Factors affecting commercialization of newly developed products: A study of selected small and medium enterprises in South Africa

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By

Michael Manaczynski

Student Number: 7099-088-3

Email: mikemana@gmail.com

Cell: 083 286 4368

Abstract

The research was conducted to determine what the success factors for new product development and commercialization were for a selected sample of SMEs in South Africa. Academic literature on success factors for New Product Development and commercialization, as well as small and medium businesseswere reviewed. The review of the literature provided the theoretical framework for 21 success factors relevant to the study. These success factors were further extrapolated to 36 success factors and used as a basis for determining South African SME relevance. The findings were consistent with the literature review and point to several success factors that South African SMEs deem critical to success of new product development. In conclusion, South African SMEs confirm the importance of the success factors as presented in the literature. The ranking by importance of these success factors highlight the specific value that South African SMEs place on these success factors. These need further in-depth research.

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Statement of own work

I, Michael Manaczynski, declare that this research study is my own work, presented to the Graduate School of Business Leadership at the University of South Africa, in partial fulfilment of the requirements for the Masters in Business Leadership degree.

Signature: Date:

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Chapter 1: Background and problem statement

1.1. Introduction

The purpose of this study is to investigate whether the same factors that make new product development (NPD) and commercialization of newly developed products a success in other countries,particularly more developed first world countries, are also applicable to small and medium enterprises (SME) in South Africa(Cooper and Kleinschmidt, 1995a), (Jensen and Harmsen, 2001), (Huang, et al., 2002), (Palmberg, 2006). Each country has a unique environment and its own particular set of challenges that it navigates in order to be successful. Therefore, several key factors for success from these countries were identified and used as a template for comparison against South African SME efforts forsuccessful NPD and commercialization.

1.2. Background of this study

The importance of small business' contribution to the growth of the South African economy is obvious when one considers that the Small, Medium and Micro Enterprises sector contributes an estimated 50% to the country's GDP, and employs about 60% of the country's labour force(Booyens, 2011).

In South Africa, there is huge expectation for SMEs to generate employment and as such, emphasis in academic literature has been focused on SMEs' role in local economic development, entrepreneurship growth prospects and constraints, as well as innovation(Booyens, 2011). According to Booysen (2011), the dynamics of innovation, entrepreneurship and small enterprises have received little research attention. As a result, policy makers have very little micro-based knowledge to inform innovation policy making in South Africa.

Innovation is widely recognised as an important benefactor to a company's economic growth and survival(Trott, 2005). The industrial revolution was fuelled by technological innovation. Today multi-national companies focus large portions of their resources on the development of new products as globalisation forces companies to become more competitive and innovative(INSEAD, 2011). The process of new product development and commercialization has become a closely studied science

as organisations strive to improve their output time of new products into the market with shortened NPD life cycles(Ali, et al., 1995).

Multiple studies into the identification and significance of which factors positively affect the successful commercialization of new products have been explored by various academics from countries across the world. The literature review will show how many of these factors pertain to large companies with large resources at their disposal to pursue profits from new products. However, few studies reveal what the success factors are for profitable commercialization of new products for SMEs.

Some studies also show that not all success factors used by large companies can be directly translated into success factors for SMEs(Jung, 2008). Furthermore, in South Africa such specific studies are glaringly absent in a country desperate to kick-start SMEs to aid in GDP growth and increase job availability(Booyens, 2011).

1.3. Statement of the problem

The main purpose of this study is to determine what the success factors are that make new product development and commercialization successful for SMEs in South Africa.

1.4. Justification of this study

Not enough information exists for policy makers to introduce policy and spending in the right areas to aid SMEs in South Africa in their capacity to successfully commercialise new products(Booyens, 2011). Results from this study might give entrepreneurs, investors, business owners, venture capitalists and government a much clearer understanding of what is required to make commercialization of new products successful.

The results of the study could be beneficial in adding knowledge to the literature available on this subject, particularly relating to SMEs in South Africa.

1.5. Purpose of this study

This study aims to identify the factors that have a significant impact on the ability of SMEs to commercialise newly developed products. This might not necessarily be different to the factors facing large multi-national corporations in commercialising their new products. Smaller firms may have a distinct advantage over larger

organisations in their propensity to commercialize theirpatent due to two reasons. A larger firm's diminishing returns on its research and development budget and the difference of patent management strategy between large and small firms (Jung, 2008).However, SMEs also have a distinct disadvantage in their access to resources as compared to large organisations.

The process of NPD is also an important aspect to the study; however, the focus of the study is on the factors affecting the actual commercialization of the newly developed products. This implies that a newly developed product has completed all the NPD processes up to the process of commercialization, including product testing and safety certification. This is not to say that the assumption is that the NPD process was done correctly up tocommercialization, but rather that the product is at the stage of commercialization in its NPD life cycle. Indeed, the study may find that if there is a weakness in the NPD process, it could have a significant effect on the commercialization of the product.

The study also aims to identify which of the common factors found in the literature are relevant to South African business and highlight any new factors that will affect success in commercialization.

1.6. Objectives of this study

The first objective of this study is to identify the most common success factors found in literature and group them into logical groupings or themes with which one can easily associate, and use as a reference in data collection.

The second objective of this study is to test these listed success factors and themes against the experiences of professionals who have undertakencommercialization projects.

The third objective is to determine whether the list of success factors remain relevant for SMEs.

The fourth objective is to determine whether there are specific factors unique to the South African SMEs that affect successful commercialization.

1.7. Research Questions

What are the most common success factors identified in literature for the commercialization of new products?

Of the success factors identified, which are more relevant and common to South African SMEs?

Are there any unidentified success factors that are more influential on the outcome of commercialization success in South African SMEs?

Why do so many SMEs fail to commercialise new products successfully?

What do SME owners and managers need to know about successful NPD commercialization?

What can South African SMEs learn from lessons learned in peer economies?

1.8. Delimitations of this study

The study will exclude businesses where innovation takes place outside the borders of the country as this would bias the focus on South African business dealing with South African challenges.Thus, the study will focus primarily on SMEs within the borders of South Africa.

The study will not attempt to create a template for commercialization of newly developed products among SMEs in South Africa, but rather givean indication for further study into the subject matter.

The study is limited to SMEs that have NPD as an integral part of their business process and/or business model.

The study will be limited to tangible products only and excludes core services and software products including internet applications and innovations. Tangible products that are combined with services and software may be included in the study.

The data collection timeframe of the study is limited to four months and might thus result in insufficient data being collected to answer all the problems presented. The number of respondents might be limited due to the insufficient collection time of responses.

1.9. Limitations of this study

Respondentbias could skew the results of questionnaires and interviews. This may be bias that is unknown to the researcher. This includes bias based on partial experience of the process, thereby skewing the result of the respondent.

Respondents' limited understanding of the material among small business owners. These aretypically entrepreneurs whose NPD knowledge is often self-taught as opposed to specialised experts that one finds in larger companies.

The geographical scope of this study will be limited to Gauteng as the primary target of research, and especially the cities of Johannesburg and Pretoria, the heart of Gauteng Province.

The time frame of the study is limited to four months which might result in insufficient data being collected to satisfy all the research questions posed.

The lack of financial resourcing could hamper the process of data collection resulting in inconclusive or biased data. The sample collected for the survey may not be representative of the whole population of SMEs in South Africa.

1.10. Significance of this study

1.10.1 Business

The study represents a way forward for inventors, entrepreneurs and managers looking to identify common pitfalls, challenges and strengths of the processes required to successfully commercialise their new products. It would add to the success of new and existing business in its drive for growth and success, which in turn will provide space for much needed growth of jobs in the manufacturing and retail sectors of the economy.

Furthermore, a successful business commercialising successful products would provide for the opportunity for expansion beyond our country's borders into new and existing foreign markets.

1.10.2 Government

In identifying key success factors; innovation hubs, venture capitalists, investors and government would be able to add to their existing knowledge to improve on the success of business in its endeavours to commercialise new products.

Government would also be able to take the knowledge gained and adapt it to challenge or enhance existing policy as well as spending in its endeavour to aid SME growth in the country.

1.10.3 Academics

The study will also add to the existing body of knowledge in the areas of success factors and how they affect small businesses in emerging economies such as South Africa. For academics new and practised, this knowledge will add to the understanding of problems that SMEs face and in finding the solutions to the economic challenges facing South Africa.

1.11. Glossary of operational terms

NPD – New Product Development:the actual development of new products is the process of transforming business opportunities into tangible products(Trott, 2005: 383).

Commercialization: Commercialization refers to the series of activities undertaken by firms to transform knowledge and technologyinto new products, processes or services, in response to marketopportunities(Julio Rosa, 2007: 9).

Discontinuous innovation: refers to radically new products that involve dramatic leaps in terms of customer familiarity and use(Robert W. Veryzer, 1998).

Pearson’s correlation – Pearson’s product moment correlation is used for examining linkages between interval and/or ratio scaled variables. It’s the most widely used measure of association for examining such relationships (Diamantopoulos and Schlegelmilch, 2006).

Firmographics - Firmographic research is focused on providing high-level descriptions of the market. This includes the industry definition, industry size, financial and business metrics, and geography(Smith, 2004).

NPD – New product development.

R&D – Research and development.

ROI – Return on investment.

SME – Small and Medium Enterprises.

SMME – Small, Medium and Micro Enterprises.

OECD – Organisation for Economic Co-operation and Development. Countries that belong to OECD are listed as follows:

Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, and United States.

1.12. Structure of research report

The research report will consist of the following structure:

Chapter 1 Introduction: Introduction to the research report explaining the purpose for the research report and the objectives of the report.

Chapter 2 Literature review: A review of the literature covering success factors that have been identified that make commercialization of new products successful as well as a review of SME and innovation in South Africa.

Chapter 3 Research design: A quantitative approach to data collection is adopted for the purposes of the research.It consists of a survey aimed at gathering information as to the importance respondents place on the success factors identified in chapter 2.

Chapter 4 Research results: Results of the data gathering are presented.

Chapter 5 Discussions, conclusions and recommendations: Results of the data gathering are discussed and conclusions drawn. Recommendations for future studies are also presented.

Chapter 6 References: References for the literature review as well as definitions are presented.

Appendix 1: Consists of questionnaires used in the survey.

Appendix 2: Consists of the timeframe allocation for each section of the research report.

1.13. Conclusion

This chapter presents an introduction to the research report by contextualising the study to identify the lack of knowledge in the field of commercialization and NPD among SMEs in South Africa. The statement of the problem is expressedand the justification of the study is explained. The aim of the study along with the goals are presented and are a measure to which the results of this study can be compared. The delimitations as well as limitations give the research scope to work and clarify the boundaries for the study. The study is significant as it affects not only SMEs but also investors, incubation hubs, government policy makers and venture capitalists.This study adds richly to the current body of knowledge of successful commercialization in South Africa.

The next chapter consists of a literature review covering the topics of success factors for NPD and commercialization as well as small business in South Africa. This review will be used as a gathering point of the most widely accepted success factors for commercialization against which the South African SME can be compared.

Chapter 2: Literature Review

2.1. Introduction

The literature review consists of an evaluation of a number of different studies that have been conducted all over the world in understanding the success factors that affect innovation, NPD and commercialization of products. These are summarised in a table further on in the chapter. The South African small and medium business landscape is explored, as well as the resources that affect successful NPD commercialization of South African companies.

“Corporations must be able to adapt and evolve if they wish to survive. Businesses operate with the knowledge that their competitors will inevitably come to the market with a product that changes the basis of competition. The ability to change and adapt is essential to survival” (Trott, 2005: 5).

Innovation is necessary for business, small or large, to remain competitive, and ultimately to survive in a fiercely competitive market. Similarly, countries need to continue to be innovative and supportive of innovation for their economic well-being and to provide an impetus for internal growth.

