous empirical studies to verify the relevance of the literature in evaluating the key NPD success factors as is reflected in the validation of case studies table (see Table 3). The validation of the case studies table was used to examine which case was suitable to be used as a measuring instrument in the current work. The validation of the case studies table comprises of the theory and the reality check from the results as shown in Table 4, as well as the validation of the case studies in Chapter Three.

Case Study Selection Method

The criteria for selecting companies for the current work include:

- engineering companies involved in manufacturing;
- companies that have between 20 and 100 employees;
- companies that are in the Western Cape.

The selected companies were the first nine companies matching the above criteria and showed interest in the study. All the companies that participated as case studies were selected following a meeting with the top management. Two of these companies were not directly producing new products, but the organisations they supplied with parts were dealing directly with their customers. To some companies their new products were their technologies that they were using to produce the complicated shapes that their customers had asked for. The Management of these companies was eager to be part of the study because they believed that the study was valuable. The lists of all these companies were provided by the South African Department of Trade and Industry (DTI). Companies were chosen from a wide range of engineering manufacturing activity.

4.3 DATA COLLECTION

The focus of this research work as indicated is within the key NPD success factors and these issues are addressed at management level. For this reason, the target group includes people who are in the senior positions like engineering managers. For the simplicity of this study only one senior person in each company was interviewed with the assistance of a well prepared questionnaire (see Appendix A). The management person interviewed seemed to know the business and its operating environment.

Questionnaires, interviews and observations were used in the collection of data. These data sources are found to have both advantages and disadvantages, but when they are used together, fair results are expected because they complement each other (Yin, 1994). According to William (2006) interviews are a far more personal form of research than questionnaires. One source of data can be good at some stage, but the other source can give informative data. Yin (1994) adds no single source has a complete advantage; that is why it is important to put them together.

The Likert scale as a research instrument is used to collect the data in this work, because of its typical format. Likert scaling gives the respondents many options to choose from without limitations. It also maintains the validity of information given by the respondents (William, 2006). The respondent is guided and led to answer the questions formulated in the questionnaire to avoid any assumptions. The questions are structured in such a way that the essence of the information contained in the model is maintained (see Appendix A for questionnaire). A voice recorder was also used to ensure that certain points were not missed in the interview. The respondents were advised to choose the preferred answer based on their opinion by making a cross. In addition, this study the SPSS 14.0 was utilised in order to generate frequencies, tables, and in particular graphs, as the researcher believes that graphs are helpful and easy to make the analysis more understandable.

During the interviews ambiguous questions were cleared up as can be seen in the fashion which the questions are structured in the questionnaire (see Appendix A). The questionnaire is divided into two different sections: section one covers personal data and section two covers decision making questions. All the questions in the questionnaire are aligned with the evaluation list in Appendix B. The evaluation list gives a description of all the different categories that make up each aspect from management to people.

The case study selection led to the four key NPD success factors as indicated before (see page 66) and are as follows:

- Management
- Strategy
- NPD process
- People

A check list is also provided that has twenty key points on NPD success factors in Appendix C. This check list is recommended for any organisation that pursues NPD. The observation was properly done since the organisations allowed the researcher to go through their factories to see how things are done.

4.4 CONCLUSION

As anticipated, the data collection process within the nine selected companies went very well. Managers of those nine companies participated whole heartedly. Although all of them were busy, they opted to give up their valuable time after seeing the importance of the study and the benefits it had for the country. They were happy to answer all the questions in the questionnaire because the questions were not sensitive. They all gave honest answers as it could be easily observed from their facial expressions. Their working environment and equipment were of good standard. The information gathered was valid and voice recording device was used as a backup. Members of management proved to be familiar with the concept of the study. When they were asked if ever there were important questions omitted in the questionnaire that were valid for the study, they were all satisfied, which showed that the standard of the questionnaire was satisfactory. It was a good idea to personally interview them in order to clear some questions.

CHAPTER FIVE: DATA ANALYSIS AND DISCUSSION

5.1 INTRODUCTION

This chapter covers the analysis and the discussion of the data captured that led to the decision as to whether SMEEs in the Western Cape used key NPD success factors to deal with problems hindering NPD. The analysis covered both general and individual discussion of each of the four key NPD success factors dealt with, the detailed information on individual parameters are to be found in appendix D.

The data obtained were perceived to be of high quality since all the precautions for case study methodologies were followed. A well structured theory for each key NPD success factor was used in the construction of the questionnaire as outlined in the theoretical framework, section 2.5 in Chapter 2. The questionnaire was theoretically based covering the fundamental key NPD success factors as seen in Appendix A.

The questionnaire was structured in such a way that the respondent chose only one option from the five available. Each key NPD success factor as seen in Appendix B was represented by a set of questions that required an answer that giving an indication of whether it was been addressed or not. All nine companies that formed part of the case study had to use the same questionnaire. To analyse this kind of quantitative data, cross tabulations and frequencies were used to demonstrate the differences and similarities of responses from these companies. Reynolds (1977) indicated that cross tabulation has the capability to show the strength of a relationship between different responses. The cross tabulation in this case clearly indicated how many companies strongly agreed, agreed, did not know, strongly disagreed or disagreed to the various statements characterizing each key NPD success factors. Besides cross tabulation, the Likert-type variables were analysed using frequency distributions. The ordinal items in the questionnaires were analysed using the mean and median. The analysis was carried out using the Statistical Package for Social Sciences (SPSS), version 14.

5.1.1 Management

Regarding the key factor management the results of the study indicated that the level of managers ranged from junior management to top management. Out of the nine companies, two had a junior manager and a senior manager respectively while the remaining companies had top managers. Their educational background ranged from Grade Twelve to University degrees. Their academic background are categorised as follows: one had completed Grade Twelve, three had College certificates and the remaining five managers had University

degrees. All of these managers had more than five years working experience with their companies. These managers demonstrated true ownership in their organization as they had a thorough understanding of their industries and acted with authority.

Regarding management in general, the overwhelming responses satisfy the model as it can be seen in the theory by Anthony (1998) which stresses that the leadership has the ability to make employees deeply committed to fulfilling the vision of the organisation. The results showed that management in general agree with the theory and were able to see the difference that they are able to bring about within their organisations (see Table 4). They know more or less what their organisations are all about and they also understand the environment that they operate in. It is true that educated managers have some sense of respect towards their employees as compared to managers who are not educated. These organisations depended more on training to compensate skills shortage. A couple of the managers had difficulty in answering the questionnaire since their companies were not directly involved in new products, but just do what they are asked to do.

The different attributes for the statements regarding management are represented by different colours as can be seen in Figure 11. The dominant colour was for companies that simply agreed to statements, followed by companies that strongly agreed to statements regarding the management key factor. The remaining colours represented companies that disagreed as well as those that did not know. The general response on the statements that the role played by management to lead NPD is of vital importance was positive. The positive response showed that those engineering managers had taken control of their businesses by implementing principles that supported the well being of their organisations as a whole.

Those companies that disagreed were due to the business environment that they were in. In most cases new products are decided on by their customers and they just produce what was requested of them. Out of all eight attributes of management two companies did not agree with two of them as it can be seen in graph two and three in appendix D. The reason why these two companies can not invest in new products persistently is that they only work with what they are given by their customers, the only thing that they can improve are their machineries and processes for efficiency. The issue about setting up objectives for new products do not directly apply to them as well.

Table 4 along with the graph in figure 11, reflect that for most the statements under management the companies responded positively (90 percent). The response by the two companies that chose to disagree was because they do not deal directly with their customers; their customers bring to them what they expect them to do. They do not plan for

themselves and they only offer what is requested. Despite not meeting this key NPD factor organisations used their expertise to lead their organisations to success. Those managers demonstrated commitment to their tasks and responsibilities as suggested by Anthony (1998). Management in the survey took control of their organisations in meeting the needs of their customers. Employees were encouraged to work as a team as they followed the lead of dedicated managers.

Regarding R&D orientation (see graph 8 in appendix D), seven companies responded positively, one company disagreed on the basis that it does not directly involved with the customers and the other one did not know. The majority agreed that since customers' needs change, organisations should invest in new technologies so that they could match them. It is a fact that technology has taken control of the markets and whoever wanted to stay ahead of competition should be technology driven, depending on their kind of the business. Most of the companies are focusing on improving their processes whereas others are interested in getting new equipment. In all these changes they are also required to train their staff so that they can operate and handle new changes. In the business environment customers are interested in doing business with an organisation that put their needs first. A manager from company E, said, "It is our pleasure to sit down with our customers so we can understand what they really want". Meeting the needs of customers depends on the understanding of what the customer requires. Most companies lose business because they do not give their customers an opportunity to explain what they expect. The manager from Company F said that they do not just accept anything from the customers, they first check if they have the resources to produce what their customers need. They are also able to advise their customers to go elsewhere if they feel that they cannot give them what they want. It is quite interesting to find that there are companies who were prepared to let go of customers because they could not give them what they were expecting. Most companies opted for technological advancement because it allows them to save time and money and most of all maintain product quality.

Table 4: Management

MANAGEMENT	Strongly agree		Agree		Do not know		Disagree		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Capability to make strategic choices	4	44.4	5	55.6					9	100
Objectives and roles of new product well defined	4	44.4	3	33.3			2	22.2	9	100
Ability to invest in new products persistently	5	55.6	2	22.2			2	22.2	9	100
The importance of new products is clear	4	44.4	4	44.4			1	11.1	9	100
Management supports new product innovation	5	55.6	4	44.4					9	100
The search for new ideas and trials is encouraged	3	33.3	5	55.6			1	11.1	9	100
Management ensures continuous learning and improvement	5	55.6	3	33.3	1	11.1			9	100

Most of these organisations started like any other businesses but their success showed that their management had a vision. Employees were encouraged to use everything they have got to see their organisations getting somewhere. The management also got it right by instilling the spirit of continuous learning within their employees.

