

**THE IMPACT OF TECHNOLOGICAL MARKETING ON PORTER'S
COMPETITIVE FORCES MODEL AND SMES' PERFORMANCE**

**BY
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**A DISSERTATION SUBMITTED IN FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE**

MASTER OF COMMERCE IN BUSINESS MANAGEMENT

**DEPARTMENT OF BUSINESS MANAGEMENT
FACULTY OF MANAGEMENT AND COMMERCE**

UNIVERSITY OF FORT HARE

2012

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DECLARATION

I, the undersigned, Progress Hove, hereby declare that this dissertation entitled “The Impact of Technological Marketing on Porter’s Competitive Forces Model and SMEs’ Performance” is my own original work. It has not been and will not be submitted or presented for the award of any other Degree, Diploma, Fellowship or similar title at any other institution.

.....

Signature.....

Date.....

ACKNOWLEDGEMENTS

The triumphant achievement of this dissertation was made possible through the support, encouragement and advice from assorted people and organisation(s). I would like to offer my gratitude to the following:

- Dr Smith. Thank you supervisor and mother for your invaluable support and patience with me.
- Mr. Reginald Masocha. Thank you co-supervisor for your invaluable advice and guidance.
- Govan Mbeki Research Centre for making sure I concentrate on the study while they provided the funding.
- Miss Anesu Hove, Miss Akudzweishe Hove, Miss Tinevimbo Shoko, Mr Tawananyasha Hove and Mr Tokudzashe Shoko, my nieces and nephews as well as friends for all the appreciation and encouragement you always afforded me: all the smiles and calls meant a lot to me, guys. You played a very significant role in my completion of this project.
- Mr Ben Jordaan. Thank you for your advice and support.
- Dr Chinomona. Thank you for your support.
- Miss Free Pangani Ncube. Little sister, thank you for your moral and spiritual support. Your love and concern gave me the strength to keep on. Thank you also for editing all my work.
- Miss Caroline Gurajena. Auntie, thank you for your inspiration.
- Miss Vongai Ruzungunde and Mr Winfred Mahlekete, thank you for the love and support.
- Miss Nicole Anenyasha Shumba, my daughter, thank you for the smiles and giggles.
- Mr Rich Mashayanyika *mwana wamai* and Muchie my son, thank you for your prayers.
- All integral worship members and Baptist brethren, thank you.
- Miss Racheal Hove. Thank you big sister for all the love, prayers and positive words, always.

DEDICATION

I dedicate this project to God for the wisdom and power he granted me in order to carry out and compile this research. Glory to his name. It is also dedicated to my nieces, Miss Anesu Hove, Miss Akudzweishe Hove, Miss Tinevimbo Shoko, my daughter Nicole Anenyasha Shumba, my nephews Mr Tawananyasha Hove, Mr Tokudzashe Shoko and to my little sekuru Mr Blessings Chiwazi. I also dedicate this study to my future family for their appreciation, kind-heartedness, the love and care that they have shown me and which has allowed me to gain confidence and has inspired me towards greater achievements.

ABSTRACT

It is commonly understood that the adoption and development of technological marketing capabilities by firms provides them with immense opportunities to transform their business practices and strategies, so as to strategically position themselves in the market and enhance firm performance. Nevertheless, little attention has, thus far, been given to the empirical investigation of the impact of adopting and developing the technological marketing on Porter's five competitive forces and firm performance of SMEs. The principal objective of this study was to fill this void by investigating the influence of the technological marketing on Porter's five competitive forces model (industry structure) of SMEs in the Buffalo City Metropolitan Municipality. Secondly, the study sought to determine the influence of technological marketing capability on firm performance of SMEs in the Buffalo City Metropolitan Municipality; in order to ascertain whether or not the competitiveness of SMEs impacts on their firm performance; to determine whether or not SMEs adopt new and advanced technological capabilities when marketing their products/services and to examine whether or not SMEs adopt new and advanced technological capabilities in order to enhance their performance. The study employs a quantitative method in data collection. Sample data from 211 SME owners/managers in the retail and manufacturing sectors of Buffalo City Metropolitan Municipality was collected for the final data analysis of this project. The sample data was analysed by performing a Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM) using AMOS 7 Statistical Analysis software. The principal finding of this study reveals that technological marketing has no significant impact on Porter's five forces. In addition, the results showed that technological marketing capability has a positive and significant influence on firm performance. The findings also revealed that SMEs adopt new and advanced technologies when marketing their products and services. The conclusions and implications of the research findings are provided and recommendations are suggested. The researcher recommended non technological strategies for improving SMEs' competitiveness and the following technological strategies to boost performance: creating a customer-centric e-commerce strategy, embracing outsourcing, joining e-business community and integrating information management into new marketing technologies. Strategies were also recommended to the government as the policy maker. These include introducing e-business finance arrangement, marketing hubs for SMEs and promoting synergies between

technology vendor companies and the small enterprises. The study tried to address marketing technologies' policy deficiencies on the side of both SMEs and the government.

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LIST OF ABBREVIATIONS

BCMM	Buffalo City Metropolitan Municipality
CFA	Confirmatory Factor Analysis
e-Marketing	Electronic Marketing
FP	Firm Performance
PFF	Porter's Five Forces
SME	Small and Medium Enterprises
SEM	Structural Equation Modelling
TMC	Technological Marketing (Capability)

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CHAPTER 1

INTRODUCTION TO THE STUDY

1.1 INTRODUCTION

Over the years, the strategies, approaches and emphasis for businesses have shifted significantly as firms strive to provide optimum customer value which ultimately ensures a sustainable competitive advantage in the contemporary business environment. Generally all firms, including Small and Medium Enterprises (SMEs), are expected and strive to formulate strategies that outperform or at least withstand their competitors. Worldwide, due to the developmental roles, such as job creation, that firms fulfil, the survival and success of SMEs has been an area commanding wide research efforts. Prior studies by scholars like Furrer and Thomas (2000:624) and Porter (2008:3) highlight that SME performance depends decisively on industry and organisational structures which are, ultimately, determined by five competitive forces as postulated by Michael Porter's Five Competitive Forces model.

1.2 BACKGROUND TO THE STUDY

First published in 1980, and modified in 2001 and 2008, the model consists of five competitive forces, namely; bargaining power of suppliers, bargaining power of customers, threat of substitutes, threat of new entrants and rivalry among existing firms. With the recent advent of technology, these five competitive forces might be affected either negatively or positively. Technology and competition are the major challenges which have a pervasive impact on firms in contemporary markets. Thus, almost all firms across all industries are challenged, on merit, by the inherent effects of persistent technological developments as businesses increasingly emphasise the utilisation of the latest accessible technologies when conducting business and competing with each other. Accordingly, the sustained competitiveness of SMEs, if not their fundamental firm performance, depends on how well the owners/managers learn to manage the increasing opportunities and threats that come with technological developments.

SMEs repeatedly form the stamina of national economies and have been augmented in importance recently, especially in developing countries where they are seen as a major instrument for poverty alleviation (McCartan-Quin & Carson, 2003:88). SMEs

refer to any enterprises, whether or not incorporated or registered under law, which consist primarily of persons conducting small business concerns in any economic sector, or an enterprise established for the purpose of promoting the interests of small business concerns (National Small Business Act, 1996). SMEs and the development of SME sectors in national economies is an important element of political and public policy life. Despite the concerns of the firm, technology is a force that cannot be ignored since it is at the forefront of redefining the way firms compete with each other and interact with their customers (Masocha, Chiliya & Zindiye, 2009:38). Thus, the way these SME firms adopt the new and advanced technological capabilities in marketing their products/services, in order to enhance their performance and gain a competitive edge against the other players in the market, justify a detailed investigation.

Consequently, modern researchers, academics and practitioners are unremittingly focused on investigations that enable firms to flourish and survive through these environments (Brady, Fellenz & Brookes, 2008:108). Against the backdrop of these very demanding conditions which emanate from technological evolvement and extreme competition, business practices and strategies are changing so as to adopt superior standards across all business activities. Henceforth, in marketing, technological marketing has sprouted as a discourse which deals with the planning and execution of conceptualising, pricing, distributing and promoting products, which occurs through technology. Currently, technological marketing is the center and extensive driver of business activities and business competition, since the superior goal for a firm is to satisfy the customer (Masocha *et al.*, 2009:40).

Given this background, this study seeks to examine the influence of technological developments on Porter's five competitive forces (industry structure) and firm performance in SMEs in Buffalo City Metropolitan Municipality. Industry structure is a variable that has often been used to explain business competition and performance variability (Galbreath & Galvin, 2008:110). It refers to the arrangement and number of organisations, firms and enterprises in an industry (Robinson, 1998:176). This study of industry structure emanates from the five-competitive-forces framework developed by Porter (2008:3), which can be used to analyse the impact of industry structure on business competition and firm performance. Thus, throughout this study, the term industry structure is used interchangeably with Porter's five forces model, even in relation to enterprises and firms such as SMEs, when explaining business

competition. This study is important in creating a framework that can be presented to both start-ups and already established SMEs in order to enhance their performance and create a sustainable competitive edge against their competitors by appropriately adopting and using the new and advanced technologies in marketing their products/services.

Although previous studies (Adeyemi, 2009; Trainor, Rapp, Beitelspacher and Schillewaert, 2011) were conducted on the impact of technology on the competitive marketing of firms, less focus was placed on how Michael Porter's five competitive forces model has been remodified due to technology. Notable efforts to redefine Porter's five competitive forces model are manifest in the addition of a sixth force known as the complementary relationships by authors such as Ghazanfar, McGee and Thomas (2000), Grant (2002) and Adeyemi (2009:2). Despite the fact that a sixth force has been added to Michael Porter's original Five Forces model, the acceptance of this framework has, to some extent, been limited.