Innovation in the form of NPD or new product development is the focus of this study. NPD is the actual process of transforming business opportunities into tangible products (Trott, 2005). Much research has been done on the formalisation of this process in and for large companies, where whole departments are dedicated to the process of new product development. Furthermore, when a product is launched, a whole marketing department is focused on the new product and its distribution(Huang, et al., 2002). SMEs do not have the same resources available to mimic a larger organisation’s infrastructure and have to find alternative ways of developing and commercialising new products successfully(Sinha and Noble, 2005).

The need for innovation within the sphere of new product development, particularly of manufactured goods, is apparent and is typically researched in such innovative countries as the USA, UK, Australia, Canada, Germany, Switzerland and, of course, the Scandinavian countries of Sweden, Finland, and Norway(Dutta, 2011). It is of concern to not only the governments of those countries, but the business communities as well that resources continue to be provided for research and

development of innovation. This is evidenced in the amount of research that has gone into bench-marking and modelling for effective NPD. Different NPD models have been developed to serve different types of organisations and to increase the success of the NPD process.

The commercialization of the newly developed products is the end point of the innovation cycle. The success or failure of the innovation depends on the successful commercialization of that product. The product development and commercialization process is described as "…the supply chain management process that provides structure for developing and bringing to market new products jointly with customers and suppliers" (Rogers, et al., 2004: 43). Effective implementation demands the resources of the whole supply chain.

Small business forms a significant part of a country's innovative capability. According to the U.S. Small Business Administration Report for 2009, it is small business that produces significantly more patents,which is an indication of more innovation, per employee, than larger firms. Small business is more likely to develop emerging technologies than larger business(U.S. Small Business Administration, Office of Advocacy, 2009). Herein lays the need to explore how one can transfer patents into commercialised and profitable products.

This study aims to answer part of that problem by identifying those factors that would aid small and medium firms in South Africa to gain the ability to succeed in their commercialization process.

2.2. The measurement of success

In the determination of success of new products commercialization, a scope needs to be set within which success can be measured and established. A summary of the types of success measured defines four distinct measurements as developed for NPD in start-up technology-based firms(Beven, 2007):

- Subjective versus objective measures.
- Bi-modal,whether success or failure, multi-modal that being success, failure or marginal success, or continuous measurement.
- Financial versus non-financial.

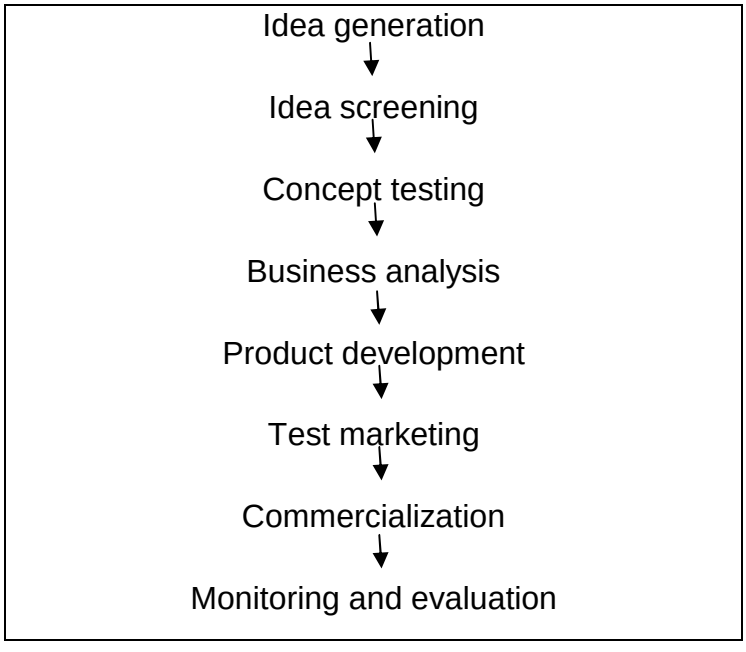
- Meeting or not meeting management and customer expectations.

For the purposes of this report, the classification of success will be simplified to the financial understanding of return on investment (ROI) of the costs, whether actual or estimated, incurred in the duration of product development and commercialization. The ROI will also be classified by time frames within which a breakeven point between costs and revenue was reached. Although breakeven point in itself may not be regarded as a point of celebrated success, it is a point of reference against which a number of diverse projects have a common marker for measurement and comparison. The timeframe too may seem to be subjective, and so for the purposes of this study, will be limited to the time frame set by a firm's management, tempered by the industry norm for the commercialization of a product.

2.3. The new product development and commercialization process

Many qualified processes for the effective NPD and commercialization of products have been tested, vetted and sanctioned by academics and industry itself. However, the research on NPD is varied and fragmented and difficult to organise for analysis (Trott, 2005). A common linear model for NPD in Figure 2.3.1below is deemed an over simplification of an NPD model not suitable in all industries, and follows more of a cash flow line. It does however simplify the NPD process as a starting point:

Figure2.3.1: Commonly presented linear NPD Model (Trott, 2005)



New product development is described by Trott (2005) as concerning the management of the disciplines involved in the development of new products. Several NPD theories are accepted as standard models that businesses use today. These are typically known as Departmental-Stage; Activity-Stage and Concurrent Engineering; Decision Stage; Conversion Process; Response; and Network Models.

More recent research calls for simultaneous and concurrent process with cross functional interaction (Hart, 1993)

The Stage Gate process or Road Map (Cooper, 1998) is used by many companies to manage new product programmes and is regarded as a standard used for successful product development.

The Stage Gate process consists of five stages each separated by a gate that acts as a pass point that serves as a quality control before allowing the process to go on to the next stage. The stages are labelled in order:

Stage 1: Scoping – a quick investigation and sculpting of the project.

Stage 2: Build the business case – a defined product, business justification and a detailed plan for the next stages.

Stage 3: Development – consisting of the design and development of the product.

Stage 4: Testing and validation – verification and validation of the proposed new product.

Stage 5: Launch – full commercialization of the product.

Much of the research into NPD includes the stage gate process, or derivative of it, in its presentation of critical success factors.

In order to define what critical success factors are, and how relevant they are to the study, a literature review of the most common ones has been carried out.

2.4. International trends in new product development and commercialization

Internationally, factors for successful NPD and commercialization are grouped into five categories, and are identified as follows:

2.4.1 Management

2.4.1.1 Corporate goals and management

The success of NPD activities have in some literature reviews grouped themes covering these activities. These themes are split between the strategic and managerial levels of a company. Baker and Hart (1998) explain the themes identified, stating that in order to be successful NPD must be guided from the corporate goals of the company. Management's support of NPD is another crucial theme that is necessary for NPD success.

2.4.1.2 The right organizational structure, design and climate

Successful new product projects require a balanced process consisting of critical activities that need to be performed by the functional areas of marketing, marketing research, engineering, Research and Development (R&D), production, purchasing and finance (Cooper, 1998; Cooper and Kleinschmidt, 1995a;1995b; 1996). Good organisational design requires that product development must be run as a multi-disciplinary, cross-functional effort using cross-functional project teams, as opposed to each function doing its own part independently. Furthermore, such project teams need to have a strong leader or champion (Barczak, 1995; Markham and Griffin, 1998) leading a dedicated and focused team with constant communication through short but effective meeting, and where the entire team is held accountable for the entire project(Cooper, 2003).

Organizational climate and culture is another important ingredient for success. A positive climate and culture encourages risk-taking, rewards success and team efforts are recognised as opposed to individual efforts.Success also requires that upper management refrain from micro-managing projects and second guessing team members(Cooper, 2003).

2.4.1.3 Top management support

An articulated product strategy, adequate resources and a disciplined new product process are the strongest drivers of new product performance at business unit level. Top management's role in NPD is to act as a facilitator to the project team in carrying out these drivers. Senior management also needs to empower project teams and support project champions through mentoring and facilitation(Cooper, 2003).

2.4.2 Competency

2.4.2.1 Requirements of the entrepreneur

Governments of innovative countries spend resources cultivating the commercialization of new products as can be seen in the numerous aid programmes that are available in those countries. In a study of the effectiveness of commercialization assistance programmes in the United States, several conclusions were reached with regard to the skills and demands the commercialization process will have on the entrepreneur (Hufft and Swartz, 2005). Among the findings mentioned are that entrepreneurs need to organise and manage a business and be willing to take a risk. They should also learn to write proposals, administrate funding and manage a project. The head of the company needs to capitalise on the strengths of his/her employees, identify critical weaknesses and manage to overcome those weaknesses. The support of their partners at home as well as their community is also mentioned as an important factor for success.

2.4.2.2 Leveraging core competencies and assets

By using current competencies, strengths, resources and capabilities, a firm increases its chances of success of a new product. The identified reasons for the impact of leverage are the availability of resources at marginal costs, operating within a field of expertise and the experience factor. Two types of leverage are important to product innovation: Technological leverage and Marketing leverage. Technological leverage is to be understood as the project's ability to exploit in-house development technology, utilize inside engineering skills, as well as use existing manufacturing resources and competencies (Cooper, 2003).

Complementary Asset effect: large firms have a greater propensity to commercialise their patents if they are able to leverage current assets at their disposal. These may include manufacturing capabilities or distribution networks that can potentially aid in the commercialization process. Smaller firms tend not have the same assets to leverage their commercialization capabilities and are more likely to license their patents(Jung, 2008).

2.4.2.3 Knowledge and skills of individual employees and organisational values and norms

Research on competence theory has links with NPD literature on success factors. The competence perspective, much like the NPD literature on success, stresses that internal company factors are the main drivers of company success (Jensen and Harmsen, 2001).

The competence perspective also focuses on the mechanisms and elements that create company action as well as competitive advantage. These competencies can be divided into four categories:

- Knowledge and skills embodied in employees.
- Employee's knowledge and skills embedded in technical systems.
- The managerial system is the creation and control of knowledge.
- The fourth dimension, values and norms, is infused through the other three dimensions.

How much each of the four knowledge dimensions contributes to a given competence will depend on the competence and the company. From this also follows that it makes little sense to try to capture a capability, for instance a product development capability, without covering these four dimensions(Leonard-Barton, 1992).

Of the four categories, the two that were included from NPD success factor literature were 'Knowledge and skills embodied in employees' and 'the values and norms infused within the organisation'.

There are the potential benefits of improved understanding of the role and importance of knowledge and skills embedded in individuals and values and norms in

relation to successful new productdevelopment and in relation to making identified NPD success factors more operational and thus more implementable.

The literature on NPD success factors displays limited knowledge of the role and importance of these two aspects. Furthermore most research into success factors seem to be able to list success factors without detailing the process of how to practically maximise the potential of a success factor. Many of the identified success factors are not operational by nature, making them difficult to implement(Jensen and Harmsen, 2001).

2.4.2.4 Quality of execution

Key activities in the new product process as well as the quality of their execution are strongly related to profitability and time to market. Successful project teams consistently perform better quality work across many tasks, which impact the outcome of a project(Cooper, 1999a; Cooper, 1999c; Cooper, 2003; Song and Montoya-Weiss, 1998). As a result many large firms have introduced a process to their innovation projects to ensure that all the critical activities are carried out. They have adopted a formal stage-and-gate product delivery process, in which they build quality assurance approaches that include check points and metrics, as well as making compulsory critical actions that are central to success(Cooper, 2003).

There exists a need for control mechanisms to be put in place to ensure the quality of execution during the NPD phase. Small firms can learn from larger firms' success in managing NPD projects successfully. Small firms typically concentrate on pre and post design and development phases, thereby neglecting the NPD process as compared to larger firms. Hence the need for benchmarking larger firms practices and adapting them to suit smaller businesses. (Van Zyl, 2008)

Australian research into NPD success among SMEs found that the quality of executing NPD activities is associated with the firm's resources and skill availability, as well as the existence of new product strategy. In that same study of NPD processes done among 276 innovative SMEs it was learnt that SMEs undertook most of the processes associated with New Product Development as suggested by Cooper and Kleinschmidt(Cooper & Kleinschmidt, 1986). The study found that the SMEs undertook marketing related activities less frequently then they did technical

activities. They found that the quality with which the NPD activities were executed affected new product success(Huang, et al., 2002).