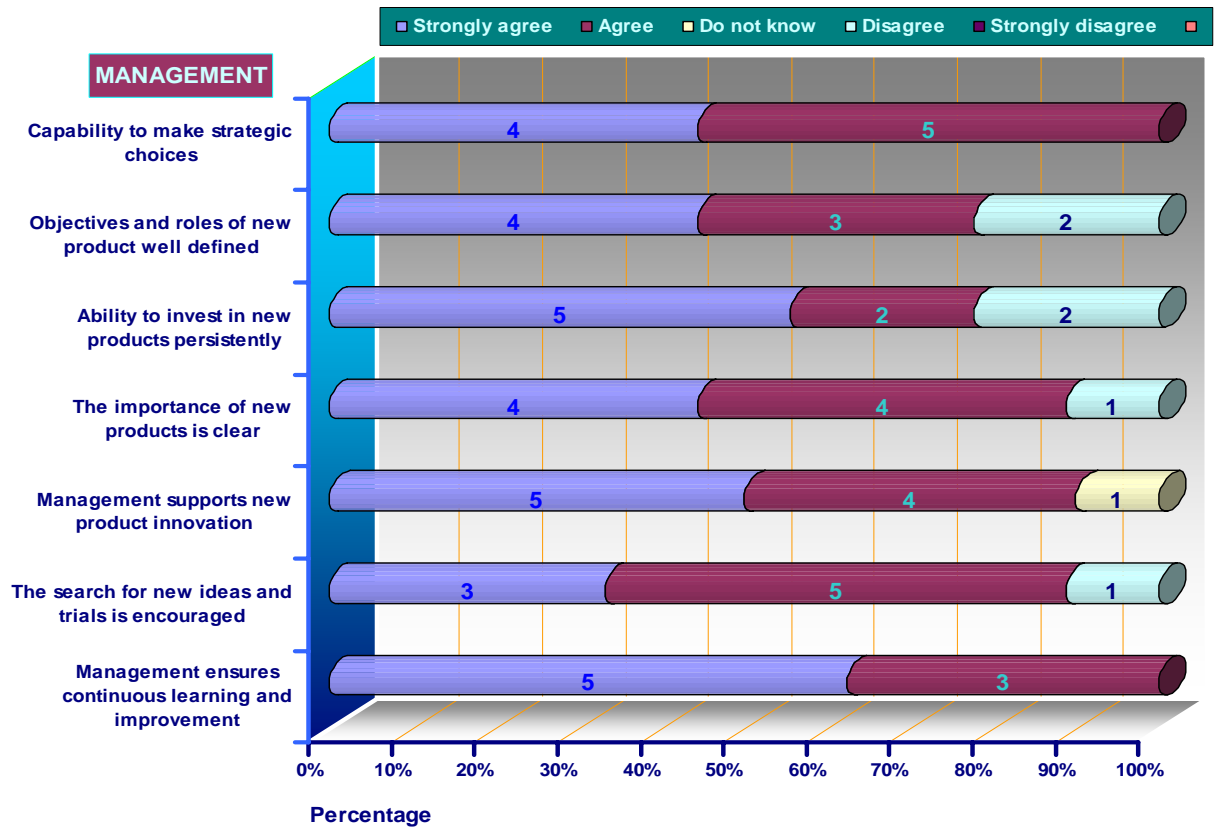


Figure 11: Management

It is clear that the role of management within any organisation involved in NPD must be visible. The personality of every manager should be reflected by their employees' behaviour, for example, the way they think and apply their knowledge. The success of any organisation rests in the hands of its employees and strong leadership which is vision oriented.

5.1.2 Strategy

Table 5 and figure 12, reflect the response of the questionnaire on the key factor of strategy. The overall responses were positive with a couple of companies disagreeing because they are not directly involved in NPD and do not deal directly with the market. Most of the managers in the companies agreed that strategy played a vital role in assisting the organisation to focus on their objectives and goals to give what their customers required at all times. When companies asked to rank the four key NPD success factors used in their strategy, strategy always came out on top. They believed strategy demonstrated management's understanding on what the organisation is all about. The input given by these managers as seen in table 5 and figure 12 corresponds with what Thompson and Strickland (1993), Mintzberg (1975) and Porter (1996) suggested concerning strategy as the road map

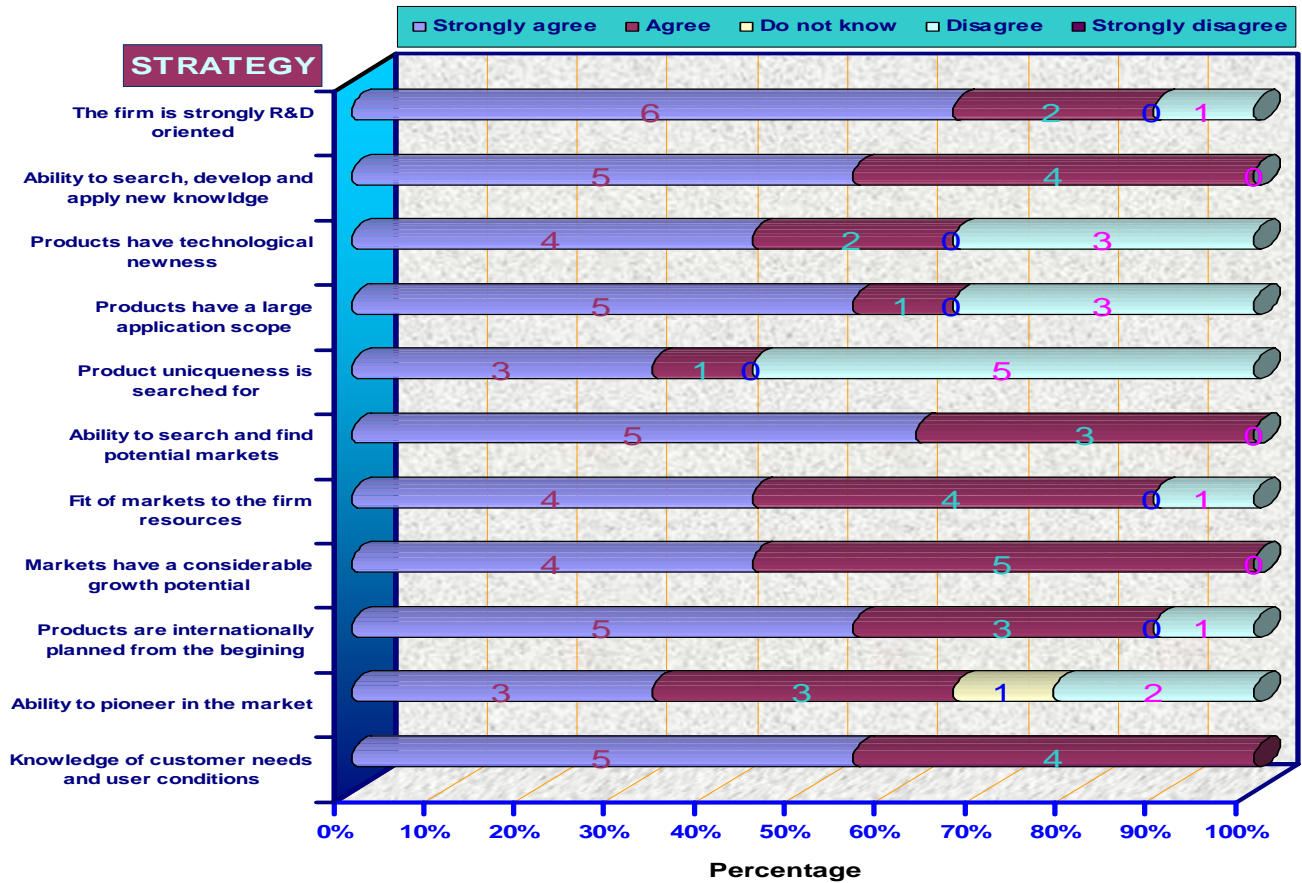
for any organization. The main emphasis in this point is that when management knows the market it needs to serve, nothing will ever stand on the way.

Table 5: Strategy

STRATEGY	Strongly agree		Agree		Do not know		Disagree		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
The firm is strongly R&D oriented	6	66.7	2	22.2			1	11.1	9	100
Ability to search, develop and apply new knowledge	5	55.6	4	44.4					9	100
Products have technological newness	4	44.4	2	22.2			3	33.3	9	100
Products have a large application scope	5	55.6	1	11.1			3	33.3	9	100
Product uniqueness is searched for	3	33.3	1	11.1			5	55.6	9	100
Ability to search and find potential markets	5	62.5	3	37.5					8	100
Provide firm resources to fit the markets	4	44.4	4	44.4			1	11.1	9	100
Markets have a considerable growth potential	4	44.4	5	55.6					9	100
Products are internationally planned from the beginning	5	55.6	3	33.3			1	11.1	9	100
Ability to pioneer in the market	3	33.3	3	33.3	1	11.1	2	22.2	9	100
Knowledge of customer needs and user conditions	5	55.6	4	44.4					9	100

Regarding product uniqueness, the response is not that great because as engineering companies they specialise in manufacturing what has been requested by their customers (see graph 12 in appendix D). Though they excel in using the best technologies, they do not go out looking for the needs of the customers. One of the managers even said that they are not like a fashion business that will always need to know what they should produce next. They are more concerned about how they can better serve their customers by manufacturing and producing products that their customers asked for.

Managers of the organisations that are involved in new product development are very much aware that strategy determines the future of every organisation. When the strategy is weak everything about the organisation will be weak. These organisations strengthen every activity from inside their organisations to the outside to keep their customers happy. They had strong bonds with their suppliers and their suppliers saw determination in how they operated. It was easy for these organisations to strategize because they knew exactly what their customers wanted. These organisations also knew very well everything about their competitors and were able to put forward defensive strategies to stay ahead.



(Figure 12): Strategy

With regard to the ability to pioneer in the market, six companies responded positively with three strongly agreeing and other three companies agreeing. Schneider *et al.* (1996) strongly suggested that going first in the market was part of the innovative culture that had to do with taking calculated risk. In business terms this means that the company that goes first in the market have its facts straight concerning their products and have properly planned to comeback when other companies follow. Going first also shows that an organisation has capabilities to outdo its competitors.

The companies which took part in the study agreed that going first in the market was the best they could do. It gave their customers confidence that they could depend upon them. Going first is the same as making the statement that the company knows what is doing and has everything under control. Going first puts other organisations under pressure and leaves them with the question when they think of retaliating. The two companies that disagreed felt that they did not have any product of their own that they could put on the market since they only render a service to their customers (see graph 17 in appendix D). These six companies

in favour of going first in the markets demonstrated that they had better resources and capabilities to effectively support their customers.

Strategy as defined by Mintzberg (1975), Porter (1996), Thompson and Strickland IV (1993) is a road map that gives direction of where the organisation is going. All the organisations that participated in the survey showed a thorough understanding on strategy. These organisations were also able to plan ahead because they could see their way forward. For good strategy to work, management should know what kind of resources they have with view to meet the needs of their customers.