1.3 STATEMENT OF THE PROBLEM

The theory in the field of technological marketing is still in its infancy and not yet well established. Also, the outcome of immense technological marketing developments and utilisation on industry structure and firm performance has not been fairly investigated, particularly in SME marketing. This posits a disparity in SME marketing given the prevalent prioritisation of technological marketing tools, such as the Internet, which provides benefits such as wide information availability which substantially reduces marketing challenges. Hence, the capacity of SMEs to capture benefits posited by technological marketing on the face of extreme competitive environments needs substantiation, subject to several variables *inter alia* industry structure. Thus, there is no general consensus on whether today's rapid pace of technological change makes subsequent industry structure and competition favourable or unfavourable towards SME marketing. In the light of the intensity of factors which restrict the firm owner/manager-customer-technology interaction, the concept of technological marketing is subject to examination in Business to Consumer (B-2-C) markets.

Electronic branding by firm owners/managers as a means of technological marketing, for instance, has proven difficult to build, conceivably due to a lack of physical

presence and direct human contact. As a result, more and more of the industry structure and elements of competition seem to be mismatched with marketing technology, particularly in instances where firms are lagging behind with advanced marketing technology systems. Conversely, from the customers' side, opportunities exist which enhance switching mobility in the market for those customers who are acquainted with technology. Therefore, the basis of industry competition nowadays is distorted in many ways due to the presence of technology in marketing a firm's products/services.

As technological utilisation continues to drive consumers in many industries, the fundamental problem driving the study is the need to know whether the increased deployment of marketing technology (independent variable) constrains or strengthens the competitiveness and performance of SMEs in all industries in the business environments of the Buffalo City Metropolitan Municipality (dependent variables). The research problem for this study arises from a gap which exists as a result of a lack of consensus between the positive and negative impacts of technological marketing developments on industry structure and, ultimately, firm performance which exists theoretically and pragmatically. **Therefore, this research investigates the compatibility and prevalence of technological marketing and Porter's five competitive forces, by focusing on the performance and competitiveness of SMEs in all industries in the Buffalo City Metropolitan Municipality.**

1.4 RESEARCH OBJECTIVES

This study seeks to explore the following primary objective and its associated secondary objectives.

1.4.1 Primary Objective

The primary objective of this study is:

- To investigate the influence of technological marketing on Porter's five competitive forces model (industry structure) in the Buffalo City Metropolitan Municipality SMEs.

1.4.2 Secondary Objectives

- To investigate the influence of technological marketing capabilities on firm

performance in the Buffalo City Metropolitan Municipality SMEs.

- To ascertain whether the competitiveness of SMEs impacts on their firm performance.
- To determine whether SMEs adopt new and advanced technological capabilities when marketing their products/services.
- To examine whether SMEs adopt new and advanced technological capabilities in order to enhance their performance.

1.5 HYPOTHESES

1.5.1 Primary Hypothesis

H₀: Technology adoption has no impact on Porter's five competitive forces model (industry structure) of SMEs in the Buffalo City Metropolitan Municipality.

H₁: Technology adoption has an impact on Porter's five competitive forces model (industry structure) of SMEs in the Buffalo City Metropolitan Municipality.

1.5.2 Secondary Hypotheses

H₂₀: Technology adoption has no impact on firm performance of SMEs in the Buffalo City Metropolitan Municipality.

H₂: Technology adoption has an impact on firm performance of SMEs in the Buffalo City Metropolitan Municipality.

H₃₀: SMEs' competitiveness has no impact on firm performance.

H₃: SMEs' competitiveness has an impact on firm performance.

H₄₀: SMEs do not adopt new and advanced technological capabilities in marketing their products/services.

H₄: SMEs adopt new and advanced technological capabilities in marketing their products/services.

H5₀: SMEs do not adopt new and advanced technology capabilities to enhance their performance.

H₅: SMEs adopt new and advanced technology capabilities to enhance their performance.

1.6 ORIGINALITY AND SIGNIFICANCE OF THE STUDY

Primarily, the originality of this study emanates from the location (Buffalo City Metropolitan Municipality) and the initiative to uncover the compatibility of SME competitiveness and modern technologies in the marketing of SME products and services.

A review of the relevant literature shows that studies of competitiveness and industry structure and, ultimately, firm performance are redefined from a technological marketing perspective have largely been conducted in developed countries. Only sketchy evidence of such studies in the South African context could be obtained. In addition, empirical evidence on technological marketing is insufficient and focuses primarily on business-to-business (B-2-B) markets. Therefore, this study has chosen to focus on Business-to-Customer markets where less has been done in terms of research.

Given this background, and based on the available research on SMEs, the vehicle for a nation's economic growth towards hastening technological development and adoption exposes the concept of technological marketing in the SME industry's competitiveness – in comparison to other industries (Wai-Ching, 2008:59). Determinedly, SMEs have been lagging in the adoption and utilisation of new technology in their business practices. In contrast, the area of technology development has constantly and increasingly obtained sponsorship and attention from various sources ranging from individuals to governments (Brady *et al.*, 2008:108-109). Consequently, these advanced and new technologies have complicated present-day business environments, thus, persuading constant business research studies of this nature in order to keep track of the implications of these new technologies (Cooper & Schindler, 2006:19).

In the modern digital and computer revolution, within business practice, SMEs have been identified as providers of the much needed flexibility to the economic structure of a country. This makes it feasible for large-scale firms to sharpen their economic competitiveness and performance by focusing on their core competency (typically, marketing and technology) and sub-contracting to SMEs. Hence, the hesitancy of SMEs to adopt and utilise new technologies, to enhance their competitiveness and performance in the market, constrains the economic growth of a nation (Shafeek, 2009:11).

The significance of carrying out this study is to provide answers to and further explore the implications and impact of adopting new marketing technologies in relation to the industry structure, competition and performance of SMEs. This study complements the government's efforts by trying to investigate how SMEs can improve their performance and competitiveness through the successful adoption of marketing technologies, thereby positively contributing to economic development. The adoption and implementation of marketing technologies is no longer a business choice; instead, it is a new way of doing business. As businesses are becoming increasingly global, increased innovation eliminates business and national boundaries, thereby acting as a strong competitive tool. The study at hand raises awareness of the importance of this phenomenon amongst SME owners/managers. The aspiration of this study is that this approach should improve SME competitiveness in this digital era and result in their success. Finally, this study serves as a baseline for future marketing and strategy studies.

1.7 THEORETICAL BACKGROUND OF THE STUDY

The literature review of this study is grounded, primarily, on two theories; these are the Market-Based View by Porter (2001, 2008), and the Resource-Based View by Penrose (1959). Studies on technological marketing (Trainor *et al.*, 2011; Kim & Jae, 2007), Porter's five forces (industry structure and competition) (Porter, 2001, 2008) and firm performance (Galbreath & Galvin, 2008, Melville, Kraemer & Gurbaxani, 2004) were reviewed. A common gap exists in these studies because there is no general consensus on whether today's rapid pace of technological change makes subsequent industry structure and competition favourable or unfavourable towards SME marketing. In addition, there is limited literature on how firm performance is defined in SMEs from a technological marketing perspective. This study therefore

seeks to close the common gap that exists. The next section focuses on the theoretical review.

1.7.1 Theoretical Review

This study draws on the Market-Based View and the Resource-Based View as the theoretical bases from which to examine firm competitiveness and performance impact of technology. The Market-Based View, which is based on market power imperative, stems from traditional economic research, and considers industry structure as the primary cause of firm competitiveness and performance (Porter, 2008:3). It holds that firm assets are a product of either implementing a firm's strategy (firm activities) over time, or obtaining them from the business environment or both (Porter, 2008:4). In this study, the Market-Based View provides a strong framework for analysing the relationships between Porter's five competitive forces model and firm performance, as well as between technological marketing and Porter's five competitive forces model.

The Resource-Based View which combines the underlying principle of economics with a management view, originates directly from strategic management research, and emphasises the value of firm-specific capabilities (Spanos & Lioukas, 2001:910). It has been employed to understand the conditions for sustaining competitive advantages (Ray, Muhanna, and Barney, 2005). Moreover, the Resource-Based View posits that unique firm resources and capabilities are the determinant of firm performance (Spanos & Lioukas, 2001:8). It provides a robust framework for analysing the relationship between technological marketing and firm performance. Thus, in order for firms (including SMEs) to compete in the uncertain and rapidly evolving business environments, there is need to develop core competencies and capabilities that may help the firms to survive the competitive environment. Zhang, Vonderembse and Lim (2003:176) posit that 'competence emphasises technological and production expertise at specific points along the value chain while capabilities are broadly based and encompass the entire value chain.' They advocate that capabilities are visible to the customers, whereas competencies are internal and support these capabilities. Accordingly, this study posits that technological marketing is the capability of an SME to respond to market changes visible to customers using a set of marketing competencies that enable such capability. The next section focuses on the empirical review.

1.7.2 Empirical Review

A review of the theoretical motivation and empirical findings on the research constructs is provided. There are three research constructs: technological marketing, Porter's five competitive forces model (industry structure) and firm performance. The next section reviews technological marketing.