Better resourced SMEs have a higher level of quality in implementing the NPD activities. NPD activities seemed to be performed better where there was some form of NPD strategy, whether formal or informal. However, it was the marketing related activities that seemed to distinguish successful and unsuccessful new products. The study also showed that respondents felt that several of the NPD activities were more important than the rest, and listed them as follows: Market study; product development; commercialization and preliminary market analysis. Through careful planning, SMEs can develop an appropriate structure to facilitate NPD(Huang, et al., 2002).

2.4.2.5 The necessary resources

Projects lacking time and money commitment are predictably less successful than those that have sufficient resources, and result in failure(Cooper, 1998; Cooper and Kleinschmidt, 1995b; 1995c; 1996). Certain vital activities such as market oriented actions as well as predevelopment research are often under-resourced, particularly in the case of product failures(Cooper, 2003).

2.4.3 Marketing

2.4.3.1 Marketing and market orientation

During an Australian study of NPD processes, done among 276 innovative SMEs, it was learnt that SMEs undertook marketing related activities less frequently than they did technical activities. Even though SME's were found to be just as innovative as their larger counterparts, SMEs lagged behind in their quality and execution of marketing related activities such as market study, market testing, and preliminary market analysis. It is these market related activities that seem to distinguish the successful and unsuccessful new products(Huang, et al., 2002). NPD success also requires a thorough understanding of customer needs and wants, the competitiveness of the market as well as the nature of the market (Cooper, 2003). This includes success themes such as:

- Needs recognition.

- Understanding of user needs.
- Market need satisfaction.
- Constant customer contact.
- Strong market knowledge and research.
- Quality of execution of marketing activities.
- Sufficient resources spent on upfront market activities.

Customer demand and the existence of a market niche significantly shorten commercialization durations, implying that customer oriented innovations have a higher probability of reaching the market quickly. Quicker commercialization times make the NPD project more profitable(Palmberg, 2006).

Marketing plays a significant role in the success of commercialising new products. Market vision, described as the ability to bridge between technological capability and market need, is crucial in being successful in NPD. This is particularly pertinent to high innovation products which usually carry a high degree of uncertainty about their final application and usability(Veryzer, 2003).

In such cases techniques such as prototype reaction studies should be incorporated alongside more traditional market research techniques such as concept tests, focus groups and surveys. Prototypes are essential instruments for market learning during the course of radical innovation as they provide valuable means for product developers to assess a product's direction and test critical assumptions. Furthermore, customers can be studied in order to identify latent needs that may alter current designs or suggest new product ideas (Veryzer, 2003).

2.4.3.2 A well-conceived, properly executed launch backed by a solid marketing plan

A strong marketing effort, and well-targeted selling approach are required for a successful product launch. This needs to be supported by an effective after sales approach which is central to the launch of a new product. Furthermore intricate planning, resourcing and proficient execution are required for successful product launch. Cooper lists four requirements for an effective market launch plan in his report on Profitable Product Innovation: The Critical Success Factors(Cooper, 2003):

- The development of the market launch plan.
- The early start of the market launch plan in the new product project.
- The market launch plan requires good intelligence.
- The personnel who will execute the launch, must be engaged in the development of the launch plan to ensure input and insight into the design of the launch effort as well as availability of resources and buy-in of those who must execute the product launch.

2.4.3.3 Market attractiveness

Porter's five forces model identifies a number of various aspects of market attractiveness as a determinant of an industry's profitability(Porter, 1985). In the same way, some business planning models employ market attractiveness as a key dimension for the allocation of resources to projects(Day, 1986). For new products, market attractiveness is also important. Cooper lists two dimensions for market attractiveness namely:

- Market potential – where there is a positive market environment, namely large and growing markets which translates to markets where a strong customer need exists for such products. Products aimed at such markets are more successful.
- Competitive situation – where there is a negative market that is characterised by intense competition, on the basis of price, high quality and strongly competitive products, and whose sales infrastructure is strongly rated. Products aimed at such markets are less successful.

Both of these dimensions are to be considered as criteria for selecting and prioritizing a new product project(Cooper, 2003).

The Sony Corporation uses an integrated product development process. This process consists of a sequence of phases from development to sales. This process at the same time has inputs into each of the phases of development, design, production and sales, coming through from research results as well as market feedback. Market feedback is continually added to each phase of the development process(Rafinejad, 2007).

2.4.3.4 Timing of market entry

The timing of market entry is often cited as one of the major reasons for new product success or failure(Abell, 1980). Beyond just the results of early or late entry into a market, there are several determinants of market entry timing(Sinha and Noble, 2005). These include:

- Firm resources - Larger firms will tend to be earlier market entrants to the market then smaller firms. The superior resources in all areas of money, people and inter-firm relationships make them generally better equipped to take advantage of emerging market opportunities.
- Market conditions - In more competitive markets, firms generally enter a related new market earlier. Furthermore, firms in higher growth markets will enter a new market opportunity more quickly.
- Appropriability - This is the ability of a firm to garner the anticipated benefits of the emerging market, whether it be through increased profits or cost reductions.

For smaller firms, considerable challenges need to be faced when entering a market that large firms also access. The determinants to successful market entry presented above are resourced with much less difficulty by larger firms. Smaller firms need to be nimble in their approach to entering new markets and thus require a more complex formula for entry, in order to compete with larger firms. Smaller firms are also encouraged to pursue markets created by discontinuous innovations and new-to-the-world technologies, even though that is more risky. Larger firms tend to stick to their core competencies when pursuing new opportunities as it is regarded as a competitive advantage over other firms. Therefore, a gap is created for smaller firms to take the risk in untried innovation(Sinha & Noble, 2005).

2.4.4 Collaboration

2.4.4.1 Distribution channels involvement

In Udell and Hignites paper “New Product Commercialization: Needs and Strategies” (2007), the authors conclude that in order to bridge the chasms of the

commercialization process, careful planning and a realistic assessment of the firm and the channels of distribution involved are required.

2.4.4.2 Strategic partnerships and collaboration

Studies have also found that it is in partnerships that success can be achieved in the commercialization process. “Partnerships help bring innovation to the point where private actors can bring them to the market. Accelerated progress in bringing the benefits of new products, new processes and new knowledge to the market has positive consequences for economic growth and human welfare”(National Research Council, 2002: 23).

Horizontal Linkages are especially important for SMEs, and particularly in the IT industry. Research shows that particularly for Taiwanese companies, it is beneficial for firms to establish and maintain productive corporation linkages, as these appear to improve a firm’s ability to leverage new technical and marketing knowledge, thereby improving NPD. Furthermore, it is a firm’s ability to absorb knowledge from these linkages that exploits the benefit of linkage(Shu, et al., 2005).

Collaboration is a strong theme in many studies in support of successful commercialization. In the USA, there is evidence of public entities such as universities that support the commercialization process through collaboration with entrepreneurs and industry. The breadth of collaboration with external entities, as well as the nature of the entity itself, is an important factor in commercialising. Suppliers and customers have been found to raise the likelihood of commercialising a given patent, whereas public entities such as universities or government research labs seem to have no significant impact on commercialization (Jung T. 2008). There is, however, evidence of successful collaboration with public entities such as found in New Mexico. In 2009, the University of New Mexico faculty research carried out commercialization through its tech transfer arm STC.UNM. This resulted in 113 invention disclosures, 84 patent applications, 15 issued patents, 38 license agreements and eight start-up companies (Schmidly, 2010).

Palmberg, in his research of Finnish firms found that while collaboration with public entities opened up new opportunities to innovate, the consequences are prolonged commercialization and break-even times of those innovations. The

commercializationtime frame is an important element in determining the success of commercialization as a lengthening of the commercialization process increases costs that the innovation has to cover before it makes a profit and is deemed successful(Palmberg, 2006).

2.4.5 New product development process

2.4.5.1 Pre-development work

Several critical pre-developmental activities need to take place for that new product to be successful. These include initial screening, preliminary market and technical assessment, detailed market studies or market research and business and financial analysis. This preparation saves a tremendous amount of time and money through reduced development times as a result of sharp and stable product definitions and fewer surprises arising later in the project(Cooper, 2003).

2.4.5.2 Sharp and early product definition

Clear product definition at the early stage of a new product development project provides clear objectives for the development phase of the project, as well as providing a platform for all concerned parties to buy-in to the project. Well defined product definition requires a specified target market; a description of the product concept and the benefits to be delivered; a positioning strategy (including target pricing) as well as a list of the product's features, attributes, attribute requirements and specifications(Cooper, 2003).

2.4.5.3 Formal product review process

Product champions who have the potential of becoming ego-involved in their projects can misjudge a product's potential or firm's ability to properly launch the product(Schultz, 2001). Failure is often a result of management's failure to pursue development and commercialization in an objective manner. In smaller manufacturing enterprises, management has greater impact on product success than product issues (Knotts, et al., 2002; Udell and Hignite, 2007). In Udell and Hignite's paper "New Product Commercialization: Needs and Strategies" (2007), the authors note that there can be "…obvious shortcomings and barriers that escape the scrutiny of those with a vested interest in the project"(Udell and Hignite, 2007: 75). In the case

study presented in that same paper, they illustrate how a formal team-oriented product review process can overcome many of the shortcomings of the typical product commercialization process. Such a review process can help identify potential failure factors and serve as a spring board for improvement of the success potential of the project.

2.4.5.4 Tough go/kill decision points and better focus

There is the necessity to weed out bad projects based on a consistent project evaluation process that scrutinizes projects based on visible Go or Kill criteria. If a project fulfils the criteria it gets a GO, and if not, a KILL. This forces a firm to focus its resources efficiently on those projects fulfilling a company's selected criteria for new product development. The focus is then aligned with the company's business strategy(Cooper, 2003).

2.4.5.5 Speed – but not at the expense of quality of execution

Speed to market yields a competitive advantage for new products(Song, et al., 2000; Song and Montoya-Weiss, 1998). Speed to market also lessens the potential change of the market environment, promotes the quicker realisation of profits(Ali, et al., 1995). However, Cooper argues that speed to market is sometimes achieved at the cost of not following due process of product development. New products and new platforms are instead being traded for incremental changes through product modifications and line extensions(Stage-Gate International and Product Development Institute Inc, 2002; Crawford, 1992). Both speed and quality are required for this to be considered a success factor. Speed and quality can be achieved through several methods including using cross functional teams; solid research; sharp early product definition and better focus (doing fewer projects). Cooper (2003) also presents the following methods to manage speed and quality:

- Parallel processing – tasks are performed in parallel by team members as opposed to sequentially.
- Flowcharting - the team maps out the required process for product development and focuses on reducing the time of each element or task in the process.

- A time line and discipline – using a project planning software application, project teams plan their projects in a critical path format, ensuring the meeting of deadlines and adding resources as required.

2.4.6 Product

2.4.6.1 Unique superior product

According to extensive studies done by Cooper the number one driver of success is a superior and differentiated product. As compared to “me too” reactive products, unique and superior products are three to five times more successful. The ingredients for success are the ability to(Cooper, 2003):

- Meet users’ needs.
- Offer unique features not available on competitive products.
- Solve a problem a customer has with a competitive product.
- Provide excellent product quality.
- Feature good value for money.
- Reduce the customer’s total cost.
- Boast excellent price performance characteristics.
- Benefits and attributes must be easily perceived by customers, and highly visible.