5.1.3 New Product Development Process

The new product development process is one of the processes that empowered people from different functional groups to work together. The literature highlighted that for employees to be suitable to work in this environment they should have gone through an empowerment process where transformation took place. The new product development process is where employees take total control of NPD, but following the lead of leadership of an innovatively minded leadership. Generally, the results as seen from table 6 and figure 13 indicate that the strongly agree and agree categories dominate; hence a positive response. It is also an indication that generally the management of those organisations were in favour of the contributions the new product development process brought across. All the managers were with their organisations for more than five years which gave them the upper hand in motivating their staff members to feel part of the organisations. The involvement of the experienced managers made a difference because they understood their customers' needs and knew how to update and adjust their operations.

Table 6: NPD Process

NPD PROCESS	Strongly agree		Agree		Disagree		Strongly disagree		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Selection of new product efforts is based on clear criteria	3	37.5	2	25.0	3	37.5			8	100
New product efforts is based on detailed market knowledge	3	37.5	4	50.0	1	12.5			8	100
Costs, risks and timing of new product efforts are mapped	4	44.4	3	33.3	1	11.1	1	11.1	9	100
Objectives of new products efforts have been set out	3	33.3	4	44.4	2	22.2			9	100
New product concept contain clear and visible attributes	5	55.6	3	33.3	1	11.1			9	100
Target markets and their characters are defined	3	33.3	6	66.7					9	100
New product position and customer mindset are defined	5	55.6	3	33.3	1	11.1			9	100
Customers' inputs are valuable and considered	3	33.3	2	22.2	3	33.3	1	11.1	9	100

These organisations were successful simply because they practiced teamwork. Most of the employees knew exactly what their customers were involved in which helped in accepting customers' suggestions. In everything that these organisations decided to do they consulted their customers and as a result their relationship became even stronger than before.

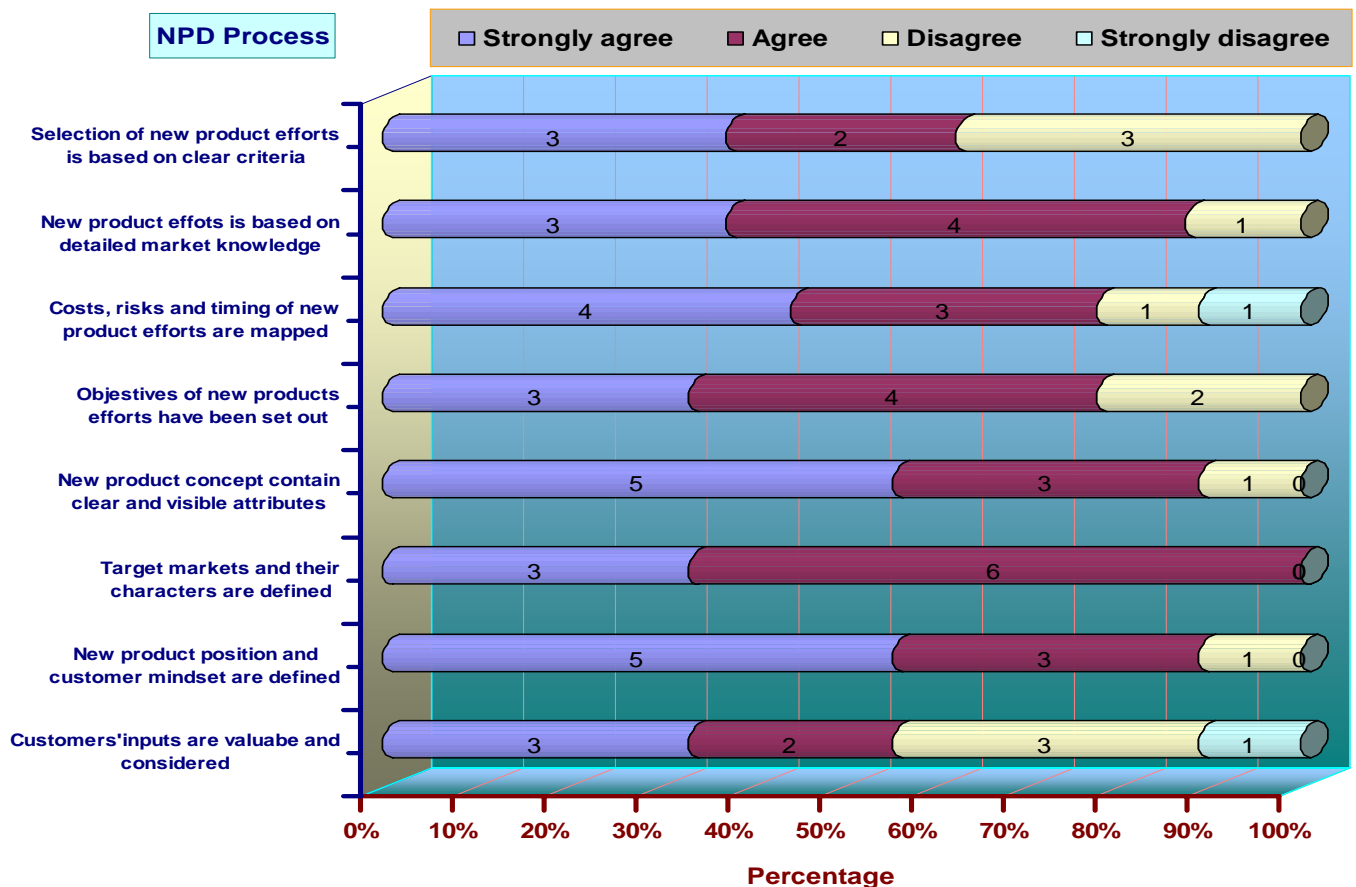


Figure 13. NPD Process

The general response was positive showing that many organisations were prepared to move from traditional way of product development process to a simultaneous engineering process that allowed activities to go concurrently. Many organisations were in favour of the process because it saved time and money as compared to sequential process. Concurrent engineering also encouraged functional coordination and teamwork. These organisations participated in the survey are successful because they do everything together and there is no division amongst their employees. Looking at the response on the subject of new products efforts in knowing the market, seven companies were in favour while one company disagreed. To the one company this aspect did not apply because it does not deal directly with its customers. The participated companies showed character in knowing their market and were quite comfortable with their business operation. All the managers in these companies took the lead in knowing their markets; they took it as a personal matter to know their customers' needs.

With regard to the knowledge of the customer needs and user conditions, amazingly all the companies responded positively with five companies strongly agreeing and four companies agreeing. The most important thing any organisation should do is to make an effort to know

what their customers needs. Most organisations which took part in the study are involving their customers; they sit together to design and select the material that will fit best their needs. One of the managers even said, “We respect what ever our customers want and we do it exactly the way they want it. We may give them suggestions but the final word is theirs”. All these organisations have learned to listen to their customers and it has worked for them. Other manager also said that it is difficult to build this kind of a relationship with the customer, but it takes only a minute to destroy it. The manager of Company D, said that the operation of the whole organisation has been put together to suit the needs of their customers. One of the managers also said that they try by all means to make their staff happy so that they could accommodate their customers at all times.

These companies are quite happy to do business with their customers because they know exactly what they want and when they want it. The relationship in these companies has developed in such a way that their customers do the marketing for them. The secret behind this is working together with their customers. The other factor that enables these companies to do well is that their internal capabilities support their operations with full force. One manager also mentioned that their secret is that they also know the background of their customers and it becomes easy for them to sustain their relationship.

5.1.4 People

People are regarded as the main contributors in NPD, however in some instances people although not properly valued are expected to be productive at all times. Some companies mistreat their employees and do not care to create a good working environment. Within the innovative culture, employees are valued and the working environment is always conducive to allowing them to perform without any stumbling blocks. Conger and Kanugo (1988), Keller and Danscreu (1995) highlighted that people are supposed to be empowered so that their mindset can be business related. It was also revealed in the literature that empowerment allows people to work as a team in fulfilling the objectives of the organisation.

The managers that have been around for many years understand that for their organisations to be successful, their workforce should be happy at all times. Most of the managers indicated that they try to assist with everything with their employees; at times they are doctors, by giving health advice, they give them legal advice, financial advice and so on. Conger and Kanugo (1988), Keller and Danscreu (1995) also indicated that employees need acknowledgement when they have done something extraordinary. Employees work harder when their efforts are appreciated and valued. The general responses on the people factor were positive as it can be seen from table 7 and figure 14.

Only one organisation indicated negative response simply because of its working environment which is not supportive to employees.

Table 7: People

PEOPLE	Strongly agree		Agree		Do not know		Disagree		Strongly disagree		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Different functional groups work together	4	44.4	5	55.6							9	100
The working environment encourages creativity	2	22.2	6	66.7					1	11.1	9	100
Employee's participation is encouraged	3	33.3	5	55.6					1	11.1	9	100
Employees are encouraged to integrate	4	44.4	4	44.4			1	11.1			9	100
Employees are entitled for similar privileges	4	44.4	3	33.3	1	11.1			1	11.1	9	100
Employees collectively share information	4	50.0	1	12.5			3	37.5			8	100

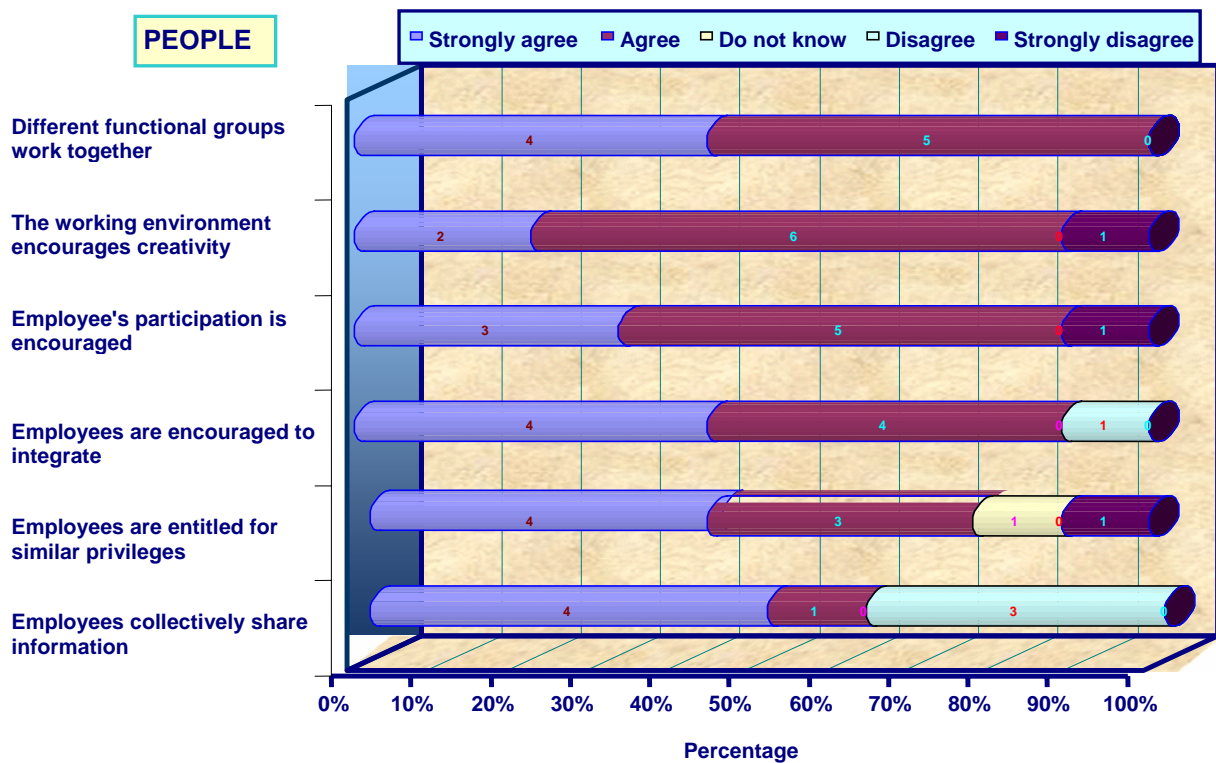


Figure 14. People

One of the secrets of success behind these organisations was unity amongst their employees. They worked well together and they all understood the vision of their organisations. They supplemented each other's knowledge without any threat. Management also allowed employees to exercise their authorities as long as they knew their boundaries. Management made it clear that whoever gave more, the organisation would be ready to