1.7.2.1 Technological marketing defined

Technological marketing is believed to be a new philosophy and a contemporary business practice which involves the marketing of goods, services, information and ideas through the use of the Internet and other electronic means (Trainor *et al.*, 2011:166). It is discerned, from assessing and reviewing the relevant available literature, that the definitions of technological marketing differ from one author's point of view, background and area of specialisation to that of another. For instance, Smith and Chaffey (2005:11) define technological (electronic) marketing as achieving marketing objectives through applying digital technologies. Alternatively, Strauss and Frost (2001:454) define it as the use of electronic data and applications for planning and executing the conception, distribution and pricing of ideas, goods and services to create exchanges that satisfy individual and organisational goals.

An assessment of the existing and relevant literature exposed that one of the key problems in the literature is the distorted manner of dealing with the concept of, and defining, technological marketing. Notably, the majority of the researchers erroneously use the term technological marketing. Most of them tend to use the terms: Technological marketing/Internet marketing/E-commerce/E-business interchangeably based on the assumption that they are synonymous, which is erroneous (Trainor *et al.*, 2011:166; Strauss & Frost, 2001:456). As such, technological marketing has a broader scope than Internet marketing. Internet Marketing refers only to the Internet, World Wide Web and e-mails, whereas technological marketing includes Internet marketing plus all other electronic marketing tools, like: Intranets, Extranets and mobile phones (Furrer & Thomas, 2000:620). In contrast, E-commerce and E-business have a wider and broader scope in comparison to technological marketing (Masocha *et al.*, 2009:39). E-commerce refers to the buying and selling of goods and services over the Internet. It encompasses business activities such as Customer Relationship Management (CRM), electronic tailing (e-tailing), search engines, portals, hubs and on-line

auctions, all of which use the Internet as a platform for conducting exchanges or for forming and maintaining relationships (Baltzan, Phillips & Haag, 2009:563). Conversely, E-business refers to the conducting of business on the Internet, which encompasses the buying and selling of goods and services, serving customers as well as collaborating with business partners (Baltzan *et al.*, 2009:563). Therefore, the definition of technological marketing, in this study, includes Internet marketing tools together with other electronic marketing tools such as Intranets, Extranets and mobile phones (Trainor *et al.*, 2011:166).

The implementation of delivering customer benefits and satisfaction coupled with electronic marketing resources is growing rapidly. In this digitalised and computerised era, marketing practices change in order to take advantage of new technologies. SME owners/managers are bound to respond to the threat, and test of success, by understanding and recognising the dangers of technological marketing deficiency, with regard to competition in their respective industries (De Klerk & Kroon, 2005:9). It is also important to note that contemporary marketing technologies firmly endorse the logic and consistency of the marketing process: situation analysis, marketing planning, strategy implementation and control.

In order for SMEs to efficiently maximise the delivery of customer benefits and satisfaction, which is at the heart of marketing today, there exists a need for constant innovation in order to improve marketing strategies and processes (Reedy & Schullo, 2004:5). In addition, digital computing, data storage, and the ability to transmit digital signals through telecommunication networks provide firms with an interactive marketing strategy which combines product features, product development, pricing, and customer information (Galbreath & Galvin, 2008:114). Thus, through marketing technology, flexibility is increased and SMEs are able to attract customers and efficiently respond to their demands, thereby enhancing their competitiveness in the market (Lamb, Hair & McDaniel, 2002:637). However, if incorrectly applied, marketing technologies could raise complex ethical issues and present significant threats (Walker, Mullins, Boyd, & Larrèchè, 2006:264).

1.7.2.2 Porter's five competitive forces model/ industry structure

In this study, the framework which is utilised in undertaking a competition analysis is Michael Porter's five competitive forces model (industry structure) of establishing industry attractiveness (a surrogate term for industry profitability), for SMEs in the

Buffalo City Metropolitan Municipality. The forces are: the bargaining power of suppliers, bargaining power of buyers, threat of substitute products/services, threat of new entrants and the rivalry amongst existing firms. Thus, the weaker/stronger these forces are, the more/less attractive the industry should be as a whole and the larger/smaller its overall profits.

a) The threat of new entrants

New entrants refer to the firms that have recently entered the market and industry to share the profits enjoyed by already existing firms in the same market (Hellriegel, Jackson, Slocum, Staude, Amos, Kloppe, Louw & Oosthuizen, 2004:106). The threat of new entrants depends on that industry's barriers to entry. For instance, the economies of scale required to be successful can provide a barrier to entry, thereby reducing competition. However, new technologies reduce the required economies of scale in many industries, hence, reducing barriers to entry and ultimately increasing competition. These huge technological investments can create barriers (Louw & Venter, 2010:219). Where new technologies reduce barriers to entry, new approaches to meet customers' needs and perform functions are enabled, thus creating new substitutes. The threat of substitutes is discussed below.

b) The threat of new substitutes

A substitute product is a product that serves the same purpose as the traditional and original product of firms in the market (Louw & Venter, 2010:218). The threat of substitutes increases where the firms' customers are willing to substitute the traditional product with a new one, where the new product/service offers relatively more benefits than the traditional one and where there are low switching costs. New technologies result in new products and services for consumers, improved existing products, better customer services and, often, lower prices; these lure customers towards switching and substituting the existing products with new ones (Boone & Kurtz, 1992:56). The rivalry amongst competing SMEs is discussed below.

c) Rivalry among existing firms

Competitive rivals are firms with similar products and services which are aimed at the same customer group (Louw & Venter, 2010:217). This is the most obvious and immediate source of competition. Industry competition intensifies when a market is composed of numerous and almost balanced competing firms. Notably, competitors

utilise strategies such as price-cutting, improved service delivery and quality (Hellriegel *et al.*, 2004:104). New technology causes firms to face more difficulties in upholding proprietary offerings. This reduces differentiation and strengthens the rivalry which exists among these firms, hence, intensifying the overall SME industry competition (Porter, 2001:66). The increased competition allows customers to gain more bargaining power, as discussed below:

d) The bargaining power of buyers

The bargaining power of buyers refers to the ability of buyers/customers to force down the prices of the firms' products and services (Hellriegel *et al.*, 2004: 105). When the SME market is dominated by a small number of customers or where the customers constitute a large proportion of the SMEs' services, competition intensifies due to the high bargaining power of customers (Malcolm & Martin, 2003:98). In addition, competition increases in an industry where customers threaten to integrate backwards (Hollensen, 2003:78). Technology provides a customer with a wider choice of channels through which to connect with a brand; this intensifies the switching and mobility of customers, thereby boosting buyers' bargaining power (Porter, 2001:66; Kotler & Keller, 2006:13; Baker & Bass, 2003:1-2). It also boosts the bargaining power of suppliers, as discussed below:

e) The bargaining power of suppliers

The bargaining power of suppliers refers to the ability of suppliers to force up the prices of the inputs of firms in the industry (Hellriegel *et al.*, 2004:106). The bargaining power of suppliers tends to be higher when the suppliers are concentrated or when they contribute to the larger component of the products that are bought by customers. Thus, suppliers can bargain for higher prices and thus reduce the profitability of the SMEs (Jain, 1997:91). Competition from suppliers is also increased when suppliers threaten to integrate forward (Malcolm & Martin, 2003:98). New technology, which results in reduced barriers to entry, results in an increase in competitors as suppliers integrate forward. Ultimately, this tends to shift the bargaining power to suppliers, hence increasing competition (Porter, 2001:66). Thus, while deploying the marketing technologies has benefits, like expanding the market, such benefits come at the expense of firms' average profitability (industry attractiveness and competitiveness) (Spanos & Lioukas, 2001:914). Firm performance is discussed in the next section.

1.7.2.3 Firm performance

Firm performance refers to how the aggregate technology-enabled performance impacts across all firm activities, such as cost reduction, revenue enhancement, and competitiveness (Melville *et al.*, 2004:296). This study, however, combines the technology-enabled performance dimension with the financial performance dimension. Therefore, in this study, firm performance is defined using technology-enabled sales growth, profitability and competitiveness based on the owners/managers assessment of their firm, relative to those against which they compete. The next section focuses on the research methodology and design of the study.

1.8 RESEARCH METHODOLOGY AND DESIGN

A research methodology is a systematic and scientifically proven way of reaching the conclusion of the research problem (Cant, Gerber-Nel, Nel, & Kotze, 2003:65). Therefore, this section provides a synopsis of the study's research methodology and design, as well as its data analysis.

1.8.1 The Survey Area

The research was conducted in the Eastern Cape's Buffalo City Metropolitan Municipality. Buffalo City Metropolitan Municipality covers two major towns, namely East London and King Williams town, with the former being the business hub.

1.8.2 The Research Design

A research design or plan is a detailed blueprint used for conducting the marketing research project towards its objectives (Malhotra, 1999:83).

This study follows a descriptive analysis since the underlying relationships of variables surrounding the problem were known (Cant *et al.*, 2003:33-37). A quantitative research technique was employed in order to obtain SME owners'/managers' perceptions of the impact of technological marketing on SMEs' industry structure and competition.

As such, this research study made use of a quantitative research technique that generally involves the collection of primary data from a large number of SME owners/managers in the Buffalo City Metropolitan Municipality. This was done with

the intention of generalising the results to the wider population of South Africa. Quantitative primary research was conducted by employing a self-administered questionnaire in the gathering of primary data for the study. The questionnaire was designed so as to allow the performance of the Confirmatory Factor Analysis indices, such as the Chi-Square/Degree of Freedom, the Comparative Fit Analysis and the Incremental Index of Fit. More so, a cross sectional study was conducted due to time limitations which restricted the use of longitudinal studies.