2.4.6.2 The world product – an international orientation

International products focused at world and neighbour export markets are better performers than products only focused on local markets(Cooper, 2001). Similarly, products designed for international markets are two, and in some cases, three times more successful than products designed for the domestic market only. This requires an international orientation, which requires that market research, concept testing and product testing needs to happen in multiple countries. It also means resourcing an international or global project team(McDonough, et al., 2001; Cooper, 2003).

A summary of these success factors is tabled below:

Table 0.1: Common success factors

	Success factor	Theme
1	Corporate goals and management.	Management

2	The right organisational structure, design and climate	Management
3	Top management support	Management
4	Requirements of the entrepreneur	Competency
5	Leveraging core competencies and assets	Competency
6	Knowledge and skills of individual employees and organizational values and norms	Competency
7	Quality of execution	Competency
8	The necessary resources	Competency
9	Marketing and market orientation	Marketing
10	A well-conceived, properly executed launch backed by a solid marketing plan	Marketing
11	Market attractiveness	Marketing
12	Timing of market entry	Marketing
13	Distribution channels involvement	Collaboration
14	Strategic partnerships and collaboration	Collaboration
15	Pre-development work	NPD Process
16	Sharp and early product definition	NPD Process
17	Formal product review process	NPD Process
18	Tough go/kill decision points and better focus	NPD Process
19	Speed – but not at the expense of quality of execution	NPD Process
20	Unique superior product	Product
21	The world product – an international orientation	Product

2.5. Small and medium enterprises and commercialization

Studies into the size of a firm reveal that large firms are less likely to commercialize their patented inventions than smaller firms, due to several factors. Studies found that firm size has a negative association with the propensity of commercialization, shown as a result of diminishing returns on research and development. This is due to the research and development having diminishing marginal returns which. As a result the productivity of research and development decreases as funding for research and development increases.Secondly the study found that there is a difference of patent management strategy between large and smaller firms. Furthermore, the same study found that patented invention coupled with manufacturing would more likely be commercialised (Jung, 2008).

2.6. Small and medium enterprises in South Africa

South Africa’s macro-economic strategy is focused on transforming the economy to a knowledge based economy. At policy level, the role of SME development and entrepreneurship is recognised as important for economic development. The National Small Business Act 102 of 1996 recognises that small business development as well as the empowerment of entrepreneurs is the most important avenues for growth in South Africa(Booyens, 2011).

According to Booysen (2011), SMME support is focused on developmental purposes and innovative or knowledge-based SMME's have received little policy attention. Furthermore SMME programmes in South Africa do not encourage an entrepreneurial and start-up culture.

In South Africa, the National Advisory Council for Innovation recognises the need for SME innovation support in its current innovation policy. Incentives are needed to promote innovation within SMEs(National Advisory Council on Innovation, 2010).

2.7. Innovation in South Africa

South Africa does not have a strong entrepreneurship culture, but SMMEs do seem to have a relatively high in-house innovation rate in comparison to Organisation for Economic Co-operation and development (OECD) countries. Small enterprises in South Africa also have a higher innovation rate than micro and medium-sized businesses. This is explained due to small businesses bringing incremental rather than major innovation. South Africa performed well in terms of new or improved products, which is evidence of innovation(Booyens, 2011).

With respect to technical innovation, several challenges face SMEs that prohibit innovation, and in a 2002 survey, the National Advisory Council on Innovation (NACI), listed the following reasons given by firms for not engaging in technological innovation activities:

Table 0.2: Reasons for not engaging in Innovation (Source:SAIS2002, South Africa. Department of Science and Technology, 2003:26)

Reasons	Firms with no technological activities
Economic risks: Cost-benefit analyses had too many uncertainties	41%
Costs too high: Estimated innovation costs too high for our firm	52%
Short of staff: Lack of qualified personnel	38%
No time: No time within the firm for innovative activities	46%
Time to market: Could not meet required market introduction	15%
Short of finance: Lack of appropriate external financial resources	45%
Demand risks : Too many uncertainties (future) product markets	40%

Table 0.3: The two most important reasons for not engaging in innovation activity. Innovation (Source:SAIS2002, South Africa. Department of Science and Technology, 2003:26)

Size of firm	Two most important reasons
< 50 employees	costs too high; no time
50 to 250 employees	costs too high; short of staff
250 to 500 employees	costs too high, no time
> 500 employees	costs too high, demand risks

2.7.1 Key factors hampering innovation in South Africa

Of the firms that did partake in innovation activities, several key factors hampered the firm in its progress.Table 2.7.1.1 lists the major causes of bottlenecks as reported by companies trying to implement previously planned projects. It presents the effects of each identified bottleneck on the implementation of the innovation project. The column 'Experienced no bottleneck' gives the proportion of projects that continued successfully without any problems, while the other columns report the consequences of the identified bottleneck on the project.

Table 0.4: Factors hampering innovation and their consequences. Source:SAIS2002

Bottleneck	Experienced no bottleneck %	Experienced a bottleneck and as a result innovation projects were:		
		% not started	% abandoned	% seriously delayed
Economic risks	37	22	4	36
Short of staff	30	14	3	53
Knowledge gap	47	11	3	39
Costs too high	43	11	11	34
Short of finance	41	15	11	33
Time to market	50	6	7	36
Partnership	70	6	7	17
Demand risks	41	19	10	30
Regulations	62	12	7	20
Rigidities	66	4	4	26
Other bottlenecks	21	54	6	19

Shortage of qualified staff remains the single highest bottleneck in a firm's endeavour to successfully innovate. Financial considerations as well as uncertainties in the market are the next mitigating factors that hamper innovation projects(National Advisory Council on Innovation, 2003).

In the South African Innovation survey 2005, the NACI analysed innovative companies that had innovations that were product and process as well as product or process. Its results concluded thatover 10% of turnover was attributed to innovations that were new to the market, 12% was generated by products that were new to the firms concerned. Therefore, of the firms that reported innovation activities, 22% of their turnover was due to new product/process innovation(South Africa. Science and Technology Department, 2005).

From those same respondents it was found that the responsibility for the development of the product innovations was in-house in 64% of the enterprises. Collaboration with other entities in the development of product innovations accounted for 28% of those interviewed and only 8% of enterprises outsourced the development to other enterprises or institutions(National Advisory Council on Innovation, 2009).

In its attempt to address the need for local innovation support the Department of Science and Technology established the Technology Innovation Agency to address specific needs relating to financial and non-financial support of all sectors of the economy in broad technology areas. These consisted of a comprehensive list of services including financing of innovations, non-financial commercialization services, business advisory services, developing human capital, strategic partnerships, technology and infrastructure planning, as well as access to advanced manufacturing technologies(Technology Innovation Agency, 2010).

2.8. Conclusion

The literature review explored previous studies done in determining the factors that make NPD and commercialization successful. These were grouped into themes of management, competency, marketing, collaboration, NPD process and product. Furthermore the South African innovation landscape was discussed along with SME participation in innovation. Small business was identified as the most innovative of all business sizes although generally lacking in entrepreneurship and start-up culture.

Chapter 3: Research Design

3.1. Introduction

The previous chapter containing the literature review presented several themes that have been explored and discussed in defining success factors for NPD and commercialization. A knowledge gap currently exists of whether these factors are relevant to SMEs in South Africa. This chapter depicts the research design selected for the purposes of addressing the research questions, namely:

- Which success factors are deemed critical to the success of NPD and commercialization for SME's in South Africa?
- Which theme or grouping of success factors is most important for South African SME's?
- Are there any significant correlations between the different success factors chosen as important by South Africa SME's?

3.2. Survey design

This study followed a descriptive research design methodology. More specifically, the study followed a survey research methodology with the aim of gathering quantitative data.

3.3. Data gathering

A structured self-completion questionnaire served as a data gathering instrument. The findings from the literature review provided thematic guidance in the development of the instrument. In addition, an interview was carried out with an innovation incubation company to gauge an understanding of South African conditions. This interview was an open ended discussion around what makes innovation, NPD and commercialization successful. The interview provided additional points of reference in informing the instrument with form and content.

The final questionnaire consisted of two parts – the first dealing with demographic information regarding the designation of the respondent, NPD experience, industry type the business operates in, number of employees and past NPD success. The second part dealt specifically with success factors grouped into themes as proposed in the literature review and further informed from the in-depth interview. Respondents

were asked to rank and give weight to each success factor in terms of importance to NPD and commercialization success.

The final questionnaire was published on-line to allow for easy and convenient completion by respondents.

3.4. Target respondents and method

The research process consisted of seeking out the e-mail information of SMEs in South Africa across different manufacturing enterprises. The survey was targetedin particularly at manufacturing enterprises dealing in plastics, metal, wood and electronics. Identifying the correct contact person was difficult based on the fact that most SMEs in South Africa don't have a NPD manager. Instead the most appropriate manager was selected for each company. These included product managers, technical managers, product development managers and production managers. In some cases the business owner was approached.

3.5. Data analysis

Basic frequency and descriptive tables were produced as part of the analysis of the data. Frequency and descriptive statistics provided a means of analysing the variation in the data. A second phase of the analysis involved correlation analysis. Pearson's correlation coefficient provides an indication of the linear strength of two scale variables. Values closer to 1 indicate stronger positive correlation, while values closer to -1 suggest stronger negative correlation. Values closer to 0 indicate the lack of linear relationship between the two factors.

3.6. Response rate

An initial 148 invitations were sent out to specifically targeted product managers, product development managers and technical managers. These were sourced from Matrix online business directory (reference: http://www.mmonline.co.za/login.seam). Once initial response was received, NPD practitioners known to the researcher were contacted telephonically to illicit an invitation to take part in the survey. The same contacts were then requested to contact their peers in the industry to illicit their involvement in the survey. This was more successful and a total of 30 complete responses were received. Of the initial 148 invitations, only seven responses were collected. Of all the responses received, four were incomplete.

3.7. Results and discussions

The data forming the basis of the results is presented in a summary of findings garnered from the responses received. The results will be studied and examined for significance and statistical analysis. The results of the total study will then be compared with the findings in the literature review. Similarities and differences will then be discussed and explored.

3.8. Ethical considerations

Confidentiality and anonymity will be maintained with regard to the identity of the individuals involved in the survey. Participation will be voluntary. Participants have the right to withdraw from the research without any repercussions. Potential participants will be contacted either by phone or email with a brief introduction about the study and the required time and information that the respondent would need to give. The findings will be objective and without bias. There is a commitment to accurately record and safely manage data collected. The integrity and respect for the participants will be maintained at all times. The results of the survey will be sent out to all parties indicating that they would like to receive the results of the survey.

3.9. Perceived limitations

Bias on the part of the respondent to selectively choose to ignore or avoid answering questions that could point out failed commercialization projects. As a result the questions pertaining to commercialization success may be answered with bias.

Furthermore, results of the study may not be transferable to all industries.

Research will be done on a micro or project level and not on a macro level. The results should therefore not be applied to a macro level.

Single key respondents will provide information and if they are biased or lack knowledge it could affect the integrity of the information provided.The sample studied will not reflect a complete random sample of the business population as it deals only with companies that actively pursue the activity of commercialization of newly developed products.

3.10. Reliability of data

The data collected from respondents is trusted to be unbiased. No undue influence was exercised to influence the respondent to partake in the survey.Incomplete surveys were left out of the sample.

Chapter 4: Research Results

4.1. Introduction

This research study aimed to address four objectives. The first objective is directed towards identifying the most common success factors from the academic literature. These common success factors were grouped into logical themes. The findings of the literature review are reported in chapter 2. The findings were also subsequently used as base for the development of a structured questionnaire.

The second objective of this study is to determine if the identified success factors are also relevant, based on the experiences of professionals and NPD practitioners who have undergone commercialization projects and who were targeted during the sampling process. This objective is answered in part in the section below in point 4.2 under the heading “Firmographics”, whereby an inspection of the respondents and the organisations they represent.

The third objective is to determine whether the list of success factors remain true for SMEs too.