appreciate such action. Every employee wanted to give their best because they were given a platform to shine. The management also tried hard to create an environment that was safe and made employees feel at ease in sharing their views.

On the point of different functional groups working together, Schneider *et al.* (1996) strongly said that everyone in the organisation should feel part of the organisation. With people coming from different backgrounds, there is a tendency of competing with each other, but innovative culture compels people to work together as a team. This point can be proven by the positive responses from the current case studies. All nine companies seconded this point of different functional groups working together. It was amazing to see electrical engineers, mechanical engineers, marketing personnel and quality personnel in most companies working together. Those companies were happy to say that working as a team was fun as long as people knew their responsibilities. One of the managers said that this point to a certain extent was not relevant, because in most cases they do simple jobs that require only one person at a time. If a person's job is to check and clean a part or a component he or she must do it properly and must not leave it for the next person to do it.

Chan and Mauborgne (1991) and Senge *et al.* (1999) said that the involvement of organisational leaders creates a platform that enables the workforce to participate positively. Researchers such as Martins (2000); Barron and Harrington (1981); Tierney and Farmer (2002) added that employees' participation was influenced by organizational culture. The current study also demonstrated from the responses that employees' participation was definitely encouraged. One NPD manager that disagreed did not support the way his co-workers operate. Besides him, other companies are doing their best to encourage their employees to be part of their organizations. One manager also said that as much as they have opened doors for employees to participate there are those that keep their space. This particular manager also said that sometimes it has to do with culture. He even said that many employees will not come forward with ideas but wait to be asked first before they could open up.

Regarding the aspect of employees being entitled to similar privileges, Schneider *et al.* (1996) said that the organisation should introduce some form of reward system for a job well-done. The main purpose of this policy is to motivate staff to work hard, but it must apply to everyone equally. The results from the responses showed that seven companies were happy and one company was not sure and the last one strongly disagreed. It makes sense that people should be rewarded equally when they have done something good in the organization irrespective of their colour or culture.

5.2 CONCLUSION

The methodology selected for this case study was proper, because nine companies were evaluated without any disturbances. The analysis of the data also went as anticipated due to the well structured questionnaire that properly guided the respondent. The usage of SPSS 14, provided understandable tables and graphs that led to reasonable interpretation and discussion. These self explainable tables and graphs made it easy to extract appropriate remarks on the study. All the managers who took part in the survey had more than five years work experience in those companies and it gave them the proper platform to know the business in full and to even understand their customers as well as their competitors.

The literature indicated that companies that failed to manage NPD, did not have a thorough understanding of the business and its environment. Also many organizations failed to manage NPD, because of the lack of management skills, lack of educational background, lack of market know how, etc. The case studies that were reported in the literature have shown that these factors were of vital importance. All the companies that did not consider these factors failed in their venture for NPD. The previous case studies also indicated that many organizations failed to make it because they did not know the needs of their customers, because they did not invest enough time and money to get to understand their customers and their needs.

In the current study, the results indicated that the organizations involved understood their customer requirements and also gave them advice when required. In the previous case study, some companies failed because their managers did not fully understand the objectives of their organizations and it became difficult for them to motivate their employees to work hard. Others failed because they did not have proper strategies in place to give their organization a sense of direction. In some cases employees did not see a point of working together as a team. The results of the current study showed that the managers knew their objectives and reasons for their existence. They had a vision for their organizations and were able to convince their employees to work with them in order to meet the needs of their customers.

The consensus in the literature is that any organization pursuing NPD, should be led by a manager that is innovative in nature, who is able to encourage people to work as a team and allow them to take ownership of their responsibilities. The literature also indicated that this empowerment process allowed employees to get to a point of understanding each other, but with the help of their managers. Though the managers of the current study did not brag about what they knew concerning key NPD success factors, the principles of those factors were

visible in all they did. One of the managers in one company said that “it is also good for a manager to show interest in what they do, because one could discover an opportunity”.

Only organizations that practise innovation culture are able to make sure that the working environment is safe to work in. The previous case studies showed that companies which created an innovative environment had good results as compared to companies which did not see value in creating a safe working environment. It was evident that the working environment of the organizations in the current study was safe to work in. People in these organizations showed that they were happy in their and teamwork was visible all over.

In the previously reported case studies the focus was on the issue of openness by managers towards their employees, stating that openness created awareness of communication between employees and management. In the present study one of the managers said that his door was always open for his employees so that they could come in and say whatever was on their mind.

In our study the general responses in all the key NPD success factors were positive, with more people agreeing strongly and fewer people just agreeing. The factors that enjoyed more responses were strategy and management. When people were asked to rank the NPD factors, strategy was always on top of the list. All the managers' responses were based on their personal experiences over the years. The managers of organizations that dealt with customers directly seemed to enjoy doing business with their customers. Most of those organizations specialized in modern technologies to better serve their customers.

The organizations, that responded negatively, were the ones that did not deal directly with customers. The overall response of the current study was theory based, which means that it fulfilled speculations that were put forward by what has been indicated in the literature.

CHAPTER SIX: CONCLUSION, FINDINGS, CONTRIBUTION AND RECOMMENDATIONS

The purpose of this current research study was to evaluate whether key NPD success factors were used within the SMEs in the Western Cape and if used to see whether these organisations are producing products or not. The study began by demonstrating the importance of NPD within any organization that seeks to produce goods/services to meet customer needs. The common NPD challenges by SMEs identified by various researchers all over the world were as follows (see section 1.3 problems facing SMEs):

- Lack of business skills
- Lack of education and training
- Lack of research skills

Looking at the theoretical framework, all the problems highlighted as problematic for the SMEs to manage NPD were sufficiently addressed. The theory on each key NPD success factor was justified by three different case studies thus demonstrating its validity. Previous case studies indicated that key NPD success factors were helpful to manage NPD and to sustain the economic position for any organisation using them. Since it was the purpose of the current study to evaluate whether key NPD success factors were in use in the SMEE in the Western Cape, the current study chose to evaluate management, strategy, NPD process and people. The results of the data analysis indicated that all nine organizations unconsciously implemented all four key NPD success factors, however at different levels. At the beginning of the each interview all the managers indicated that they were not aware of the theories behind the key NPD success factors, but amazingly all the principles of NPD success factors were fully represented in their answers. Out of the total of nine organizations, two of them were not directly producing new products; they were only asked to manufacture some parts every now and then using same machinery and skills. Most of the companies benefited from their technological advancement.

6.1 FINDINGS

When comparing the theoretical framework and the results from the data analysis, the managers of the companies in our case studies showed that they had good understanding of their businesses, they took total control and most of all they had a vision. These managers had knowledge on which innovation type to pursue between radical and incremental. It was a good thing for them to know which type because they were able to successfully allocate their resources based on their customers' requirements. It also gave them an opportunity to align their operations depending on their choices of incremental or radical innovation. They were able to give advice to their customers on whatever they could not offer to their customers.

One of the managers even said that honesty made their customers trust them more. Most managers focused on their core businesses and stayed there instead of trying this and that.

Management was able to lead by example in motivating employees to take charge of their actions. It was easy for those managers to relate well with their employees simply because they had been together for many years. It showed that experience in their working environment allowed managers to know what to do and when to do it.

In the previous case studies, it was revealed that some SMEs failed to manage NPD successfully because the management was not effectively involved. It was indicated that those managers were also not ambitious with regards to the growth of their organizations. The opposite could be said in the current study; management drove most of the activities in the organizations that took part in the survey. The managers took total control and worked hard as if the companies were their own.

Their NPD strategies were perfectly aligned to their organizational strategies and they yielded good results. They made sure that their employees understood the objectives of their organizations well. The communication between management and employees was smooth and employees were free to raise their views on issues related to them. The previous case studies indicated that other organizations failed because their managers were comfortable with the little results they had achieved. The difference with the current studies was that these managers were goal oriented and always wanted to see something happening. Most of these organizations believed in moving into the market first instead of being followers, indicating that they were confident of their moves and had backup plans in case of retaliation by their competitors. Moving first could also mean that they had a thorough understanding of what their customers were looking for and they knew the status of their competitors very well.

Producing quality products at all times made their customers come back for more. All of these organizations did not market their products the normal way; their customers did the marketing for them. One of the managers from one of these companies said that they were not really concerned about their competitors; they just did their best when given a chance to produce products. This kind of character showed that these managers, though they did not know about the theories of key NPD success factors, knew intuitively what they were doing. Their advantage perhaps was that most of them had both management and technical qualifications, and those who did not have management skills were given the opportunity to attend short courses.

As stated in the literature the primary reasons for many SMEs failing to manage NPD were that they did not spend enough time investigating the needs of their customers, and indicated that most managers did not know how to investigate their customer needs. The results from the current study showed that managers spent valuable time with their customers trying to understand what they wanted. Spending time with their customers was a good thing because they were able to clarify any misunderstandings.

Lack of education and training contributes to companies struggling to manage NPD. Education and training makes a person think broadly and take responsibility in decision making. As reported in case studies many companies struggled with NPD because their managers did not give their employees any exposure to any kind of training; as a result they were not skilled enough to create new opportunities and use the resources they had effectively. The state of their mind did not empower them enough to have research and networking skills.