1.8.3 Data Gathering Technique

Questionnaire protocol served as the primary means for data collection from the SME owners/managers (as shown in Appendix A). The questionnaire was developed primarily on the basis of instruments used in other studies (as indicated in section 1.7.6 below). Multi-item scaled questions (particularly Likert scales) were used to test the research hypotheses. Thus, most of the questions contained in the questionnaire are 5-point Likert scale questions.

1.8.4 Population

This section focuses on the target population to be surveyed. The SME owners/managers are the target population and those SMEs which participated in the study comply with the definition of a Small and Medium Enterprise contained in the National Small Business Act of 1996 (Shafeek, 2009:7). The population was obtained from the database of the Small Enterprises Development Agency (SEDA). The SEDA database was not representative of all SMEs in Buffalo City Metropolitan Municipality, but it was useful in quantifying the actual number of SMEs in the Metropolitan Municipality. According to SEDA, there are 578 retail and manufacturing SMEs in Buffalo City Metropolitan Municipality, thus comprising the target population.

1.8.5 Sampling

The SME owners/managers in Buffalo City Metropolitan Municipality were sampled using simple random sampling, which dictates that each population element has a known non-zero chance of being selected. Simple random sampling has the following advantages: simple random sampling is an easy to use method, and it minimises selection bias. Using simple random sampling, 211 SMEs were selected from the total target population of 578 retail and manufacturing SMEs in Buffalo City Metropolitan Municipality.

1.8.6 Operationalisation and Measurements

The research measurements were operationalised, primarily, on the basis of previous works and consultation with field and academic experts. A review of the relevant literature resulted in three main constructs, i.e. technological marketing (e-marketing), Porter's five competitive forces model (used to measure industry structure) and firm performance. Minor modifications were made in order to suit the current research context/purpose and the opinions of experts. Technological marketing (e-marketing) was measured using an adapted five item scale instrument, employed by Powell and Dent-Micallef (1997) and Trainor *et al.* (2011:167-168). Alternatively, Porter's five competitive forces model (industry structure) was measured using a five item scale adapted from Galbreath and Galvin (2008:115-116). Finally, firm performance was measured using scales adapted from the works of Powell and Dent-Micallef (1997).

1.8.7 Data Analysis

Data analysis is not an end in itself; its purpose is to produce information that helps address the problem at hand (Malhotra, 1999:434). The research data gathered for this study was coded in short phrases to make it easier to enter into the analysing software, for further analysis. It was analysed using a two-step procedure, as suggested by Anderson and Gerbing (2001). First, the accuracy of multi-item construct measures was assessed, followed by a test of the research model and hypotheses. In both data analysis stages, the current study tended towards the use of the Structural-Equation-Modeling (SEM) technique. A Confirmatory-Factor-Analysis (CFA) was performed using Amos 7 in order to access the measurement model. In addition, Amos 7 was employed as the computation SEM software.

1.9 ETHICAL CONSIDERATIONS

According to Churchill (1991:1039), ethics is a concern with the development of moral standards by which situations can be judged and it applies to all situations in which there can be actual or potential harm of any kind to an individual or group. Therefore, the respondents who completed the questionnaires were willing to participate in the survey. More so, the respondents were informed about the "potential impact of the investigation" and that the study is a Masters degree research project conducted for academic purposes; this was done by means of a covering letter attached to the front of the measuring instrument (Strydom, 1998:25). In

addition, the respondents' information would be kept confidential and they would remain anonymous (Churchill, 1991:54).

1.10 DELINEATIONS AND LIMITATIONS OF THE RESEARCH

Technological marketing, as interpreted and used in this study, is sometimes referred to as electronic marketing (e-marketing) and marketing technology. For the purposes of this study, competition is defined using Michael Porter's five competitive forces model and the forces are: the bargaining power of suppliers, the bargaining power of buyers, threat of substitute products, threat of new entrants and rivalry among existing firms. Firm performance is defined using technology-enabled sales growth and profitability, while competitiveness is based on the owners'/managers' assessments of their firm, relative to those against which they compete.

The limitations of this study include language barriers which were, however, minimised by the use of an interpreter. In addition, time was a constraint since a period of less than five years was inadequate for assessing the impact of long-term technological marketing capabilities, such as long-term technological marketing campaigns on firm competitiveness and performance.

1.11 OUTLINE OF PROPOSED RESEARCH REPORT

- Chapter one (Introduction and Background to the Study) outlines the background of the research and the research problem.
- Chapter two (Theoretical Background of the Study) focuses on the theoretical review and empirical review of the research constructs.
- Chapter three (Conceptual Model and Hypotheses) initially outlines the definitions, structure, importance of SMEs, technological marketing adoption in SMEs as well as the challenges they face. It then focuses on explaining the relationships and hypotheses depicted in the conceptual framework of the study.
- Chapter four (Research methodology and Design) outlines the research design, sampling methodology, data collection and data analysis procedures employed in this study.
- Chapter five (Data analysis and presentation) provides scientifically analysed and presented research findings.

- Chapter six (Conclusions and Recommendations) presents some concluding remarks on the research and offers a few recommendations; it highlights the most important findings from the study.

CHAPTER 2

THEORETICAL BACKGROUND OF THE STUDY

2.1 INTRODUCTION

This chapter consists of two sections, namely, the theoretical and empirical review of relevant literature. The first section revolves around the two theories in which this study is grounded. The Market-Based View forms the basis of the second theory (Resource-Based View) used in this study. Therefore, the Market-Based View is discussed first and is then built on in a discussion of the Resource-Based View (RBV). The research construct literature review section focuses on reviewing empirical evidence related to the research constructs. In particular, there are three research constructs used in this study: technological marketing, Porter's five competitive forces model (industry structure) and firm performance.

2.2 THEORETICAL REVIEW

Several theories borrowed from other disciplines such as sociology, socio-politics and economics have been used in examining the impact of Information Technology (IT) on firm competitiveness and performance. Alternatively, this study focuses on the Market-Based view and the Resource-Based view as theoretical foundations for a study of the impact of technology on firm competitiveness and performance. The Market-Based view receives attention in the next section.

2.2.1 Market-Based View

The Market-Based view derives from the works of Porter (2008). It assumes that firm resources are not valuable in and of themselves since they (and not the other way round) are attached to strategic activities. In addition, the sustenance and enhancement of these firm resources demands reinvestment through constant execution of firm activities. Thus, their value significantly depends on how well they sustain the firm strategy pursued, and how well they fit industry structure (Spanos & Lioukas, 2001:910). According to Porter (2008:3), firm resources occupy a fundamentally transitional position in the value chain of causality, with regard to firm performance. More so, firm assets are a result of either performing firm activities (strategy) over time, or obtaining them from the environment, or both. Thus, in either

case, the available amount of firm resources reveals the previous managerial choices, with the latter being concerned with the choice of strategy. The argument, according to this view, is that firm activities are logically preceding, given that their successful execution requires different firm resources and skills, firm arrangements, control procedures and incentive systems (Porter, 2008:4).

One of the most imperative assertions made in the Market-Based view is that industry structure determines business competition rules and plays a vital role in explaining firm performance (Spanos & Lioukas, 2001:8). In contrast, the industry structure, which refers to the arrangement and number of firms, enterprises or organisations, is determined by the five competitive/industry forces outlined by Porter (1980, 2001 & 2008), which dominates the Market-Based View. As previously mentioned, the five competitive forces include the bargaining power of suppliers, bargaining power of customers, threat of new entrants, threat of substitute products/services and rivalry amongst existing firms (Porter, 2008:3). These forces determine the profit potential of an industry or its segment (Spanos & Lioukas, 2001:8). From such a perspective, as posited by Rivard, Raymond and Verreault (2006:33), a firm has to assess these forces and establish ways to find a positive stance in the market. Thus, the way a firm opts to improve its competitive position should preferably cause significant difficulties for others to imitate, which then produces a sustainable competitive advantage. Porter (2008:3) conceives that a successful firm is one that has an attractive relative strategic position in the market under the premises of holding the industry structure constant. He further asserts that such an attractive relative position is the outcome of either having lower cost advantages than competitors, or the differentiation between advantages that allow for imposing a premium price in excess of the extra cost of differentiation. Thus, superior performance and profitability can only logically arise from realising a higher price than rivals, or enjoying lower costs (Porter, 2008:4)

Most IT researchers have adopted a Market-Based View to examine the potential and actual influence of IT on firm performance. Porter (2001:94) harmonises the competitive forces model with the concept of the value chain to explain how IT can change the competition rules by altering the industry structure, thus creating a competitive advantage by providing firms with new ways to outperform their rivals and creating opportunities for initiating new business. Levy, Powell and Galliers

(1999:256) reveal, in a case study of four firms, how Porter's value chain and five forces model are imperative in analysing business processes and competitive drivers for SMEs. They propose that the value of the five competitive forces model makes SMEs look outside their operational boundaries as the value chain analysis encourages them to identify activities that contribute directly to profitability (Rivard *et al.*, 2006:31). The Market-Based View in contemporary business markets has been complemented by the Resource-Based view.

2.2.2 Resource-Based View

Over time, firms persistently follow strategies due to the opportunities imposed by the competitive environment and the consequent constraints from their own acquired asset base, organisational structure, ownership and other firm specific factors. As a result, the current or future strategic firm decisions are constrained by prior resource deployments, leading to further reinforcement of strategic profile. Thus, contrary to the Market-Based View is the Resource-Based view on strategy resources and the resource performance relationships. The Resource-Based view of the firm derives from the work of Penrose (1959) and describes a firm as a 'bundle of resources'. It combines two perspectives which are the internal analysis of the phenomenon within a firm and an external analysis of the industry and its competitive environment (Dess, Lumpkin & Eisner, 2010:93). Contradicting the Market-Based View, this view holds that the resources are more valuable than the industry structure in an attempt to gain a competitive advantage (Ehlers & Lazenby, 2007:84).