The fourth objective is to determine whether there are specific factors unique to the South African SME market that might affect successful commercialization.

The results of the survey will follow the structure of the themes identified in the literature.

The responses below are firstly addressed in the previous groupings or themes of success factors as defined in the literature review pertaining to Management, NPD Process, Collaboration, Competency, and Marketing. Each of the questions grouped in these themes has its source in the list of success factors of NPD listed in the Literature review.

4.2. Firmographics

The sizes of the organisations represented by the respondents were quite evenly spread between the respondents. The table below demonstrated the even spread of respondents with firm size 5-19 employees being the largest pool representing 36.67% of the respondents.

Table 0.5 Size of firm

Size of firm	Total
(1) 0-4	20.00%
(2) 5-19	36.67%
(3) 20-99	23.33%
(4) 100-500	20.00%
Grand Total	**100.00%**

The turnovers of the organisations represented by the respondents were also quite evenly spread between the different options. The table below indicates the summary of the responses.

Table 0.6 Annual turnover

Annual turnover	Total
(1) < R100,000	13.33%
(2) R100,000 to R500,000	3.33%
(3) R500,001 to R1m	26.67%
(4) R1m to R5m	20.00%
(6) R10m to R50m	6.67%
(7) R50m to R100m	10.00%
(8) R100m to R500m	20.00%
Grand Total	**100.00%**

The industries represented by the respondents are presented in the table below.

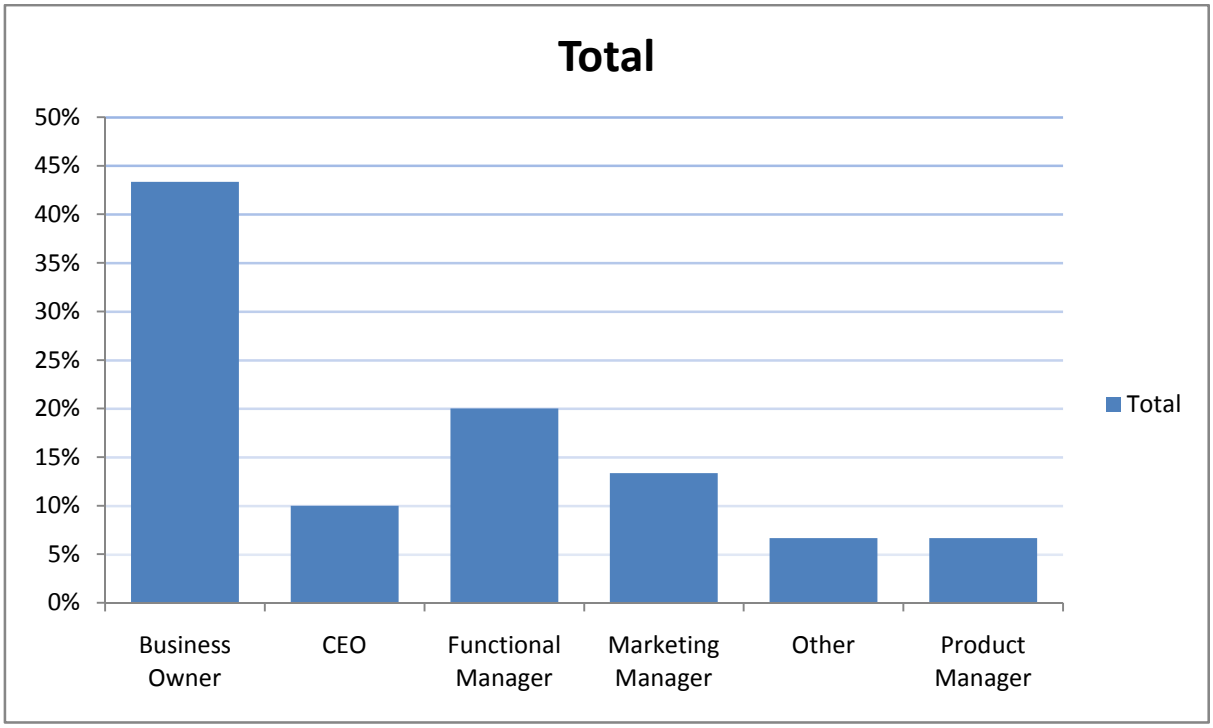
Table 0.7 Industry sector

Industry sector	Total
Automobile, boat and other transportation equipment manufacturing	3.33%
Chemical, petroleum, and coal products manufacturing	10.00%
Computer and electronic product manufacturing	23.33%
Fabricated metal product manufacturing	20.00%
Food and beverage manufacturing	13.33%

Telecommunication and information services	3.33%
Textile and apparel manufacturing	6.67%
Wood, paper products and furniture manufacturing	20.00%
Grand Total	**100.00%**

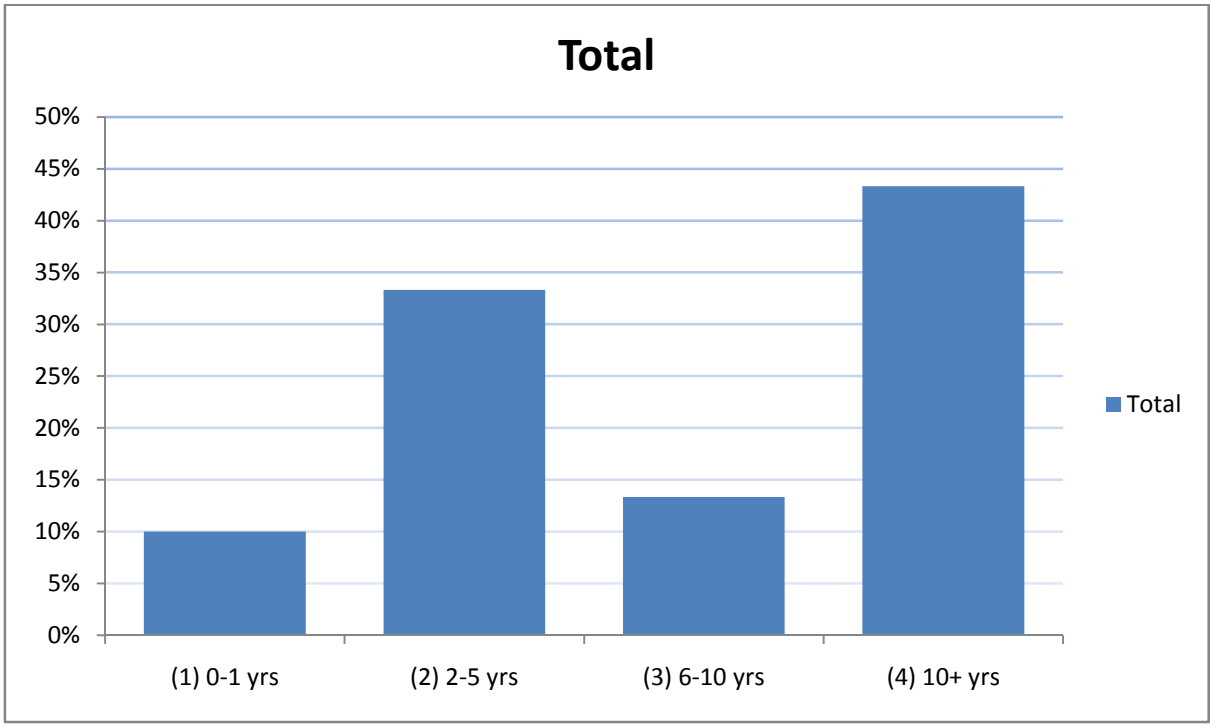
The current positions held by the respondents in their organisation are represented in the graph below.

Figure 0.1Current positions held by respondents



The years of NPD experience that the respondent had at the time of the survey is represented in the graph below.

Figure 0.2 Years of NPD Experience



The number of new products launched annually by the respondents firms is represented in the table below.

Table 0.8 New products launched annually

New products launched annually	Total
1	3.33%
2	40.00%
3	23.33%
4	23.33%
5	10.00%
Grand Total	**100.00%**

Three to five products are currently being developed by 40% of the organisations that are represented by the respondents. The table below shows the full summary of the results:

Table 0.9 Products currently being developed

Products currently being developed	Total

(0) No new products	6.67%
(1) One	30.00%
(2) Two	16.67%
(3) 3 – 5	40.00%
(4) 6 - 9	3.33%
(5) Ten	3.33%
Grand Total	**100.00%**

The market success of the organisations represented by the respondents recorded no failures and significantly 46.67% of the respondents regarded their firms' NPD projects a success. The table below has the full summary of the results.

Table 0.10 NPD products that are a market success

Market success	Total
A huge success	13.33%
A success	46.67%
Not a success but not a failure either	40.00%
Grand Total	**100.00%**

The firms represented by the respondents mostly seem to still be actively developing new products. The summary of the responses are represented in the table below.

Table 0.11 Last time a product was developed

Last time a product was developed	Total
2008	10.00%
2010	10.00%
2011	80.00%
Grand Total	**100.00%**

4.3. Relevance of success factors identified to the South African small and medium enterprise market

The second objective of this study aimed to verify if the success factors identified during the literature review could also be considered relevant to the South African SME environment. In addressing this objective the average importance rating calculated out of five for each of the 36 factors were inspected.

Inspection of Table 4.3.1 shows that of the 36 factors listed, the lowest average rating of 2.63 was obtained for the factor “The collaboration with research institutions on NPD processes”. If an average value of 1.80 and lower is used as a derived cut-point for the indication of unimportance of a factor, with any average rating above 1.80 as indication for importance (i.e. ranging from slightly important to critically important), the average value of 2.63 suggests some level of importance, although only somewhat. These cut-points provide crude, but relative simple, indications of the levels of importance when dealing with five point rating scale, such as the case in this study. Therefore, the result suggests that all 36 factors are deemed important to some extent to the respondents, and might also be regarded relevant to the SME market in South Africa.

Table 0.12: Success Factors Average Rating

Factor	Average
Management’s support of NPD activities	4.60
NPD is a part of the company’s strategic goals	4.53
The company’s organisational structure supports NPD	3.33
A company culture that allows risk taking	4.43
An entrepreneur that has a wide variety of skills	3.83
NPD projects are chosen based on the company’s core competencies	4.50
NPD projects are chosen based on the company’s assets	4.00
Correct knowledge and skills of employees who are involved in NPD and commercialization process	4.33
The organisational values and norms that support NPD	3.50
The quality of the execution of NPD tasks	4.50
The necessary personnel resources	4.27
The necessary financial resources	4.63
The collaboration with suppliers on product requirements and design	3.87
The collaboration with customers on product requirements and design	4.23
The collaboration with research institutions on NPD processes	2.63
Idea generation as part of the start of NPD	3.93

Factor	Average
The screening of ideas	3.87
Preliminary market assessments for the product to be carried out	4.07
Preliminary technical assessment for the product to be carried out	4.03
Business analysis of the NPD project to be carried out	3.97
Financial analysis and feasibility of the project to be carried out	4.33
Products potential is reviewed by a cross functional team	3.53
Sharp and early product definition	3.33
Formal product review process	3.21
Go or kill points at each stage of the NPD process	3.13
Speed of execution of the NPD process	3.67
A thorough market study as part of NPD process	3.70
Customer demand to be established as part of the marketing process	4.40
A prototype reaction study as part of the marketing process	3.28
Concept tests as part of the marketing process	3.23
Surveys as part of the marketing process	3.03
The development of a marketing launch plan as part of the marketing process	3.72
Market intelligence gathering for the marketing launch plan as part of the marketing process	3.32
Market potential of the product is included in the market research	3.66
Competitive market situation that a product is entering is established as part of the criteria for accepting a new NPD project	3.73
The timing of the product entry is considered when going to market	3.40

The following paragraphs explore further the success factors that were assigned high value by the respondents.