In the current study, managers emphasized equipping their employees with skills because they believed that their prosperity lay amongst their employees. In most companies involved in the survey, employees were encouraged to study from time to time so that their knowledge base could broaden, to handle new technologies which changes all the time. The training process also gave employees an opportunity to interact and know each other better.

The current study satisfies the question of whether the four key NPD success factors investigated were being implemented by the SMEs in the Western Cape. The results from the observations and the data analysis showed that they were in fact if not knowingly at least intuitively adhering to theory. All of these organizations did not complain about their state of their businesses; they were quite happy and were looking forward to more challenges. Their focus was more on knowing what their customers were anticipating and also improving their resources from time to time as well as skilling their employees for future challenges.

Any organisation that pursues NPD, should consider using the fifteen key lessons of NPD (see Appendix C). These key lessons are used as a check list to see if all the important elements are included.

Out of the nine companies which took part on the survey, seven of them demonstrated that they implemented key NPD success factors and they were able to produce products to satisfy their customers. The remaining two companies were not directly involved in new products development directly, but they implemented some of the elements of the four key

NPD success factors that were investigated. When looking at how they originated, they had to produce something for someone to use. They may say that they are not involved in NPD, but every month, there are new business transactions taking place.

The results of the study show that the SMEEs in the Western Cape practised key NPD success factors and produced outstanding results. It is clear that if these key NPD factors were acknowledged by these organisations results were going to be outstanding.

6.2 CONTRIBUTIONS TO THE SOCIETY

Local companies can really benefit if they get to understand that the main purpose of any organisation is to meet the needs of their customers. It is also important for any organisation to realize that knowing the needs of their customers is not enough; they should also access the environment and be prepared to stand up to their competitors. This study may be used to signal local organizations that they need to make proper choices on which innovation type they are suited after considering their resources.

The management should review their strategies from time to time depending on the market condition. Above all, at all times, the performance of the company should be assessed with regard to answering the questions associated with the four NDP success factors used in this study. In other words from time to time assessment using twenty five key lessons for new product success compiled by Cooper (1993).

6.3 RECOMMENDATION FOR FUTURE STUDIES

One may argue that the current study's results are perhaps inconclusive because only few SMEs took part in the survey. To validate this point, further study using the four key NPD success factors to manage new product development used here should be conducted covering a larger number of SMEEs that claims of producing innovative goods/services in the Western Cape, South Africa.

The second recommendation is to develop a NPD model that can be used by SMEEs to manage NPD.

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APPENDIXES

Appendix A: Questionnaire for data collection

PART 1: PERSONAL DATA

Please choose the appropriate answer by making a cross in the box to determine the personal information for the management.

1. Number of years this organization operating.

1-3 3-5 5 & more

2. Number of years working in this organization.

1-3 3-5 5 & more

3. Position held in the organization.

Junior Manager Senior Manager Top Management

4. Number of employees in the organization.

10-20 20-50 50-100 100 & more

5. Educational background

Grade 7-12 College certificate University Degree Other

6. Are you involved in New Product Development?

Yes No

PART 2: DECISION MAKING

The purpose of the questionnaire is to discover the responses from management regarding their involvement in NPD within their organization. The respondents are requested to rate

their opinions by making a cross in the appropriate box with the level of agreement in each of the questions.

Questions	MANAGEMENT Decision Making				
	Strongly Agree	Agree	Do not know	Disagree	Strongly Disagree
1. Management plans and communicates project activities to meet the overall organizational strategic vision.					
2. Management always clarifies and defines the objectives and roles of new products in terms of business goals.					
3. The manager has the ability to invest in new products persistently.					
4. Top management clarifies the goals of NPD to everyone and encourages face-to-face communication.					
5. Top management is willing to invest and take risks in order to achieve organizational goals.					
6. Management creates a culture so that it is easy for employees to participate any of the organizational activities.					
7. Management always ensures that the organization continually learns, adapt, evolve, and improve.					

Questions	STRATEGY Decision Making				
	Strongly Agree	Agree	Do not know	Disagree	Strongly Disagree
8. Competition is always well considered beforehand by the organization regarding its customer requirements.					
9. The organization has the ability to search, develop, and apply new knowledge.					
10. The products have technological newness.					
11. The organization produces product that have a large application scope and accessibility.					
12. The organization always searches for product uniqueness.					
13. The organization has the ability to search and find potential markets.					
14. The organization has the ability to fit the markets to the firm resources.					
15. The organization is able to assess the markets' considerable growth potential.					
16. The organization plans its products from the very beginning for international markets.					
17. The organization has the ability to move first in the market.					
18. The organization has the knowledge of their customer needs and their conditions.					

Questions	NPD PROCESS Decision Making				
	Strongly Agree	Agree	Do not know	Disagree	Strongly Disagree
19. Selection of new product efforts is based on clear criteria developed and agreed on in advance.					
20. New product efforts are based on detailed and credible market knowledge.					
21. Costs, risks and timing of new product efforts are mapped as to a new product and its production.					
22. The objectives of new product efforts have been set out and financial end results estimated.					
23. New product concept contains clear and visible product attributes which increases competitiveness.					
24. Target markets and their characters are defined.					
25. New product position along the customer mindset and preferences has been defined.					

Questions	NPD PROCESS Human management				
	Strongly Agree	Agree	Do not know	Disagree	Strongly Disagree
26. Different functional groups are encouraged to work together as a team.					
27. The working environment encourages employees to be creative and take ownership					
28. Employees are consulted when changes are made in the business.					
29. Employees are encouraged to integrate and share their knowledge and information.					
30. All staff is accounted to similar privileges based on their level of responsibilities.					
31. People are at ease to share information and to even make collective decision to choose which product to produce.					

Appendix B: All Evaluation basis of NPD

New product performance factors	Description of performance	Coding
MANAGEMENT		
Visionarism	Capability to make strategic choices	MAN 1
Goal orientation	Objectives and roles of new products have been defined in terms of business goals	MAN 2
Fast and action oriented	Ability to invest in new products persistently	MAN 3
Communication	Meaning and importance of new products have been made clear to everyone	MAN 4
Commitment	Top management supports new product innovation	MAN 5
Culture	Search for new ideas and trials is encouraged	MAN 6
Immersed in progressive change	Top management ensures continuous learning and improvement	MAN 7
STRATEGY		
Role of R&D in business strategy	Firm is strongly R&D oriented and searches actively for new technological knowledge	STS 8
Character of the products developed	Ability to search, develop and apply new knowledge	STS 9
Degree of innovation	Products have technological newness	STS 10
Generity of the product	Products have a large application scope	STS 11
Product differentiation	Product uniqueness is searched for	STS 12
Market orientation	Ability to search and find potential markets	STS 13
Nature of target markets	Fit of markets to the firm resources	STS 14
Market growth	Markets have a considerable growth potential	STS 15
Internal orientation	Products are planned from the very beginning for international markets	STS 16
Timing of market entry	Ability to pioneer in the market	STS 17
Customer expertise	Knowledge of customer needs and user conditions	STS 18
NPD PROCESS		
Screening method	Selection of new product efforts is based on clear criteria developed and agreed on in advance	NPDP 19
Preliminary market	New product efforts is based on detailed and credible	NPDP 20

assessment	market knowledge	
Preliminary technical assessment	Costs, risks and timing of new product efforts are mapped as to a new product and its production	NPDP 21
Preliminary business assessment	Objectives of new product efforts have been set out and financial end results estimated	NPDP 22
New product competitiveness	New product concept contains clear and visible product attributes which increase competitiveness	NPDP 23
Market requirements	Target markets and their characters are defined	NPDP 24
Product positioning	New product position along the customer mindset and preferences has been defined	NPDP 25
PEOPLE		
Functional co-ordination	Different functional groups are encouraged to work together as a unit	PEO 26
Safe working environment	The working environment allows employees be creative and take ownership	PEO 27
Employees involvement	Employees are consulted when changes are made in the business	PEO 28
Functional integration	Employees are encouraged to integrate and share their knowledge and information	PEO 29
Employee rewards system	All staff should be accounted to similar privileges based on their level of responsibilities	PEO 30
Functional collaboration	People are at ease to share information as well as making collective decision	PEO 31

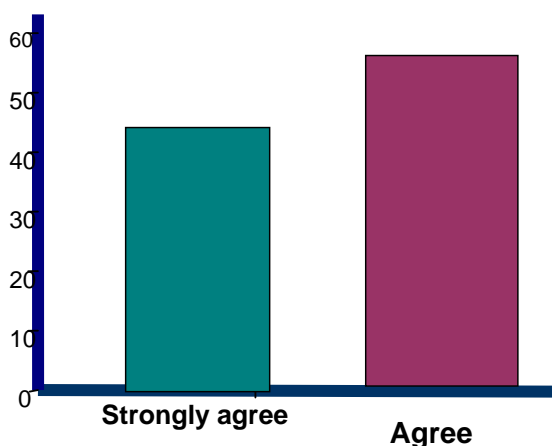
Appendix C: Fifteen Key Lessons for New Product Success

1. The number one factor is a unique superior product: a differentiated product that delivers unique benefits and superior value to the customer.
2. A strong market orientation – a marker-driven and customer – focused new product process – is critical to success.
3. Look to the world product: An international orientation in product design, development, and target marketing provides the edge in product innovation.
4. More predevelopment work – the homework – must be done before product development gets underway.
5. Sharp and early product definition is one of the key differences between winning and losing at new products.
6. A well – conceived, properly executed launch is central to new product success. And a solid marketing plan is at the heart of the launch.
7. The right organizational structure, design, and climate are key factors in success.
8. Top management support doesn't guarantee success, but it sure helps. But many senior managers' get it wrong.
9. Synergy is vital to success – “step-out” projects tend to fail.
10. Products aimed at attractive markets do better; market attractiveness is a key project-selection criterion.
11. New product success is predictable; and the profile of a winner can be used to make sharper project-selection decisions to yield better focus.
12. New product success is controllable: More emphasis is needed on completeness, consistency, and quality of execution.
13. The resource must be in place.
14. Speed in everything! But not at the expense of quality of execution
15. Companies that follow a multistage, disciplined new product game plan fare much better.