While the Market-Based View perceives strategy as primarily industry driven, the resource-based perspective holds that the core of the strategy is or should be defined by the unique resources and capabilities of a firm (Spanos & Lioukas, 2001:8). More so, the potential of a strategy to create value, which is the ability of a firm to establish and imperatively sustain a profitable and competitive market position, depends on the rent-generating capacity of its underlying resources. In other words, this view argues that the importunate differences in firm profitability require that either the product of a firm be distinctive (differentiated), or that it attains a low cost position in relation to its competitors (Louw & Venter, 2010:245). Thus, the main argument here is that resources and capabilities determine how efficiently and effectively a firm functions and performs.

Central to the Resource-Based view is the notion that there are three types of resources that will lead to distinctive competencies and, therefore, to competitive advantages. These are tangible assets, intangible assets and firm capabilities. Tangible assets are the easiest to identify, as they are visible through the location of the firm and status of its building and equipment. Alternatively, intangible assets are not concrete issues but are often the critical assets that create the real competitive advantage. It is imperative to note that there is no competitive advantage to a firm if the resources are available, yet there is no capacity to deploy them through a complex process of interactions between tangible and intangible resources. Therefore, capabilities are actually the glue that emerges over time and binds a firm together (Ehlers & Lazenby, 2007:84). An imperative premise of the Resource-Based View is the assumption of considerable and continual firm heterogeneity in terms of resource endowments. It is commonly proposed that this heterogeneity results from inimitability and the inability of firms to alter their acquired stock of resources over time (Dess *et al.*, 2010:95). It is worth noting that a given strategy will create a sustainable performance differential if, and only if, the resources used to envisage and implement it are valuable, rare, inimitable and non-substitutable (Dess *et al.*, 2010:95, Ehlers & Lazenby, 2007:84).

Despite the evident conflicting views between the Market- and Resource-Based perspectives discussed above, both can co-exist and shape actual firm behaviour in reality (Spanos & Lioukas, 2001:908). It has recently been recognised that the Market-Based View and Resource-Based View complement each other in explaining firm competitiveness and performance (Dess *et al.*, 2010:95, Spanos & Lioukas, 2001:908, Rivard *et al.*, 2006:32). According to Spanos & Lioukas (2001:911), these two views comprise two sides of the same coin. Instinctively, value creation comes from the fit of internal capabilities to the strategy pursued, and of strategy to the competitive environment (Rivard *et al.*, 2006:32). Hence, this study asserts that the Market-Based View can be used to understand industry structure or Porter's five competitive forces and firm performance of SMEs which are consequently posited to be influenced by technological marketing in the Buffalo City Metropolitan Municipality. Conversely, it posits that the Resource-Based view can be used to understand technological marketing as a distinctive capability, which is the antecedent construct in this study. The discussion on the Market-Based and Resource-Based Views makes it possible for the research construct to be reviewed.

2.3 RESEARCH CONSTRUCT REVIEW

In this section of the study, a review of the theoretical motivation and empirical findings on the research constructs is provided. As previously noted, there are three research constructs: technological marketing, Porter's five competitive forces model (industry structure) and firm performance. This section commences by reviewing technological marketing, followed by Porter's five competitive forces model and, lastly, firm performance.

2.3.1 Technological Marketing

Marketing researchers, practitioners and academics have struggled with technology oriented research and theoretical frameworks which consistently explain and prescribe technological evolvments and involvements in the marketing environments (Brady *et al.*, 2008:108). Scholars, like Weeks (2002:5), posit that technology impacts marketing in many ways, and marketers and managers ought therefore to have knowledge competence extended towards the effects thereof. Chen (2001:17), in support, argues that everything that essentially constitutes a market has been redefined, including products, industry structures, competition, regulations and laws within the modern and highly technological environments. In order to fully explain what technological marketing capability entails, it is vital to discuss technological marketing and capabilities separately.

2.3.1.1 Technological marketing defined

Technological marketing (e-marketing) is the process of building and maintaining customer relationships through online activities so as to facilitate the exchange of ideas, products and services that satisfy the goals of both parties (Swanepoel, 2007:13). It also refers to the use of the Internet and other digital technologies to create and mediate dialogue between the firm and identified customers (Coviello, Milley & Marcolin, 2001:19). Technological marketing extends beyond Internet-based advertising and communications to include technologies, supporting numerous marketing functions such as customer relationship management, sales activity, customer support, marketing research and planning (Brady, Saren & Tzokas, 2002:556). When properly deployed and utilised, technological marketing can enhance the effectiveness of exchanges between the SME and the consumer, and it

can eventually contribute to the competitiveness and ultimate success of the SME business (Swanepoel, 2007:14; Brady *et al.*, 2002:555).

Technological marketing can create value by providing a close connection to an SME business process and providing customers with direct access to SME resources (Trainor *et al.*, 2011:164). For instance, when an SME provides customised support Extranets for its customers, technological marketing connects customers to that SME business process. Thus, these Extranets make the relevant support knowledge bases, product documentation, and electronic communications with engineers accessible to customers. Hence, they provide a direct interface to SME resources. In addition, they also provide product management with a rich set of information regarding customer demands and product usage. Therefore, it is this type of information sharing that plays a crucial role in developing and maintaining strong customer relationships and, ultimately, the competitiveness of SMEs (Jayachandran, Sharma, Kaufman & Raman, 2005:124).

2.3.1.2 Firm capability defined

Capabilities refer to the knowledge and know-how of a firm, specifically with respect to individuals, teams and the firm at large (Galbreath & Galvin, 2008:112). Louw and Venter (2010:253) refer to firm capabilities as the firm's capacity to combine resources into productive activities. There are three broad categories of capabilities, these are: threshold, distinctive and dynamic capabilities. The threshold capabilities are the minimum capabilities that a firm needs to compete in the market and provide no competitive advantage to the firm.

Distinctive capabilities, also referred to as the core competencies, are the unique, valuable and 'difficult to imitate' capabilities that provide a basis for competitive advantage (Louw & Venter, 2010:253). Trainor *et al.* (2011:164) hypothesise that distinctive capabilities are what ultimately contribute to a sustainable competitive advantage, enhanced competitiveness and superior performance. This view claims that distinctive capabilities allow the firm to deliver superior customer value in a more cost-effective approach and can seldom be readily matched by rival firms. Boynton and Victor (1991:54) further suggest that distinctive capabilities facilitate SME adaptation to changes in the marketing environment and provide it with a competitive position.

Dynamic Capabilities, on the other hand, refer to the ability of the firm to develop new capabilities (Louw & Venter, 2010:254). These capabilities are embedded in a firm's managerial and organisational processes aimed at the creation, coordination, integration, reconfiguration or transformation of its resource position. Thus, capabilities are dynamic when they provide SMEs with the ability to implement new strategies to adapt to changing market conditions (Trainor *et al.*, 2011:164). In addition, Menguc and Auh (2006:65) suggest, from a marketing strategy perspective, that marketing resources or capabilities must be combined and integrated with other complementary capabilities to generate and sustain a competitive advantage.

2.3.1.3 Technological marketing as a capability

Nath, Nachiappan and Ramanathan (2010:320) found that marketing capabilities dominate business competitiveness and performance and that these capabilities depend on the ability to understand customer needs and create long-term relationships. Furthermore, a dynamic capability of market responsiveness, which leads to increased firm competitiveness, is claimed to be created by combining knowledge resources and entrepreneurial proclivity (Griffith, Noble & Chen, 2006:52). In addition, research on market orientation also suggests that the positive influence that market orientation has on firm competitiveness is only visible when market orientation is coupled with firm innovativeness, hence the combination of technological marketing and firm capabilities (Menguc & Auh, 2006:66).

Technological marketing capability, therefore, embodies a firm's competence in deploying and utilising the Internet and other digital technologies to facilitate rich interactions with customers (Trainor *et al.*, 2011:163-164). These interactions simultaneously provide customers with access to SME resources and information, while providing the SME with information about its customers. A technological marketing capability enables employees to improve their focus on the customer by synchronising activities and information throughout the SME, thereby creating value (Kim & Jae, 2007:260). This important customer information can be useful to marketers seeking a better understanding of their customers' expressed and latent needs (Trainor *et al.*, 2011:164). Although the example used in this study highlights the use of technology as an interface to customers, the emphasis is not on technology itself. Instead, the focus is on the fusion of technology with the SME firm's business processes as well as the derivation, integration and accessibility of

information from technology throughout the SME firm so as to enhance industry structure and competition through enhanced relationships with customers (Jayachandran *et al.*, 2005:125). Technological marketing somehow complements Porter's five competitive forces model on industry structure and business competition.

2.3.2 Porter's Competitiveness Model

As indicated previously, throughout this study, the term industry structure is applicable even to enterprises and firms such as SMEs, when explaining business competition. According to Rossouw, Roux and Groenewald (2003:45), an industry environment, also called the competitive environment, refers to the situation facing an organisation within its specific competitive arena such as an industry. In the industry environment, a firm deploys a competitive or business strategy that strives to attain a sustainable competitive advantage. It comprises factors that are particularly relevant to a firm's strategy, these are: competitors (existing or potential), customers and suppliers. A potential competitor may be a supplier considering forward integration or a firm in an entirely new industry introducing a similar product that uses more efficient technology (Dess *et al.*, 2010:56).