4.4. Management

Table 4.4.1 presents the responses for success factors that form part of the Management theme. Of the 30 respondents, more than 50% rated all three of the four factors as critically important, with percentages varying between 53.3% for factor “NPD is a part of the company’s strategic goals” and 60% for factor “Management’s support of NPD activities”.

Table 0.13: Management success factors

Factors	Not Important	Slightly Important	Somewhat Important	Very Important	Critically Important
Management’s support of NPD activities	0.00%	0.00%	0.00%	40.00%	60.00%
NPD is a part of the company’s strategic goals	0.00%	0.00%	0.00%	46.67%	53.33%

The company's organisational structure supports NPD	10.00%	10.00%	40.00%	16.67%	23.33%
A company culture that allows risk taking	0.00%	3.33%	6.67%	33.33%	56.67%

4.5. Competency

Table 4.5.1 represents the responses for success factors that form part of the theme of Competency. Of the 30 respondents, more than 59% rated all the competency factors as either very or critically important. The factor "The necessary financial resources"particularly was notable with 70% of the respondents rating it as critically important.

Table 0.14: Competency success factors

Factors	Not Important	Slightly Important	Somewhat Important	Very Important	Critically Important
An entrepreneur that has a wide variety of skills	0.00%	6.67%	33.33%	30.00%	30.00%
NPD projects are chosen based on the company's core competencies	0.00%	0.00%	6.67%	36.67%	56.67%
NPD projects are chosen based on the company's assets	3.45%	0.00%	27.59%	31.03%	37.93%
Correct knowledge & skills of employees that are involved in NPD and commercialization process	0.00%	0.00%	3.33%	60.00%	36.67%
The organisational values and norms that support NPD	10.00%	6.67%	16.67%	56.67%	10.00%
The quality of the execution of NPD tasks	0.00%	0.00%	3.33%	43.33%	53.33%
The necessary personnel resources	0.00%	0.00%	26.67%	20.00%	53.33%
The necessary financial resources	0.00%	0.00%	6.67%	23.33%	70.00%

4.6. Collaboration

Table 4.6.1 represents the responses for success factors that form part of the theme of Collaboration. Of the 30 respondents, more than 70% rated the collaboration factors: "The collaboration with suppliers on product requirements and design" and "The collaboration with customers on product requirements and design" as either very or critically important. Notably, 52% of the respondents rated the factor "The collaboration with research institutions on NPD processes"as "Not Important".

Table 0.15: Collaboration success Factors

Factors	Not Important	Slightly Important	Somewhat Important	Very Important	Critically Important
The collaboration with suppliers on product requirements and design	3.33%	10.00%	16.67%	36.67%	33.33%
The collaboration with customers on product requirements and design	0.00%	10.00%	20.00%	6.67%	63.33%
The collaboration with research institutions on NPD processes	51.85%	3.70%	7.41%	3.70%	33.33%

4.7. New product development process

Table 4.7.1 represents the responses for success factors that form part of the theme of NPD Process. Of the 30 respondents, more than 50% rated the NPD Process factors as either very or critically important, with the exception of one factor. The success factor “Formal product review process” was rated by 44.83% of the respondents as either very or critically important. Notably, success factors “Formal product review process” and “Go or kill points at each stage of the NPD process” had between 16.67% and 17.24% of the respondents rate it as “Not Important”

Table 0.16: NPD Process success factors

Factors	Not Important	Slightly Important	Somewhat Important	Very Important	Critically Important
Idea generation as part of the start of NPD	0.00%	0.00%	33.33%	40.00%	26.67%
The screening of ideas	0.00%	13.33%	3.33%	66.67%	16.67%
Preliminary market assessments for the product to be carried out	0.00%	6.67%	23.33%	26.67%	43.33%
Preliminary technical assessment for the product to be carried out	6.67%	0.00%	13.33%	43.33%	36.67%
Business analysis of the NPD project to be carried out	6.67%	6.67%	6.67%	43.33%	36.67%
Financial analysis and feasibility of the project to be carried out	0.00%	6.67%	6.67%	33.33%	53.33%
Products potential is reviewed by a cross functional team	10.00%	3.33%	26.67%	43.33%	16.67%
Sharp and early product definition	0.00%	23.33%	23.33%	50.00%	3.33%
Formal product review process	17.24%	3.45%	34.48%	31.03%	13.79%
Go or kill points at each stage of the NPD process	16.67%	10.00%	20.00%	50.00%	3.33%
Speed of execution of the NPD process	0.00%	20.00%	16.67%	40.00%	23.33%

4.8. Marketing

Table 4.8.1 represents the responses for success factors that form part of the theme of Marketing. Of the 30 respondents, more than 60% rated the Marketing factors as somewhat, very or critically important. Less than 43.4% of respondents rated the success factors in the marketing theme as critical.

Table 0.17: Marketing success factors

Factors	Not Important	Slightly Important	Somewhat Important	Very Important	Critically Important
A thorough market study as part of NPD process	6.67%	0.00%	13.33%	76.67%	3.33%
Customer demand to be established as part of the marketing process	0.00%	0.00%	3.33%	53.33%	43.33%
A prototype reaction study as part of the marketing process	10.34%	3.45%	44.83%	31.03%	10.34%
Concept tests as part of the marketing process	10.00%	6.67%	43.33%	30.00%	10.00%
Surveys as part of the marketing process	6.90%	31.03%	13.79%	48.28%	0.00%
The development of a marketing launch plan as part of the marketing process	6.90%	10.34%	10.34%	48.28%	24.14%
Market intelligence gathering for the marketing launch plan as part of the marketing process	7.14%	21.43%	3.57%	67.86%	0.00%
Market potential of the product is included in the market research	6.90%	10.34%	10.34%	55.17%	17.24%
Competitive market situation that a product is entering is established as part of the criteria for accepting a new NPD project	6.67%	0.00%	20.00%	60.00%	13.33%
The timing of the product entry is considered when going to market	6.67%	10.00%	33.33%	36.67%	13.33%

4.9. Ranking the themes

The graph below is a graphical representation of the last question of the survey that requests that the themes be ranked in order of importance. The results are presented in the table below as sum total of all the rankings. The theme that received the most ranking points was Collaboration, which received 32.22% of the weighted ranking points. Collaboration also had a mean of 4.83 out of five and a median and mode of five each. The standard deviation was calculated at 0.59 with a range of three. A distant second in the ranking was Competency, receiving 19.33% of the weighted ranking, followed by Marketing with 18% of the weighted ranking. Fourth in the

rankings was NPD process with 15.56% of the weighted ranking, last was Management with a weighted ranking of 14.89%.

Figure 0.3: Ranking the Themes

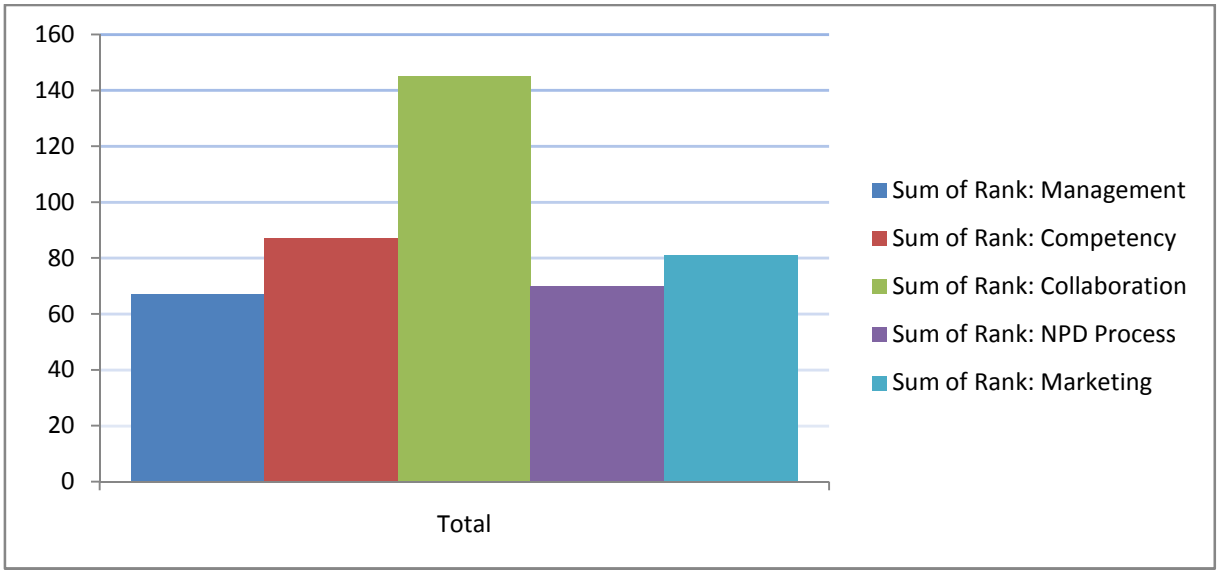


Table 0.18: Ranking the themes

	Sum of Rank: Management	Sum of Rank: Competency	Sum of Rank: Collaboration	Sum of Rank: Marketing	Sum of Rank: NPD Process
Total	67	87	145	81	70
%	14.89%	19.33%	32.22%	18.00%	15.56%

In comparison, when taking into account the individual factors and their weighting and then ranking them according to a mean average across all themes, the following result was calculated:

Table 0.19: Averages per themes

Management	Competency	Collaboration	NPD Process	Marketing
4.23	4.18	3.49	3.72	3.48

Here the ranking by theme places Management as the most important followed by Competency, NPD Process, Collaboration and Marketing respectively.

4.10. Correlation analysis

Several significant bivariate correlations were identified among the factors within the themes as well as across themes. These are reported on below.

4.10.1 Correlations within themes

The twelve highest correlation coefficients amongst factors within themes are discussed in the sections below.

4.10.1.1 NPD process theme correlations

A strong positive correlation coefficient of 0.89 was found between “The screening of ideas” and “Business analysis of the NPD project to be carried out”. Another strong positive correlation within the NPD process theme was found between “Preliminary technical assessment for the product” and “Business analysis of the NPD project to be carried out” (r = 0.79).

4.10.1.2 Marketing theme correlations

A strong positive correlation between factor one and six of the Marketing theme was found. The success factors “A thorough market study as part of NPD process” and “The development of a marketing launch plan as part of the marketing process” had a positive Pearson Correlation coefficient of 0.80.

Further strong positive Pearson correlation coefficients of 0.76, 0.81, 0.81 were found between factor “A thorough market study as part of NPD process” and factors seven, “Market intelligence gathering for the marketing launch plan is part of the marketing process”, eight, “Market potential of the product is included in the market research” and nine, “Competitive market situation that a product is entering is established as part of the criteria for accepting a new NPD project” respectively.

Factor seven and factor eight of the Marketing themes had a strong positive Pearson correlation coefficient of 0.91. Similarly factor seven and nine of the Marketing theme was found to have a strong positive correlation coefficient of 0.84. The factorsnine and ten of the Marketing theme had a positive correlation coefficient of 0.89.

4.10.2 Correlations between themes

Correlations between themes were also found with some strong positive correlations showing:

The strongest correlation across all factors and themes was measured between factor four, “A company culture that allows risk taking” of the Management theme and

factor two, “NPD projects are chosen based on the company’s core competencies” of the Competence theme. A positive correlation coefficient of 0.96 was calculated.

Several strong positive correlations exist between the NPD Process theme and Marketing theme. Factor two, “The screening of ideas” of the NPD Process theme and factor six, “The development of a marketing launch plan as part of the marketing process” of the Marketing theme have a positive correlation coefficient of 0.83. That same factor two, “The screening of ideas” of the NPD Process theme and factor nine, “Competitive market situation that a product is entering is established as part of the criteria for accepting a new NPD project” of the Marketing theme had an even stronger positive correlation coefficient of 0.85.