(Source: Cooper, 1993)

Appendix D: Individual attributes of key NPD success factors

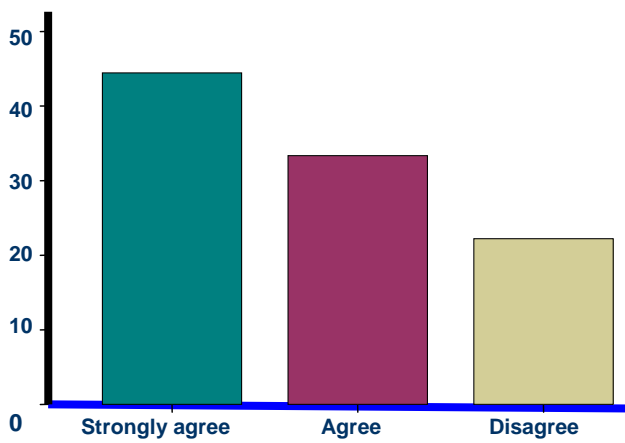
Percent



		Frequency	%
Valid	Strongly agree	4	44.4
	Agree	5	55.6
	Total	9	100.0

Graph 1: Capability to make strategic choices

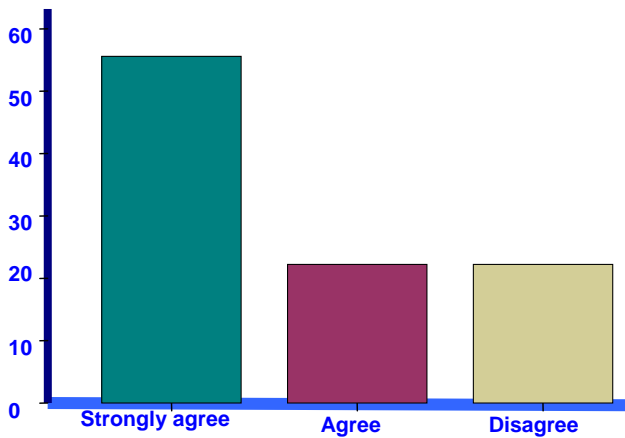
Percent



		Frequency	%
Valid	Strongly agree	4	44.4
	Agree	3	33.3
	Disagree	2	22.2
	Total	9	100.0

Graph 2: Objectives and roles of new product well defined

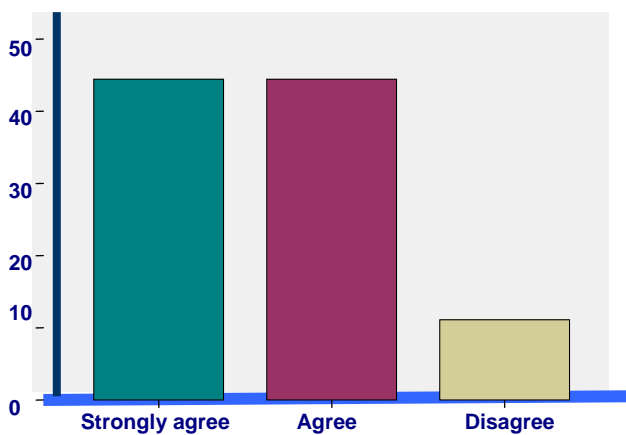
Percent



		Frequency	%
Valid	Strongly agree	5	55.6
	Agree	2	22.2
	Disagree	2	22.2
	Total	9	100.0

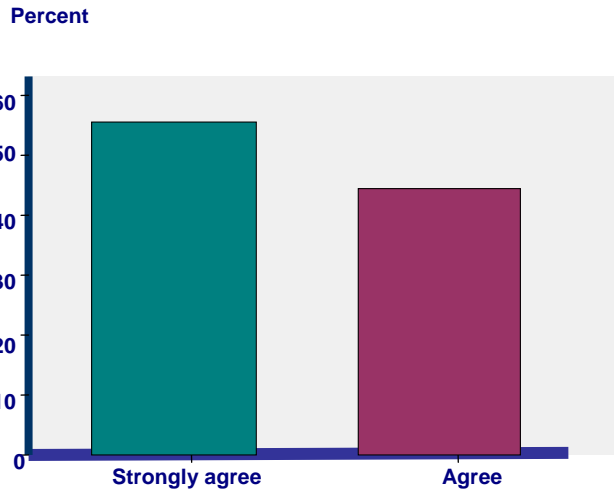
Graph 3: Ability to invest in new products persistently

Percent



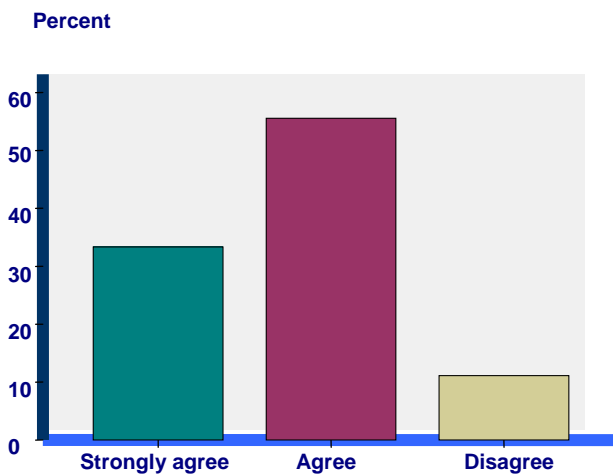
		Frequency	%
Valid	Strongly agree	4	44.4
	Agree	4	44.4
	Disagree	1	11.1
	Total	9	100.0

Graph 4: The importance of new products is clear



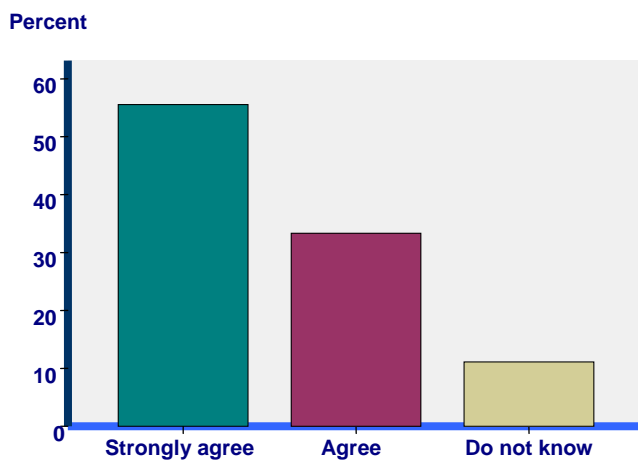
		Frequency	%
Valid	Strongly agree	5	55.6
	Agree	4	44.4
	Total	9	100.0

Graph 5: Management supports new product innovation



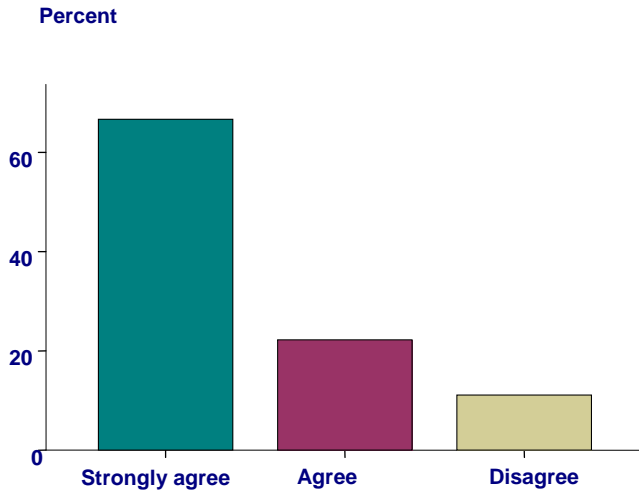
		Frequency	%
Valid	Strongly agree	3	33.3
	Agree	5	55.6
	Disagree	1	11.1
	Total	9	100.0

Graph 6: The search for new ideas and trials is encouraged



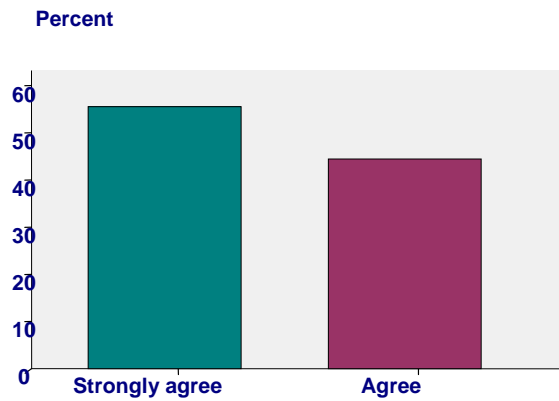
		Frequency	%
Valid	Strongly agree	5	55.6
	Agree	3	33.3
	Disagree	1	11.1
	Total	9	100.0

Graph 7: Management ensures continuous learning and improvement



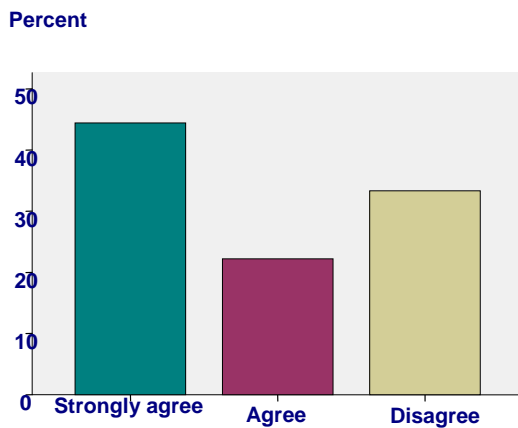
		Frequency	%
Valid	Strongly agree	6	66.7
	Agree	2	22.2
	Disagree	1	11.1
	Total	9	100.0

Graph 8: The firm is strongly R&D oriented



		Frequency	%
Valid	Strongly agree	5	55.6
	Agree	4	44.4
	Total	9	100.0

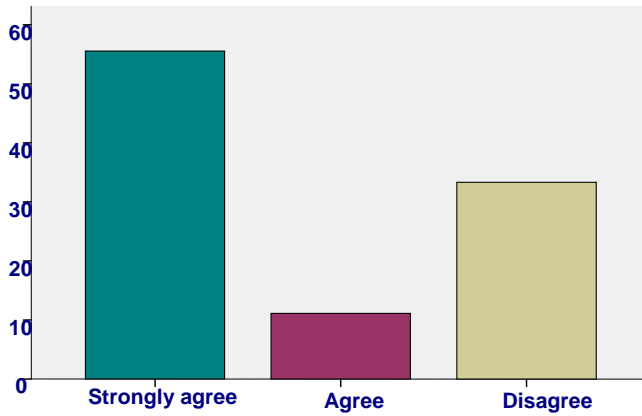
Graph 9: Ability to search, develop and apply new knowledge



		Frequency	%
Valid	Strongly agree	4	44.4
	Agree	2	22.2
	Disagree	3	33.3
	Total	9	100.0