Porter made one of the most meticulous attempts to analyse the industry economic forces and, as such, the next section on models of industry structure and competition draws extensively on the work of Porter (2008:7). In industry structure and competition, the focal point is on understanding the impact of industry competitive forces on competitive advantage and the effect that these have on the relative profitability of industry players. There are two broad categories of relationships that shape the industry, namely, those that reduce profits by negatively affecting cost and/or price and those that enhance profits (Louw & Venter, 2010:215).

Porter's five forces framework can be used to analyse the impact of industry structure on competition, the five competitive forces being the bargaining power of buyers, the bargaining power of suppliers, the threat of substitute products, the threat of new entrants, and the rivalry among existing competitors (Porter, 2008:7). The extent to which these forces vary across countries is industry-specific.

Industry analysis of competition and structure is a tool that facilitates a firm's understanding of its position relative to other firms that produce similar products or services (McGee, Thomas & Wilson, 2005:148). It is the analysis of assets,

resources and capabilities that set out the basic economic conditions under which firms collectively operate. Furthermore, McGee *et al.* (2005:148) state that assets, resources and capabilities condition a firm's abilities to create distinctive individual positions and boundaries. Industry analysis, therefore, enables SME owners/managers, for example, to identify the threats and opportunities facing their businesses, and to focus their resources on developing unique capabilities that lead to a competitive advantage (Spanos & Lioukas, 2001:930).

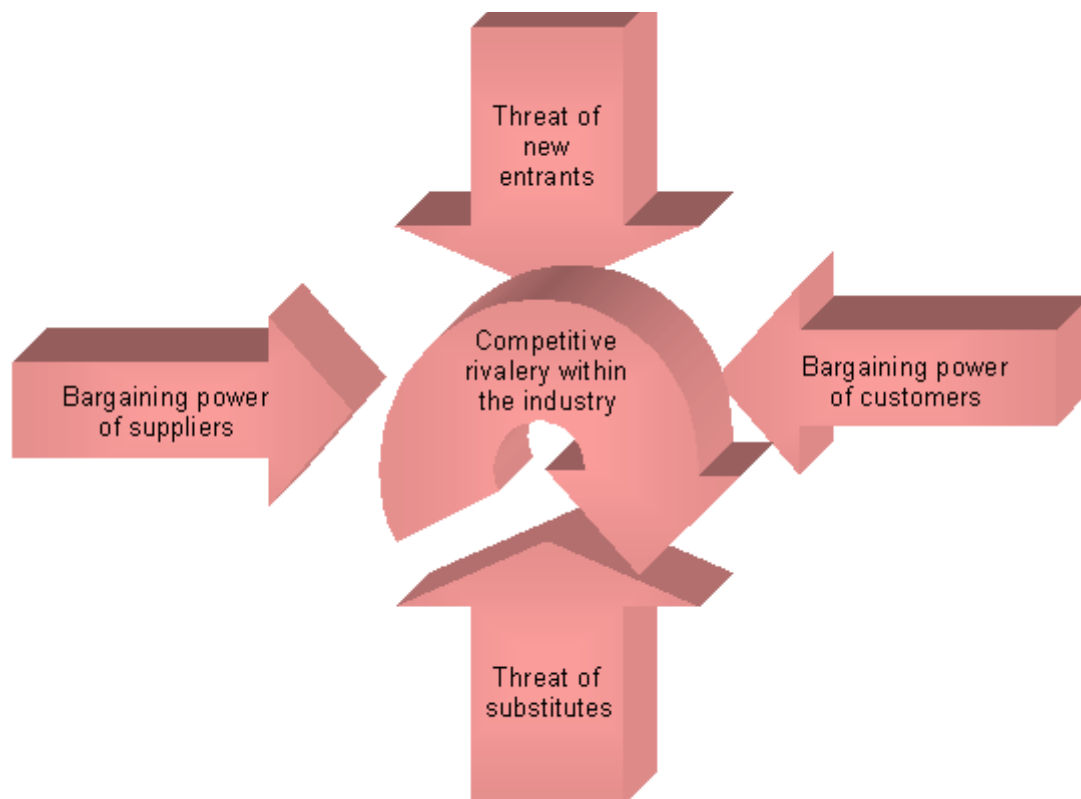
The majority of SME owners/managers and executives believe that they are the worst victims, and best observers, of what occurs in their industry. Occasionally, they fail to recognise that understanding their industry has a direct impact on their firm's ability to succeed. More so, this understanding of the firm's industry as well as anticipating its future trends and directions, provides knowledge needed by the SME owner/manager to react and control the firm's portion in that industry (Sawers, Pretorius & Oerlemans, 2008:173). However, such industry analysis is important only in a relative sense. Thus, since the SME and its competitors are both in the same industry, the key is in finding the incompatible abilities between the firm and the competition in dealing with the industry forces that impact on it. If the SME can identify the abilities that it owns, which are superior to its competitors, it can use those abilities to establish a competitive advantage (McGee *et al.*, 2005:148).

According to Galbreath and Galvin (2008:112), industry analysis comprises three key elements: the underlying forces at work in the industry; the overall attractiveness of the industry; and the critical factors that determine a firm's success within the industry. Porter's model confirms that rivalry among SMEs in an industry depends on five forces: the potential for new competitors to enter the market; the bargaining power of buyers and the bargaining power of suppliers; the availability of substitute goods; and the competitors and the nature of the competition. The collective strength of these forces determines the ultimate profit potential in the industry, where profit potential is measured in terms of long-term return on invested capital (Porter, 2001:7). Adeyemi (2009:5), notes that understanding the underlying forces determining the structure of the industry highlights the strengths and weaknesses of an SME, shows where strategic changes make the greatest difference, and illuminates areas where industry trends turn into opportunities or threats. The next section focuses on Porter's five competitive forces model.

2.3.2.1 Porter's five competitive forces model

The five forces model developed by Porter has been the most widely used analytical tool for examining the competitive (industry) environment (Dess *et al.*, 2010:56). Porter has identified five competitive forces that shape every industry and every market; these forces determine the intensity of competition and, hence, the profitability and attractiveness of an industry (Galbreath & Galvin, 2008:113). Porter refers to these five competitive forces as the micro environment, to distinguish them from the more general term, macro environment. Thus, these five competitive forces are those forces close to a firm and that affect a firm's ability to serve its customers and make a profit. A change in any of the forces normally requires an SME to re-assess the marketplace (Adeyemi, 2009:1). Therefore, it is important for the owners/managers to understand the competitive forces and their underlying causes. This reveals the roots of an industry's current profitability while providing a framework for anticipating and influencing competition (and profitability over time) (Porter, 2008:4). The five competitive forces are diagrammatically illustrated in Figure 2.1, below.

Figure 2.1: Porter's Five Competitive Forces Model



Source: Adapted from: Porter: 2008

Figure 2.1, depicts that the other four competitive forces, i.e. the threat of new entrants, bargaining power of supplier, bargaining power of customers and the threat of substitutes and competition among rivals, i.e. the fifth force. In the following section, attention is given to the threat of new entrants.

a) Threat of new entrants

The threat of new entrants refers to the possibility that the profits of established firms in the industry may be eroded by new competitors (Dess *et al.*, 2010:56). This threat is high when the industry is attractive (when existing participants are making good profits) and when there are low barriers to entry (Macmillan & Tampoe, 2000:102). For instance, when the incumbents (existing participants) do not continuously provide the market with new forms of value, they open opportunities for new entrants who are able to provide them. New entrants to an industry bring new capacity and a desire to gain market share; they sometimes bring substantial resources to the industry which exerts pressure on prices, costs and the required rate of investment (Rossouw *et al.*, 2003:45; Porter, 2008:8).

The extent of the threat of new entrants depends on existing barriers to entry and the combined reactions of existing participants or competitors (Louw & Venter, 2010:218; Dess *et al.*, 2010:56). If the entry barriers are low and new competitors expect little retaliation from the existing competitors, the threat of new entrants tends to be high, thereby moderating industry profitability (Porter, 2008:8). Among the factors which are important contributors to the threat of new entrants are barriers to entry such as the economies of scale and product differentiation.

- Economies of scale

Dess *et al.* (2010:57) define economies of scale as the spreading of costs of production over the number of units produced. Economies of scale exist whenever large volume firms enjoy significantly lower costs per unit than smaller volume firms enjoy. This then forces new entrants to enter the market at a large scale and risks a strong reaction from existing firms or comes in at a smaller scale and accepts a cost disadvantage, both of which are undesirable options. Economies of scale are also related to product differentiation.

- Product differentiation

Where customers perceive that an existing firm's product/service or product package offers better value than the new competitor's, it may be difficult for the new

competitor to enter the market unless new ways are found to imitate the offering or reduce customer loyalty for that offering (Louw & Venter, 2010:218). However, imitation may require that the new competitor spends heavily on advertising and promotions in order to establish its own brands (Rossouw *et al.*, 2003:46). Product differentiation is complemented by low switching costs.

- Switching Costs

Switching costs are costs that make buyers (customers) reluctant to switch to another supplier's product/service (Botha, Bothma & Geldenhuys, 2008:19). Such costs are one-time costs that a buyer incurs when switching from one supplier's product or service to another (Botha *et al.*, 2008:19). Buyers may not be willing to change their suppliers because of these costs, thus making it difficult for any new supplier to poach the existing business; this reduces the threat of new entrants. Switching costs, in turn, link with the capital requirements.