The NPD process factor five, “Business analysis of the NPD project to be carried out” had strong positive correlations with Marketing factors one:“A thorough market study as part of NPD process”, six: “The development of a marketing launch plan as part of the marketing process”, seven: “Market intelligence gathering for the marketing launch plan is part of the marketing process”, eight: “Market potential of the product is included in the market research”, and nine: “Competitive market situation that a product is entering is established as part of the criteria for accepting a new NPD project”. Correlation coefficients were calculated to be 0.88, 0.84, 0.83, 0.91 and 0.84 respectively.

4.11. Conclusion

The results chapter started off by reminding the reader of the objectives of this study. The survey was undertaken in order to address the study objectives. The respondents’ credentials were also presented in the firmographics results, adding credence to the survey results. The survey yielded notable results about what South African SMEs consider to be very important and critical success factors. Of the 36 factors identified, 15 are worth noting due to the high number of weighted ratings they received.

Significant correlations were also discovered both within success factor themes and between correlation themes. The correlations, particularly, were many between the Marketing and NPD Process theme.

In the next chapter, these results will be analysed further in the discussion section, as well as possible reasons explored for the findings discovered here. The analysis and findings will then be summarised into a conclusion, and further exploration may be recommended.

Chapter 5: Discussion, conclusion and recommendations.

5.1. Introduction

In trying to determine which success factors for NPD and commercialization are important to SMEs in South Africa, the results need to be put in context. Firstly, the literature defined 21 factors that lead to success in NPD and commercialization of products. The 21 success factors were then listed as 36 factors and required to be ranked by the respondents. Respondents were asked to give each of the success factors a weighting ranging from one to five. Each weighting had a description defining the importance of these factors. The rankings in ascending order were “Not Important”; “Slightly Important”; “Somewhat Important”; “Very Important” and “Critically Important”. An option for “Not Sure” was also available although it carried no ranking. The discussion below will explore only the success factors that the majority of the respondents ranked as either Very Important or Critically Important. These will be discussed in their themes. Thereafter those same success factors will be ranked from the most highly regarded success factor to the least.

Correlations between the success factors will then be discussed and explored.

Once the discussion has been completed a conclusion will be presented pertaining to the survey and the research report. Thereafter several recommendations will be made for further studies in this fascinating area of business.

5.2. Discussion

The results produced by the survey require some further discussion, as well as comparison to the literature that has already been presented.

5.2.1 Firmographics

The firmographics yielded some notable results that added weight to the survey response. One of the more notable results was the indication that 43.33% of the respondents were the business owners of the organisations they represented in the survey. Align that with the fact that none of the respondents were NPD managers, and that the remaining respondents had designations that were not primarily specified as NPD related. This indicates that the function of new product development is not prevalent among SMEs in South Africa.

Another notable result was the experience represented in the survey by the respondents. Over 43% of the respondents had ten years or more experience in the practise of new product development. A further 13% had between six to ten years of experience in new product development. This significantly added weight and credibility to the results of the survey. Furthermore, 60% of the organisations represented by the survey consider the products developed in the last 10 years as successful. Again, this indicated a significant weight to the survey results.

5.2.2 Success factors

The survey distinctively showed that South African SMEs agree almost completely with the literature about the importance of the success factors tested in the survey. Only one factor tested as Not Important. The factor “The collaboration with research institutions on NPD processes” tested negatively, possibly because SMEs generally do not work with research institutions on NPD projects. This theory may need to be explored in further research study.

Furthermore, the survey highlighted 15 of the 36 success factors as Very Important and Critically Important. Only the success factors where the majority of respondents rated the success factor as Very Important or Critical were regarded as significant for further discussion. Out of a weighting ranging from one to five, where five is the highest, only success factors where 50% or more of the respondents rated four or five were deemed as important success factors for South African SMEs in NPD and commercialization.

These 15 success factors are discussed within the grouping of the success factor themes as identified earlier in the literature.

5.2.3 Management

The Management theme provided three clear success factors. These are listed below in order of rank from the most important to the least.

1. Management’s support of NPD activities.
2. NPD is a part of the company’s strategic goals.
3. A company culture that allows risk taking.

The first success factor “Management’s support of NPD activities” was clearly regarded as a success factor that remains important to South African SMEs, with all respondents agreeing about its importance. The second success factor, with a slightly lower ranking, was similarly unanimously regarded by all respondents as an important success factor. The third success factor, although receiving good support from respondents, had a wider range of ranking from respondents. This result strongly supports the existing literature concerning managements’ role in new product development and commercialization(Cooper, 2003).

5.2.4 Competency

The Competency theme had several strong indicators of important success factors. These are listed below in order of rank from the most important to the least.

1. The necessary financial resources.
2. NPD projects are chosen based on the company’s core competencies.
3. The quality of the execution of NPD tasks.
4. Correct knowledge and skills of employees that are involved in NPD and commercialization process.

The success factor “The necessary financial resources” had the highest ranking of all the success factors tested. This finding is supported by the findings that SMEs find it hard to access finance in South Africa. Funding and Guarantees are not available from most banks, and venture capital and seed funding is relatively weak(Booyens, 2011).

The remaining success factors two, three, and four are clear indications of the importance of competent staff and being able to leverage a company’s knowledge to bring about innovation and successful commercialization of new products.

5.2.5 Collaboration

Only three success factors were listed in total for the Collaboration theme, of which two have been regarded by South African SMEs as important.

1. The collaboration with customers on product requirements and design.
2. The collaboration with suppliers on product requirements and design.

The first success factor was ranked not only first in the theme of collaboration, it alsoranked second over all the success factors listed. Working with customers is regarded as critically important to successful NPD and commercialization. Collaboration with suppliers, had less support for being a critical success factor, but remained very important to the NPD process.

5.2.6 New product development process

NPD process success factors generally rated lower than the other themes. Four success factors are listed below with the first three rating similarly.

1. Financial analysis and feasibility of the project to be carried out.
2. Preliminary market assessment for the product to be carried out.
3. Preliminary technical assessment for the product to be carried out.
4. Business analysis of the NPD project to be carried out.

Notably, the success factors that were regarded as important in the NPD process theme were all related to planning and assessment of the NPD project. Success factors relating to the carrying out of NPD tasks are regarded less important than the actual planning and assessment of them. Financial analysis and feasibility was regarded by most as critical.

5.2.7 Marketing

Only two marketing success factors were regarded as important by respondents. These are ranked in order of importance:

1. Customer demand to be established as part of the marketing process.
2. A thorough market study as part of the NPD process.

The success factor “Customer demand to be established as part of the marketing process” was regarded by respondents highly with the weight “Very Important” selected in 53.3% and “Critically Important” receiving a further 43.3% of the selection. This result confirms the finding under the Collaboration theme of the importance of working with customers.

The success factor “A thorough market study as part of the NPD process” was regarded as very important and not much more. Only one respondent regarded it as

critical. Of the 30 respondents, 23 weighted this success factor as “Very Important”, making it almost unanimous. They clearly regarded as very important but not critical.

The lack of importance placed on marketing activities may support the view that SMEs undertook marketing related activities less frequently than they did technical activities. They may also lag behind in their quality of execution of marketing activities as opposed to large business(Huang, et al., 2002).

5.2.8 Comparing the themes

The final survey question required respondents to rank the themes in descending order of importance. The question produced astonishing results that deviate in comparison to the earlier part of the questionnaire. Respondents ranked Collaboration as the most important theme with a third of all weighting being allocated to this theme. With a mean of 4.83 out of five and a median and mode of five each, along with a standard deviation of 0.59, it makes the decision among SMEs quite clear that Collaboration as a theme, is the most important of all NPD activities.

However, when compared to the selections made by respondents for each of the factors in their respective themes, the results are conflicting. Management was the most important theme followed by Competency, NPD Process, Collaboration and Marketing respectively. This difference could be attributed to the difference in the number of factors apportioned to each theme. Collaboration had only three factors, whereas Management had four. Just one of the factors could have distorted the comparison sufficiently to cause the difference. Furthermore, the ranking of the themes as a summary cannot take into account the factors they represent so specifically.

Notably though, competency in both measurements was ranked second. The rest of the themes were closely grouped with not much separating their importance.

5.2.9 Ranking the success factors

The success factors were ranked as follows in order of importance based on total value of weighted ranking:

Table 0.20: Ranking the success factors

Ranking	Weighting	Success factor
1	139	The necessary financial resources
2	138	Management's support of NPD activities
3	136	NPD is a part of the company's strategic goals
4	135	NPD projects are chosen based on the company's core competencies
5	135	The quality of the execution of NPD tasks
6	133	A company culture that allows risk taking
7	132	Customer demand to be established as part of the marketing process
8	130	Correct knowledge and skills of employees that are involved in NPD and commercialization process
9	130	Financial analysis and feasibility of the project to be carried out
10	128	The necessary personnel resources
11	127	The collaboration with customers on product requirements and design
12	122	Preliminary market assessment for the product to be carried out
13	121	Preliminary technical assessment for the product to be carried out
14	119	Business analysis of the NPD project to be carried out
15	118	Idea generation as part of the start of NPD
16	116	NPD projects are chosen based on the company's assets
17	116	The collaboration with suppliers on product requirements & design
18	116	The screening of ideas
19	115	An entrepreneur that has a wide variety of skills
20	112	Competitive market situation that a product is entering is established as part of the criteria for accepting a new NPD project
21	111	A thorough market study as part of NPD process
22	110	Speed of execution of the NPD process
23	108	The development of a marketing launch plan as part of the marketing process
24	106	Products potential is reviewed by a cross functional team
25	106	Market potential of the product is included in the market research
26	105	The organisational values and norms that support NPD
27	102	The timing of the product entry is considered when going to market
28	100	The company's organisational structure supports NPD
29	100	Sharp and early product definition
30	97	Concept tests as part of the marketing process
31	95	A prototype reaction study as part of the marketing process

Ranking	Weighting	Success factor
32	94	Go or kill points at each stage of the NPD process
33	93	Formal product review process
34	93	Market intelligence gathering for the marketing launch plan is part of the marketing process
35	88	Surveys as part of the marketing process
36	71	The collaboration with research institutions on NPD processes

5.2.10 Correlations

Several correlations were found between factors within themes, which were expected. The NPD process theme showed that there is a strong correlation between the screening of ideas and the business analysis of a NPD project. This close association could be attributed to the fact that the screening of ideas might well be a part of the analysis process. Similarly, preliminary technical analysis was also closely associated with the analysis of the NPD project, again probably due to the fact that one might well form part of the other.

Correlations found in the Marketing theme all relate to investigating and assessing the market. These include market research, a marketing launch plan, assessing market potential and assessing the competitiveness of the market. Again these strong correlations can be attributed to the fact that they may all be part of the same general market research process.

The correlations between factors across themes were interesting and highlight some key associations.

The strongest correlation found across all factors was between the factor “A company culture that allows risk taking” and “NPD projects are chosen based on the company’s core competencies”. This could infer that a company could more readily accept taking more risk on an NPD project, as long as it keeps to doing projects within the range of its competencies.

Another interesting association was revealed between the factor “The screening of ideas” and “Competitive market situation that a product is entering is established as part of the criteria for accepting a new NPD project”. This association indicates that

assessing the competitive market situation of a product is part of the screening process of ideas.

The factor “Business analysis of the NPD project to be carried out” has strong associations with several Marketing factors namely:

- A thorough market study as part of NPD process.
- The development of a marketing launch plan as part of the marketing process.
- Market intelligence gathering for the marketing launch plan as part of the marketing process.
- Market potential of the product is included in the market research.
- Competitive market situation that a product is entering is established as part of the criteria for accepting a new NPD project.

The association links business analysis with marketing analysis and planning. The association can be explained as a result of being similar in nature.