Graph 10: Products have technological newness

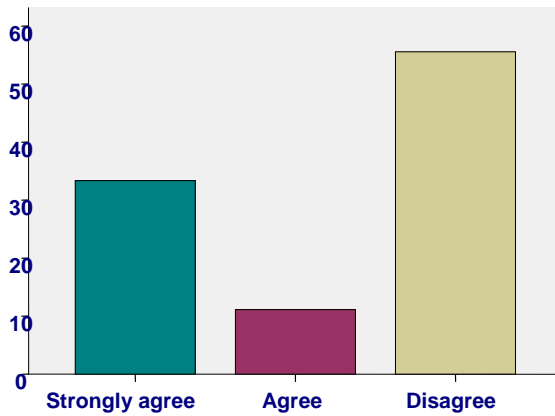
Percent



		Frequency	%
Valid	Strongly agree	5	55.6
	Agree	1	11.1
	Disagree	3	33.3
	Total	9	100.0

Graph 11: Products have a large application scope

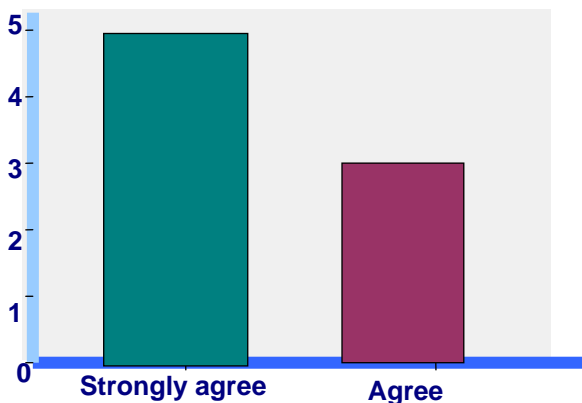
Percent



		Frequency	%
Valid	Strongly agree	3	33.3
	Agree	1	11.1
	Disagree	5	55.6
	Total	9	100.0

Graph 12: Product uniqueness is searched for

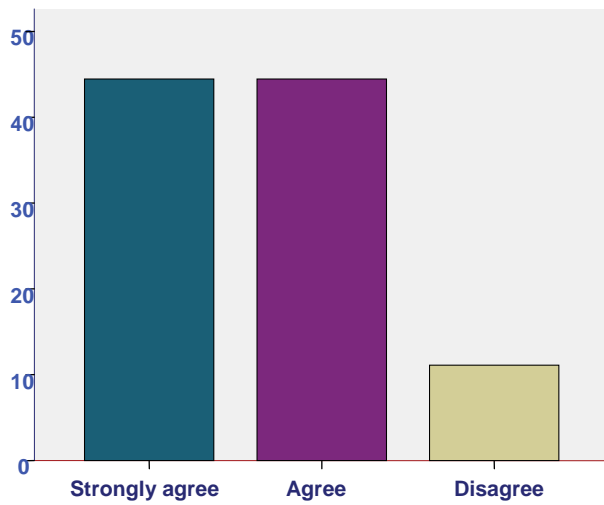
Frequency



		Frequency	%
Valid	Strongly agree	5	55.6
	Agree	3	33.3
	Total	8	88.9
Missing	System	1	11.1
	Total	9	100.0

Graph 13: Ability to search and find potential markets

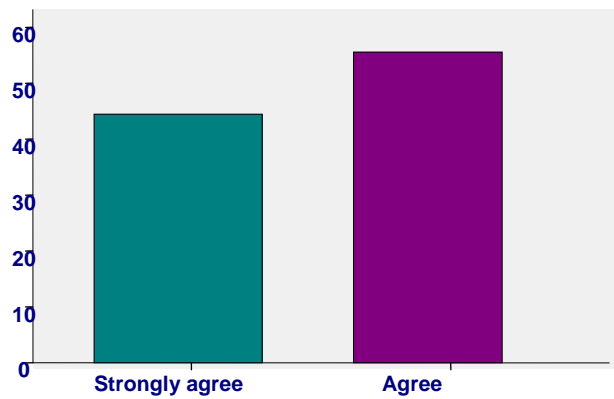
Percent



		Frequency	%
Valid	Strongly agree	4	44.4
	Agree	4	44.4
	Disagree	1	11.1
	Total	9	100.0

Graph 14: Provide resources to fit the markets

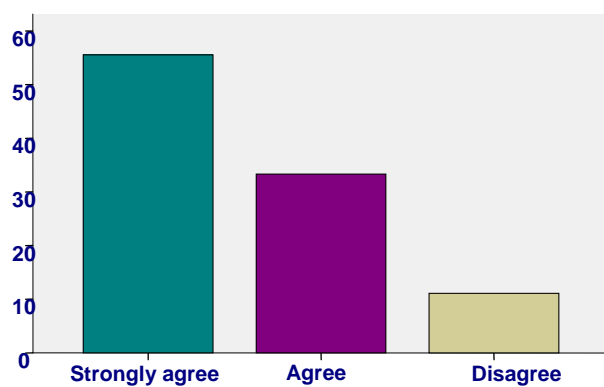
Percent



		Frequency	%
Valid	Strongly agree	4	44.4
	Agree	5	55.6
	Total	9	100.0

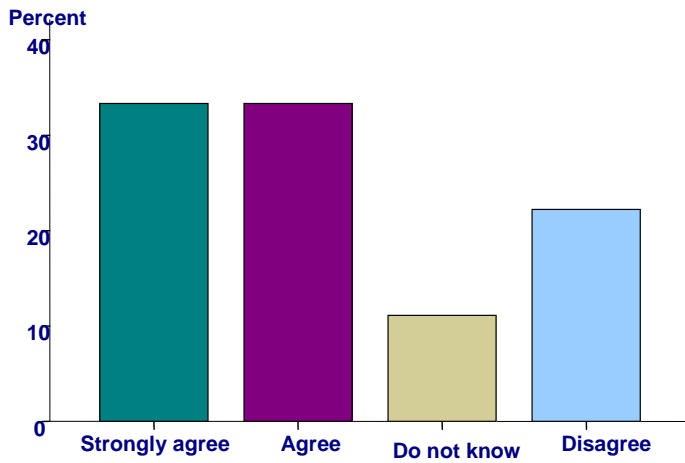
Graph 15: Markets have a considerable growth potential

Percent



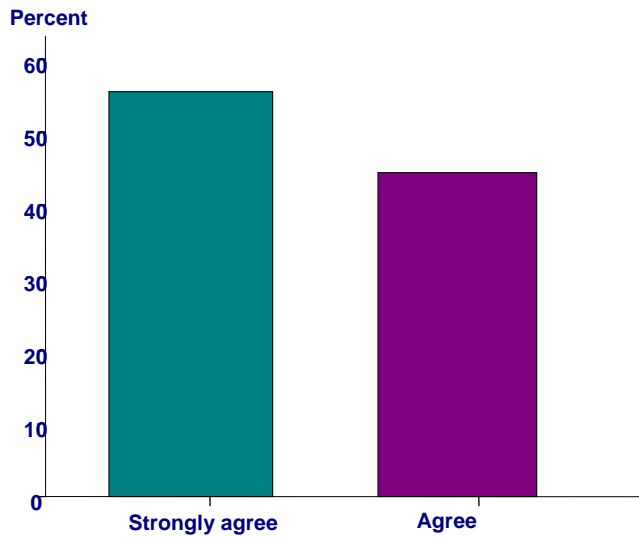
		Frequency	%
Valid	Strongly agree	4	44.4
	Agree	3	33.3
	Disagree	1	11.1
	Total	8	88.9
Missing	System	1	11.1
Total		9	100.0

Graph 16: Products are internationally planned from the beginning



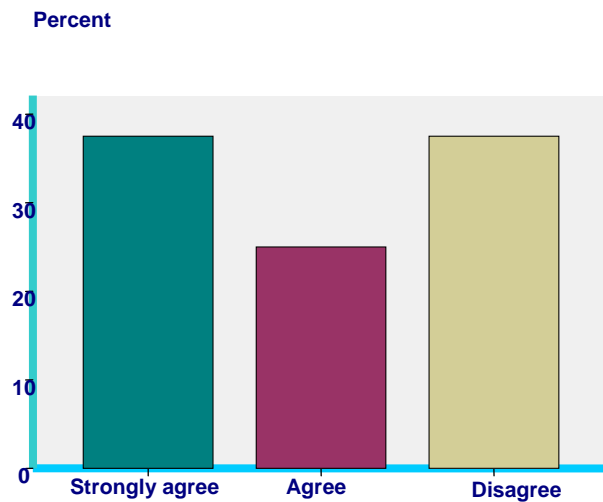
		Frequency	%
Valid	Strongly agree	3	33.3
	Agree	3	33.3
	Do not know	1	11.1
	Disagree	2	22.2
	Total	9	100.0

Graph 17: Ability to pioneer in the market



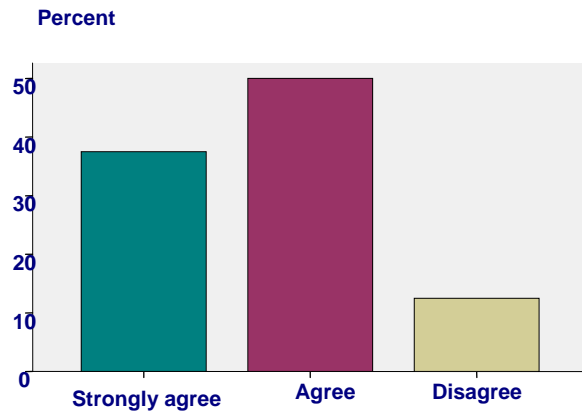
		Frequency	%
Valid	Strongly agree	5	55.6
	Agree	4	44.4
	Total	9	100.0

Graph 18: Knowledge of customer needs and user conditions



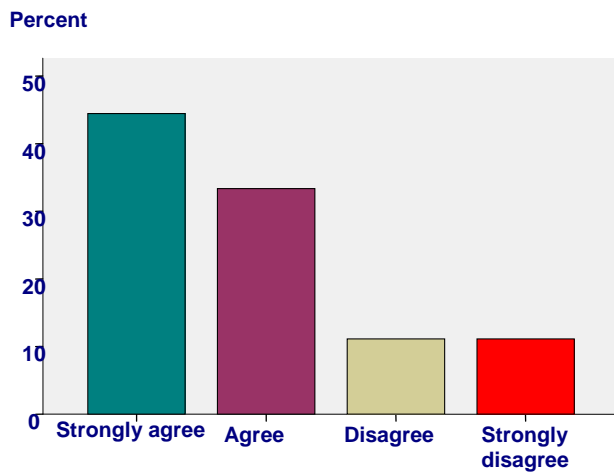
		Frequency	%
Valid	Strongly agree	3	33.3
	Agree	2	22.2
	Disagree	3	33.3
	Total	8	88.9
Missing	System	1	11.1
Total		9	100.0