- Capital Requirements

A capital requirement is a barrier to entry that is created by the need to invest large financial resources to compete, especially where capital is required for risky or unrecoverable up-front advertising or research and development (Dess *et al.*, 2010:57). Capital requirements serve as a determinant of the accessibility of the distribution channels.

- Access to distribution Channels

Established relationships and agreements between manufacturers and key distributors in a market create barriers to entry (Louw, 2008:120). For instance, some manufacturers are vertically integrated and own their distributors. Other distributors may have successful working relationships with particular manufacturers and little incentive to change, hence creating a barrier to new entrants. However, firms aspiring to enter the market may look for unique distribution opportunities to provide both access and immediate differentiation (Johnson, Scholes & Whittington, 2005:86). This barrier complements the bargaining power of suppliers.

b) Bargaining power of suppliers

The relative bargaining power of suppliers determines the supplier opportunity cost (the lowest price that suppliers are willing to accept for a product/service), which in turn affects the input prices (Louw, 2008:122). Suppliers can exercise bargaining power on the existing firms of an industry by raising prices or by cutting their own

costs through a reduction in the quality of purchased goods and services. The power of each important supplier is dependent on a number of features related to its market situation and on the importance of its sales to the industry, compared with its total business (Rossouw *et al.*, 2003:47). Thus, a supplier's bargaining power is high in the following situations:

- Supplier concentration - The more concentrated the suppliers are in a market, which is also dominated by a few firms than the industry to which the suppliers sell, the more powerful the suppliers will be.
- Switching costs - The bargaining power of suppliers is high where the buyers' cost of switching suppliers is high. This may include situations where products or services are unique or differentiated to such an extent that it will be difficult to develop alternative sources of supply.
- Forward vertical integration - The threat of forward vertical integration could increase supplier bargaining power. This threat exists when suppliers are not making sufficient profit margins and may acquire their own channels or by-pass existing intermediaries to reach out to the final customers. The bargaining power of suppliers capitalises on the rivalry amongst existing competitors.

c) Rivalry amongst existing competitors

Competitive rivals are firms with similar products and services aimed at the same customer group (Louw & Venter, 2010:217). Rivalry occurs when competitors sense the pressure or act on an opportunity to improve their position. Competitive rivalry usually takes the form of price competition, product introduction, increased customer service or warranties and advertising battles. Thus, rivalry easily matches the price cuts, an action that lowers profits for all firms, and advertising battles which expand overall demand or enhance the level of product differentiation, for the benefit of all firms in the industry. Competitive rivalry is enhanced under the following circumstances:

- Number and size of competitors - The more competitors there are, and the more equal in size and power they are, the more intense the rivalry will be.
- Rate of industry growth - When industry growth is slow, competition may be more intense as competitors battle for market share (since firms seek to expand their sales). Therefore, as the industry matures, the expectation then becomes that of realising an increase in competitive intensity.

- Differentiation and switching costs - If a product or service lacks differentiation or the switching costs which lock buyers in are low, competition intensity may be higher.
- High exit barriers - Exit barriers are economic, strategic and emotional factors that keep firms competing even though they may earn low or negative returns on their investments. Examples of exit barriers include: specialised assets, fixed costs of exit, strategic interrelationships. Exit barriers lead to the increased bargaining power of customers.

d) Bargaining power of customers

The relative bargaining power of buyers (customers) can have an impact on the prices that can be charged by competitors in an industry, hence affecting the customers' willingness to pay (Louw, 2008:122). Buyers threaten an industry by forcing down the prices, bargaining for higher quality, or more, services and playing competitors up against each other. The bargaining power of customers is determined by the following:

- Buyer concentration - Where there is a concentration of buyers (large customer groups that purchase high volumes), bargaining power of customers may increase, especially where a large number of suppliers are presented.
- Switching costs - Switching costs lock the buyer to particular sellers. However, where there are low costs of switching suppliers, the bargaining power of customers is high. This may include situations where the product or service is undifferentiated and generic.
- Backward vertical integration - If buyers are either partially integrated or pose a credible threat to a buyer acquiring the supplier or establishing its own source of supply, then they are typically able to secure bargaining concessions.
- Ratio of purchase price to total cost - When the purchase price is a small fraction of the total cost of producing the product and the purchase price is not important to the buyers' quality, buyers will generally be less price-sensitive. In addition, buyers are less sensitive to prices where they are highly profitable and interested in quality rather than the price of the product. As a result, few buyers are inclined to shop around, thereby reducing their power to bargain further for lower prices. On the other hand, buyers are more price-sensitive where the purchasing price is a significantly larger fraction of the total cost of the product. This is usually the

case where buyers consider the purchase price to be a significant element of a product's quality; both the price and quality of the product then become important to buyers. Consequently, most buyers are inclined to shopping around, comparing prices and increasing their power to bargain for lower prices.

- Information - The more information buyers have about suppliers' pricing structures and input costs, the more powerful the buyers will be. The availability of information about product input costs can increase the threat of substitute products or services in the market.

e) Threat of substitutes

Substitutes are alternative products/services that an industry's customers can turn to, that satisfy the same basic needs as the industry's original product/service (Mintzberg, Lampel, Quinn & Ghoshal, 2003:100). They limit the potential profits to be made by existing firms in the industry, unless these firms can upgrade the quality of their products or differentiate them (Rossouw *et al.*, 2003:49). They normally take the form of new technologies or business models. Johnson *et al.* (2005:82), categorises substitutes into three types, which are:

(i) Product-for-product substitution

Product-for-product substitution occurs when customers substitute existing products/services with new and improved products/services. This may occur because of industry convergence; for example, electronic mail (e-mail) substituting for the traditional mail service. Substitution may also occur because of complementary relationships such as the relationship between windows and Intel, where products are constantly upgraded; for instance, Windows Vista substituting for Microsoft Windows XP.

(ii) Substitution of needs

Substitution of needs occurs when a new product/service renders an existing product/service redundant by satisfying the same need in a better way. For example, the introduction of cellular phones rendered traditional telephones redundant, since cellular phones are portable and meet the same needs in a better way.

(iii) Generic substitution

Generic substitution occurs when products/services compete for disposable income. For example, cellular phones introduced in low-income market segments compete for the customer's disposable income with clothing, food and beverages (Louw, 2008:121).

Most importantly, substitutes that pose a major threat are those that perform better than the existing products or are produced by industries that earn high profits. The effect of substitute products is that they place a ceiling on prices that industry competitors can charge and therefore limit the industry's potential profits (Louw & Venter, 2010:219). Thus, the more attractive the price/performance ratio of the substitute products, the tighter the lid on an industry becomes. However, the magnitude of this threat is reduced where there are high switching costs or if the price performance of available substitutes is poor (Macmillan & Tampoe, 2000:102).

2.4 FIRM PERFORMANCE

Firm performance is the dependent variable and outcome construct in this study. It is a multidimensional construct that has been afforded various definitions by various scholars (Baker & Bass, 2003; Snoj, Milfelner & Gabrijan, 2007:154). Chakubva (2011:26), citing the work of Damanpour and Damanpour (2001) define firm performance using a systems performance view. Thus, systems firm performance refers to the ability of a firm to manage all four processes of the system: inputs, outputs, transformations and feedback in relation to a firm's goal seeking behavior (Chakubva, 2011:26). Hence, high performance in firms will be achieved when firms accomplish their primary tasks efficiently and implement functions that adapt to changes and maintain the firm effectively. In contrast, Melville, Kraemer and Gurbaxani (2004:296) refer to firm performance as the aggregate IT-enabled performance impacts across all firm activities, with dimensions capturing the fundamental firm impacts such as cost reduction, revenue enhancement, and competitiveness. Alternatively, Robinson (1998:168) focuses on the financial dimension of firm performance and refers to it as the dimension of firm performance that reflects the fulfillment of the economic goals of the firm and includes indicators such as sales growth, profitability, return on investment (total assets or net assets),

return on sales, and return on equity. Therefore, this study defines firm performance from within IT-enabled financial dimension; it is thus measured as the owners'/managers' assessment of the sales growth, profitability and the competitive position of their firm in relation to those of their competitors.

2.4.1 Measures of Firm Performance

Generally, firm performance indicators range from the dimensions of financial performance, market share, market growth, productivity, human resource management, customer satisfaction and customer orientation to employee efficiency (FriedLob & Schleifer, 2003:57). As such, scholars employ various ways to measure firm performance, since there is no universally acceptable firm performance measure. Despite the fact that multiple firm performance measures have been employed in most recent strategic management studies, the work of Croteau and Bergeron (2001:81) categorises all the measures into two broad categories, which are: objective and subjective measures.

2.4.1.1 Objective measures

Objective measures refer to the financial and objective data of firms usually found in the financial statements of firms that are publicly owned and are therefore required, by the state, to disclose their financial performance in newspapers (Croteau & Bergeron, 2001:81). The most commonly used objective firm performance measures are profitability and sales growth measures. Profitability is commonly measured using return on investment (ROI), return on equity (ROE) and return on assets (ROA) (FriedLob & Schleifer, 2003:57). ROI refers to income after taxes, expressed in proportion to the average total long-term debt, other long-term liabilities and shareholders' equity. ROE is defined as the income available to common shareholders expressed in proportion to the average common equity. It indicates the success of a firm in employing the shareholders' investment in order to generate profits. Lastly, ROA refers to the expression of the income after taxes, in relation to the average assets. It shows the ability of a firm to use its assets to generate profits (FriedLob & Schleifer, 2003:57). Objective firm performance measures involve less bias. However, the financial data of privately-owned firms is not easily accessible and available to researchers. Subsequently, researchers employ subjective measures to measure the firm performance of privately-owned firms.