5.3. Conclusion

Much research has been done in determining what the success factors are for New Product Development and commercialization. Most of the literature has been focused on large companies, with more research being done to investigate whether SMEs also benefit from these factors. In South Africa particularly, some research has been done around innovation and SMEs. This paper sought to determine what similarities or differences there were between NPD success factors among South African SMEs; and what is generally regarded in international literature as success factors for NPD and commercialization.

The first objective of this study was to identify the most common success factors found in the available literature and group them into logical groupings or themes with which one could easily associate and use as a reference in data collection.

The second objective of this study was to test these listed success factors and themes against the experiences of professionals who have undergone commercialization projects.

The third objective was to determine whether the list of success factors remain true for SMEs too.

The fourth objective was to determine whether there are specific factors unique to the South African SME that affect successful commercialization.

In answering the first objective the literature review established 21 success factors that were deemed as generally accepted success factors due to their support, testing and referencing by different authors. These were grouped into themes to try and better understand the distinction and type of success factors and be able to generalise the specific success factors into manageable groupings.

The determined success factors were then extrapolated into 36 factors each better defining the success factors given in the literature. The survey was sent to professionals who deal with NPD and commercialization and determined that almost all the success factors were deemed important bar one. This result answers the second and the third objective. For South African SMEs, 35 of the 36 factors that represent the 21 success factors remain true.

The results of the survey and the discussion around them go a long way to answer objective four. Several success factors stood out as particularly more important than the rest. These include first and foremost the necessary financial resources for a project. All the themes presented were regarded as important by respondents with little to separate them when compared to one another using the responses across the entire survey. It is worth repeating that, using a weighted average, the Management theme was highest of all the themes. However, the ranking of themes by respondents put Collaboration as the most important.

In conclusion, it can be said that the study has reached its objectives and goes some way to answer some of the questions posed. It also raises some questions that require further study and unfortunately fall outside the scope of this study.

5.4. Recommendations

The research report yielded relevant information and raised several new questions about SMEs in South Africa that develop new products. Of particular relevance was the success factor “The necessary financial resources”. Why is this so important to

an SME? Are financial resources for NPD and commercialization so limited that they become an important obstacle to success?

The Management and Collaboration themes also require further study in that they both can be explored in greater detail, further explaining why SMEs regard these as so important.

The discrepancy in results when ranking the themes also needs further investigation so as to explain the difference. The themes in themselves need further more detailed investigation, as they all form an integral part of successful commercialization of new product development

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Chapter 7: Appendices

7.1. Appendix 1: Survey

The purpose of this survey is to determine whether there are common success factors among SMEs in South African that occur in the development and commercialization of new products.

The results of the study will be used for academic purposes and is conducted as part of the fulfilment of a Master's in Business Leadership (MBL) degree at the Unisa School of Business Leadership (SBL).

While your participation in this study is very important to us, the survey is voluntary. The survey is expected to take approximately 8-10 minutes to complete.
Answers you give will be treated as confidential.

Please contact the undersigned if you have any questions or enquiries.

Mr Michael Manaczynski
Cell: 083 286 4368
E-mail: 70990883@mylife.unisa.ac.za
Student No.70990883

Please take note of the following definitions:

Definitions:
New product - refers to a newly developed product that is developed for commercial purposes and that is new to the world.

New product development (NPD) - refers to the process of developing a product from idea to end product ready for commercial sale.

Commercialization - The process of bringing a product to market.

Q1

1. By ticking here, I consent to be a participant in this study.

- [ ] I Agree

2. What is the approximate size of your company in terms of the number of employees?

- [ ] 0-4 employees
- [ ] 5-19 employees
- [ ] 20-99 employees
- [ ] 100-500 employees
- [ ] 500 + employees

3. Please state your firm's approximate annual turnover

- [ ] Less than R100,000
- [ ] R100,000 to R500,000
- [ ] R500,001 to R1 million
- [ ] R1 million to R5 million
- [ ] R5 million to R10 million
- [ ] R10 million to R50 million
- [ ] R50 Million to R100 million
- [ ] R100 million to R500 million

- [ ] R500 million and more
- [ ] Not Sure

4. Please identify your industry sector

- [ ] Automobile, boat, & other transportation equipment manufacturing
- [ ] Chemical, petroleum, & coal products manufacturing
- [ ] Computer and electronic product manufacturing
- [ ] Electrical equipment and appliance manufacturing
- [ ] Fabricated metal product manufacturing
- [ ] Food and beverage manufacturing
- [ ] Machinery manufacturing
- [ ] Non-metallic mineral manufacturing
- [ ] Primary metal manufacturing
- [ ] Telecommunication and information services
- [ ] Textile and apparel manufacturing
- [ ] Tobacco products manufacturing
- [ ] Wood, paper products and furniture manufacturing

Other (please specify)

5. What is your current position in the company? Please tick all the appropriate options

- [ ] Business Owner
- [ ] CEO
- [ ] Functional Manager
- [ ] Marketing Manager
- [ ] New Product Development Manager
- [ ] Product Manager

Other (please specify)

6. How many years of NPD experience do you personally have?

- [ ] 0-1 years
- [ ] 2-5 years
- [ ] 6-10 years
- [ ] 10+ years

7. How many new products (on average) are launched annually by your firm?

Number per year

8. How many new products are currently being developed by your firm?

- [ ] No new products are currently being developed

- [ ] One
- [ ] Two
- [ ] 3 – 5
- [ ] 6 – 10
- [ ] 10+

9. How many new products has your firm developed in the past 10 years?

Number

10. How many of these products are still in your product range today?

Number

11. How would you rate the market success of your firm's latest developed product?

- [ ] A failure
- [ ] Not a success but not a failure either
- [ ] A success
- [ ] A huge success

Other (please specify)

12. Approximately, what percentage of NPD projects in the last 10 years has gone to market successfully?

- [ ] Don't know
- [ ] Less than 10%

- [ ] 20%
- [ ] 30%
- [ ] 40%
- [ ] 50%
- [ ] 60%
- [ ] 70%
- [ ] 80%
- [ ] 90%
- [ ] 100%

13. When was the last time your company developed a new product?

- [ ] 2011
- [ ] 2010
- [ ] 2009
- [ ] 2008
- [ ] 2007
- [ ] 2006
- [ ] 2005
- [ ] 2004

- [ ] 2003
- [ ] 2002
- [ ] 2001
- [ ] Before 2001

Other (please specify)

PART TWO

The success factors of NPD are summarised as MANAGEMENT, COMPETENCY, COLLABORATION, NPD PROCESS, PRODUCT and MARKETING AND COMMERCIALIZATION. These are described as follows:

MANAGEMENT:

This includes the corporate goals of the company and whether NPD and commercialization is included. Furthermore management's commitment and support to commercialization success.

COMPETENCY:

This includes the knowledge and skills of individuals involved with NPD, as well as the core competency of the company. Organisational values and norms are a large part of the competency of the business. The Quality of execution is important as well as whether the necessary resources are available.

COLLABORATION:

The involvement of third parties and the inclusion of the supply chain both within and outside of the company.

NPD PROCESS:

The steps followed in the New Product Development process.

MARKETING AND COMMERCIALIZATION:

The marketing, market orientation of the product, market conditions and timing of market entry included in commercialization.

14. MANAGEMENT:
Please indicate how important the following is to New Product Development and Commercialization success.

	Not Important	Slightly Important	Somewhat Important	Very Important	Critically Important	Not Sure
Management's support of NPD activities	☐	☐	☐	☐	☐	☐
NPD is a part of the company's strategic goals	☐	☐	☐	☐	☐	☐
The company's organisational structure supports NPD	☐	☐	☐	☐	☐	☐
A company culture that allows risk taking	☐	☐	☐	☐	☐	☐

15. COMPETENCY:

Please indicate how important the following is to New Product Development and Commercialization success.

	Not Important	Slightly Important	Somewhat Important	Very Important	Critically Important	Not Sure
An entrepreneur that has a wide variety of skills	☐	☐	☐	☐	☐	☐
NPD projects are chosen based on the company's core competencies	☐	☐	☐	☐	☐	☐
NPD projects are chosen based on the company's assets	☐	☐	☐	☐	☐	☐
The correct knowledge and skills of the employees that are involved in the NPD and commercialization process	☐	☐	☐	☐	☐	☐
The organisational values and norms that support NPD	☐	☐	☐	☐	☐	☐
The quality of the execution of NPD tasks	☐	☐	☐	☐	☐	☐
The necessary personnel resources	☐	☐	☐	☐	☐	☐
The necessary financial resources	☐	☐	☐	☐	☐	☐

16. COLLABORATION:

Please indicate how important the following is to New Product Development and Commercialization success.

	Not Important	Slightly Important	Somewhat Important	Very Important	Critically Important	Not Sure
The collaboration with suppliers on product requirements & design	☐	☐	☐	☐	☐	☐
The collaboration with customers on product requirements and design	☐	☐	☐	☐	☐	☐
The collaboration with research institutions on NPD processes	☐	☐	☐	☐	☐	☐

17. NPD PROCESS:

Please indicate how important the following is to New Product Development and Commercialization success.

	Not Important	Slightly Important	Somewhat Important	Very Important	Critically Important	Not Sure
Idea generation as part of the start of NPD	☐	☐	☐	☐	☐	☐
The screening of ideas	☐	☐	☐	☐	☐	☐
Preliminary market assessments for the product to be carried out	☐	☐	☐	☐	☐	☐
Preliminary technical assessment for the product to be carried out	☐	☐	☐	☐	☐	☐
Business analysis of the NPD project to be carried out	☐	☐	☐	☐	☐	☐
Financial analysis and feasibility of the project to be carried out	☐	☐	☐	☐	☐	☐
Products potential is reviewed by a cross functional team	☐	☐	☐	☐	☐	☐
Sharp and early product definition	☐	☐	☐	☐	☐	☐
Formal product review process	☐	☐	☐	☐	☐	☐
Go or kill points at each stage of the NPD process	☐	☐	☐	☐	☐	☐
Speed of execution of the NPD process	☐	☐	☐	☐	☐	☐

18. MARKETING AND COMMERCIALIZATION:

Please indicate how important the following is to New Product Development and Commercialization success.

	Not Important	Slightly Important	Somewhat Important	Very Important	Critically Important	Not Sure
A thorough market study as part of NPD process	☐	☐	☐	☐	☐	☐
Customer demand to be established as part of the marketing process	☐	☐	☐	☐	☐	☐
A prototype reaction study as part of the marketing process	☐	☐	☐	☐	☐	☐
Concept tests as part of the marketing process	☐	☐	☐	☐	☐	☐
Surveys as part of the marketing process	☐	☐	☐	☐	☐	☐
The development of a marketing launch plan as part of the marketing process	☐	☐	☐	☐	☐	☐
Market intelligence gathering for the marketing launch plan is part of the marketing process	☐	☐	☐	☐	☐	☐
Market potential of the product is included in the market research	☐	☐	☐	☐	☐	☐
The competitive market situation that a product is entering is established as part of the criteria for accepting a new NPD project	☐	☐	☐	☐	☐	☐
The timing of the product entry is considered when going to market	☐	☐	☐	☐	☐	☐

Rank the themes

The five summary options covered above, how would you rank them in terms of importance? No.1 would rank as the most important and no.5 as the least important

	5	4	3	2	1
Management	☐	☐	☐	☐	☐
Competency	☐	☐	☐	☐	☐
Collaboration	☐	☐	☐	☐	☐

	5	4	3	2	1
NPD Process					
Marketing					

7.2. Appendix 2: Schedule/Timeline

Activity	**Duration**	**Due Date**	**Status**
Research Proposal	4 weeks	24/03/2011	Completed
Interim research report	8 weeks	31/05/2011	Completed
Data collection	4 weeks	28/10/2011	Completed
Data analysis and interpretation	2 weeks	11/11/2011	Completed
Submit draft report	1weeks	14/11/2011	Completed
Final Editing	1 weeks	24/11/2011	Completed
Submit Report	1day	15/12/2011	Completed