Graph 19: Selection of new product efforts is based on clear criteria



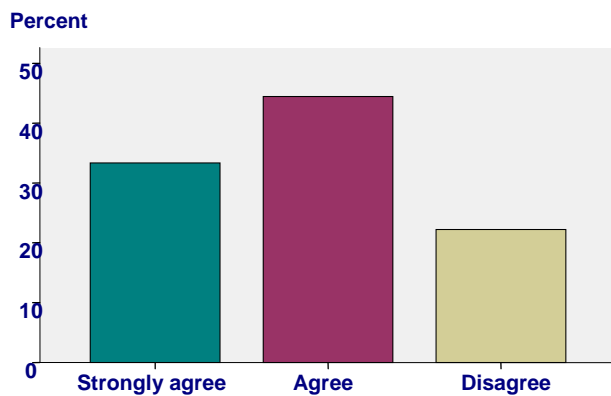
		Frequency	%
Valid	Strongly agree	3	33.3
	Agree	4	44.4
	Disagree	1	11.1
Total		8	88.9
Missing	System	1	11.1
Total		9	100.0

Graph 20: New product efforts is based on detailed market knowledge



		Frequency	%
Valid	Strongly agree	4	44.4
	Agree	3	33.3
	Disagree	1	11.1
	Strongly disagree	1	11.1
Total		9	100.0

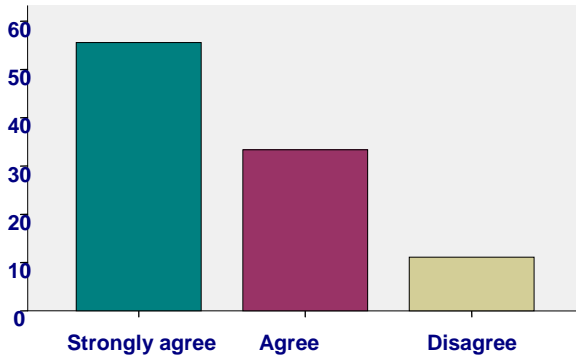
Graph 21: Costs, risks and timing of new product efforts are mapped



		Frequency	%
Valid	Strongly agree	3	33.3
	Agree	4	44.4
	Disagree	2	22.2
Total		9	100.0

Graph 22: Objectives of new products efforts have been set out

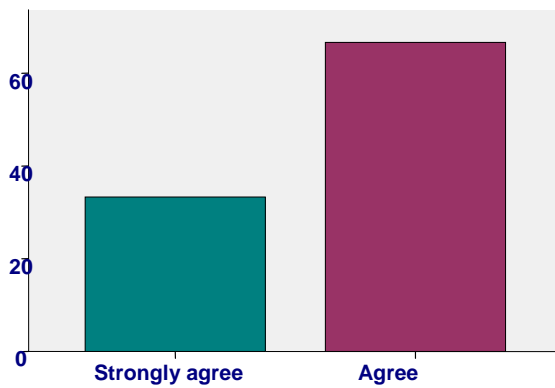
Percent



		Frequency	%
Valid	Strongly agree	5	55.6
	Agree	3	33.3
	Disagree	1	11.1
	Total	9	100.0

Graph 23: New product concept contain clear and visible attributes

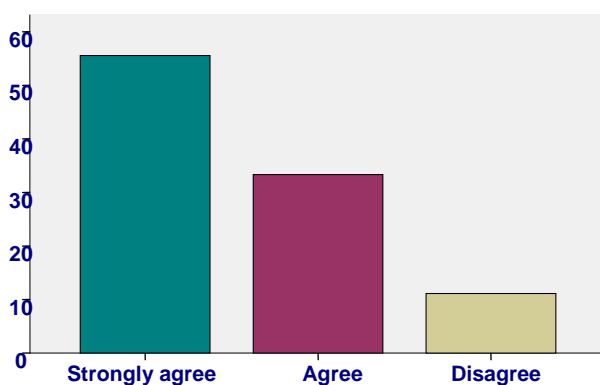
Percent



		Frequency	%
Valid	Strongly agree	3	33.3
	Agree	6	66.7
	Total	9	100.0

Graph 24: Target markets and their characters are defined

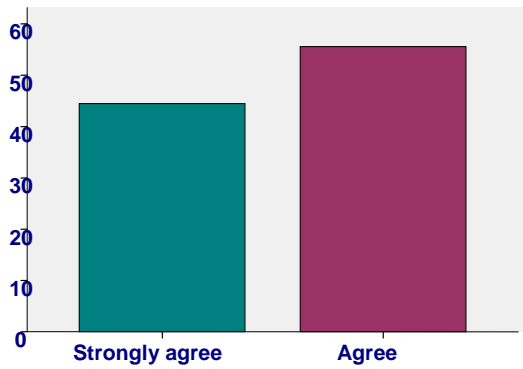
Percent



		Frequency	%
Valid	Strongly agree	5	55.6
	Agree	3	33.3
	Disagree	1	11.1
	Total	9	100.0

Graph 25: New product position and customer mindset are defined

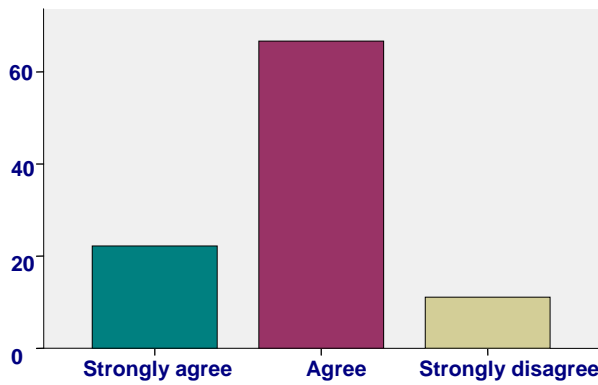
Percent



		Frequency	%
Valid	Strongly agree	4	44.4
	Agree	5	55.6
	Total	9	100.0

Graph 26: Different functional groups work together

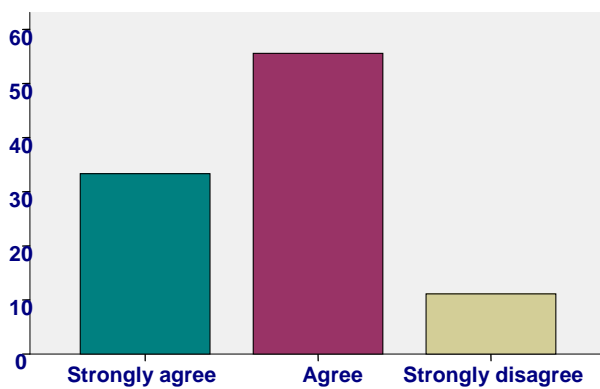
Percent



		Frequency	%
Valid	Strongly agree	2	22.2
	Agree	6	66.7
	Strongly disagree	1	11.1
	Total	9	100.0

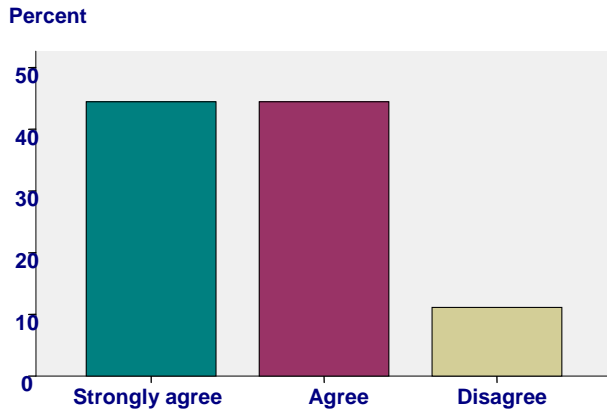
Graph 27: The working environment encourages creativity

Percent



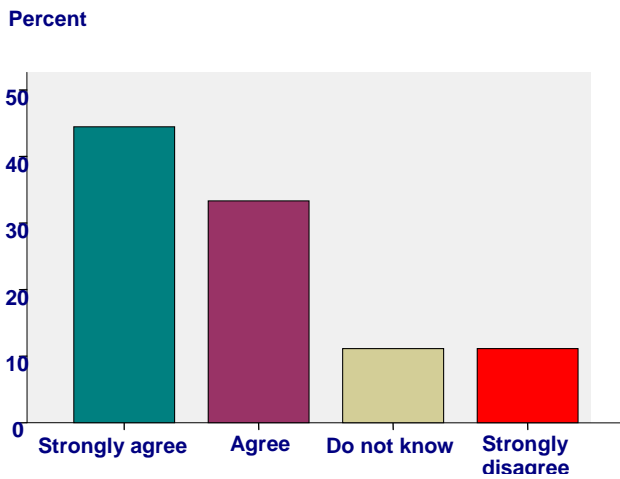
		Frequency	%
Valid	Strongly agree	3	33.3
	Agree	5	55.6
	Strongly disagree	1	11.1
	Total	9	100.0

Graph 28: Employee's participation is encouraged



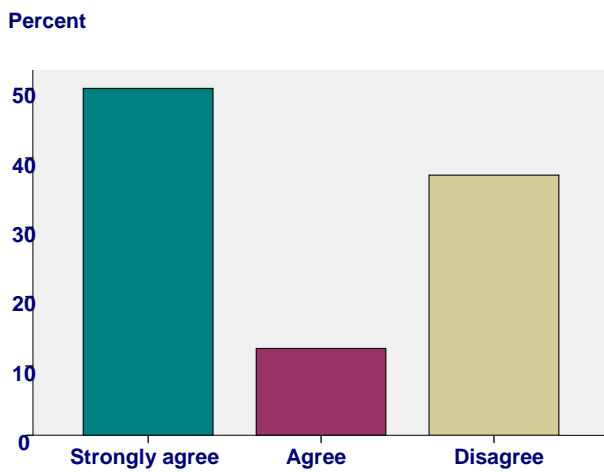
		Frequency	%
Valid	Strongly agree	4	44.4
	Agree	4	44.4
	Disagree	1	11.1
	Total	9	100.0

Graph 29: Employees are encouraged to integrate



		Frequency	%
Valid	Strongly agree	4	44.4
	Agree	3	33.3
	Do not know	1	11.1
	Strongly disagree	1	11.1
	Total	9	100.0

Graph 30: Employees are entitled for similar privileges



		Frequency	%
Valid	Strongly agree	4	44.4
	Agree	1	11.1
	Disagree	3	33.3
	Total	8	88.9
Missing	System	1	11.1
Total		9	100.0

Graph 31: Employees collectively share information