2.4.1.2 Subjective measures

Subjective firm performance measures have become a logical alternative for objective measures and are expansively adopted by scholars. Croteau and Bergeron (2001:81) refer to subjective measures as an approach which involves the use of a questionnaire to obtain the perceptions of the respondents on firm performance. In other words, questions regarding the profitability and sales growth of a firm, within a comparable number of years, are formulated. These questions aim to assess and obtain the perceptions of the relevant respondents on the success of the firm. Previous studies by Kim (2005) and Schmid (2002) indicate that subjective and objective measures, at firm-level, are significantly correlated. In support of this, Croteau and Bergeron (2001:81) add that none of these measures is preferable to the other, since they produce similar results. As such, this study employs subjective measures to measure firm performance.

2.5 SUMMARY

The concept of technological marketing and industry analysis, based on Porter's existing model of the five competitive forces and other relevant literature, was pursued in this chapter. The discussions considered a holistic viewpoint of technological marketing, which is the antecedent construct and the outcome variables of industry structure and firm performance, respectively. Porter's five competitive forces model was discussed in detail since the impacted constructs of this study are based, primarily, on the five inclusive forces. Some of the benefits and limitations of using Porter's model were discussed, yet the model was still found to be important to firms in all industries, despite the presence of some limitations. Finally, the definition of firm performance, provided here, was based on the prior studies definitions. The following chapter (Chapter 3) focuses on SMEs, the conceptual model and hypotheses development

CHAPTER 3

CONCEPTUAL MODEL OF THE STUDY

3.1 INTRODUCTION

This chapter unfolds as follows: firstly it defines SMEs, provides the significance of conducting the study on technological marketing adoption in SMEs by discussing the structure of SMEs, the importance of this sector to an economy, the advantages for SMEs when adopting technological marketing as well the barriers they encounter. Secondly, this chapter covers the conceptual framework which is vital in explaining the development of the project's hypotheses. Drawing from the research objectives, research constructs, Market-Based and Resource-Based Views, a conceptual framework was built and the research hypotheses were developed thereafter, for the purpose of conducting a reliable and valid study. The model consists of three basic constructs, namely; the technological marketing (e-marketing), Porter's five competitive forces and SME performance. Conceivably, technological marketing is expected to influence Porter's five competitive forces model (industry structure) which, in turn, impacts on business competition and, consequently, the firm performance of SMEs. Detailed explanations of the associations between these constructs are provided in the hypotheses developed hereafter.

3.2 TECHNOLOGICAL MARKETING ADOPTION IN SMEs

The next section focuses on the definition of an SME, the structure and importance of SMEs to the South African economy, the technological marketing adoption in SMEs as well as the challenges SMEs face in adopting technological marketing.

3.2.1 SME Definition

There is no single and universally acceptable definition of an SME. Instead, SMEs are defined using various definitions, partly because of their heterogeneous nature. Scholars have used SMEs' gross asset value (Nieman, 2006), the number of employees (Besser & Miller, 2000) and total revenue (Moore & Spence, 2006) as indicators when attempting to define the term SME. The size of classification varies within regions and across countries; it is relative to the size of the economy and its

endowments. However, it is important to note that there is a minimum as well as a maximum size for SMEs.

Hillary (2000) refers to an SME as a catch-all term, bandied about whenever small-scale firms are being discussed. Small and medium-sized enterprises (SMEs) are a heterogeneous group of businesses usually operating in the service, trade, agribusiness, retailing and manufacturing sectors. They include a wide variety of firms such as village handicraft makers, small machine shops, and computer software firms that possess a wide range of sophistication and skills. Some are dynamic, innovative, and growth-oriented while others are satisfied to remain small and, perhaps, family owned. SMEs usually operate in the formal sector of the economy and tend to employ wage-earning workers. In general, an SME is a formal enterprise meeting certain measurement criteria, as described by different nations or world finance institutions (Lukacs, 2005:1).

In Europe, the European Union (EU) has defined an SME as a firm with less than 250 employees and with less than €40 million in sales per annum, or with a balance sheet total below €27 million. In addition, the firm must be independent and should be separate from an economic group that is stronger than the SME. Conversely, the American Small Business Administration refers to a manufacturing firm as small if it employs less than 1 500 people (Storey, 2000). However, in South Africa the working definition of an SME is derived from the National Small Business Act of 1996. An SME, as defined in the National Small Business Act of 1996 of South Africa, is “a separate and distinct business entity, including cooperative enterprises and non-governmental organisations, managed by one owner or more which, including its branches or subsidiaries, if any, is predominantly carried on in any sector or sub-sector of the economy and which can be classified as a very small (micro), a small, or a medium enterprise (SME)” (Mbonyane, 2006; Fatoki & Garwe, 2010:731). It is also agreed that, across all sectors, a small firm must employ less than fifty employees and earn an annual sales turnover within the range of R3 million to R32 million. In contrast, a medium-sized firm must employ between 100 to 200 employees across all sectors (DTI, 2003).

3.2.2 Structure of the SME Sector

The SME sector has a multi-faceted structure. The structure can be based on the economic sector, which includes: manufacturing, wholesaling, retailing, tourism as

well as transport and communication. Alternatively, the structure can be based on the magnitude of the SME, with respect to measurables such as number of employees, net sales and assets value, resulting in the three common categories, which are: medium enterprises, small enterprises and micro enterprises. More so, the structure can also be based on the racial distribution of ownership of the population, as a result of the apartheid legacy. Therefore, the racial groups which own SMEs in the new South Africa are whites, blacks, coloureds and Indians.

3.2.3 Importance of SMEs to the Economy

SMEs are very important for a healthy dynamic market economy (Hillary, 2000:1). South Africa, like other world economies, recognises SMEs as the bedrock of the economy and the primary driver of economic development (Fox, 2005; Spence & Rutherford, 2001). SMEs constitute more than 90% of businesses worldwide and 50-60% of employment (Jenkins, 2006:243). In South Africa, they represent approximately 98% of South Africa's total number of firms (Mbonyane, 2006:1). As such, the South African government supports entrepreneurship in the SME sector in order to accelerate the national Gross Domestic Product (GDP).

Some of the generally cited SME contributions include: the creation of sustainable jobs, alleviation of poverty levels, local economic development, creation of local technologies, serving niche markets, stimulate savings and investment and stimulation of economic growth (Dalziel, 2006). The contributions of SMEs to employment and the countries' GDPs are by no means trivial. Evidence from the developed nations reveals that the potential of the SME sector, as a major contributor to the economy, cannot be overlooked. The next section focuses on the primary importance of SMEs to the economy.

3.2.3.1 Contribution to gross domestic product (GDP)

The small business sector plays an important role in both the economic and social development of a country, and South Africa is no exception. Thus, the contribution of SMEs to the well being of South Africa cannot be understated, as they contribute approximately 36.1% to the GDP of South Africa (Ntsika, 2002).

3.2.3.2 Contribution to employment

Large firms are in the process of becoming efficient and lean, resorting to restructuring and downsizing, which reduces labour, thereby increasing the unemployment rate of the nation (Ladzani, 2006:154). Alternatively, SMEs produce a balanced share of new jobs. Tybout (2000:34) stresses that a major macroeconomic objective of any state should be to fully employ the available factors of production, especially labour. There is a wealth of evidence of the high labour absorption ability of the small business sector; this may enable nations to strive towards achieving their macroeconomic objective of full employment. SMEs make a considerable contribution to the support of the formal economy's inability to provide jobs (DTI, 2003). In South Africa, SMEs contribute to 36.2% of employment (Ntsika, 2002). Hence, it is the labour absorption capacity of SMEs that is of major interest to this study, especially within the South African context. Moreover, the average capital cost of creating a job in the small business sector is lower than that of creating employment in the big business sector (DTI, 2003:11).

3.2.3.3 SME Importance to the Market

This section describes other contributions that make SMEs important to the South African market. SMEs offer better customer service as they are flexible, thus allowing them to tailor their products and services to the satisfaction of the market. SMEs are usually the pioneers in terms of product offering. They are very innovative when it comes to producing new products. Producing these new products is an opportunity that is pursued by innovation; it involves doing something different in a radical or incremental manner. Therefore, the agility and flexibility of SMEs and their need to survive allow them to spot new technologies quickly and deploy them in producing new products (Wickham, 2001:206; Nieman, 2006:11). The next section focuses on the adoption of technological marketing in SMEs.

3.2.4 Technological Marketing Adoption in SMEs

The key question for firms to stay competitive in this modern economy is not whether to deploy new digital technologies, but how to deploy them. As such, firms (including SMEs) need to exercise caution on how to adopt and deploy these technologies (Porter, 2001:64). Globally, governments have also been pushing the need for SMEs to adopt and deploy these digital technologies.

In general, the experience of SMEs in deploying new digital technologies, in the past, have not been profitable, even with government assistance (Jutla, Bodorik, & Dhaliwal, 2002; Jeffcoate, Chappell, & Feindt, 2002:125; Anckar, Walden, & Jelassi, 2002:218). As such, many SME owners/managers do not have an overriding interest in prematurely deploying these technologies, unless forced to do so by their suppliers or buyers (Quayle, 2002:1148-1161). Moreover, several traditional brick and mortar retailers have not deployed these new digital technologies for direct retailing; instead, they have used them as a communications and indirect marketing channel (Fenech & O'Cass, 2001:380). Thus, while it is commonly accepted that there are many advantages to be gained from adopting marketing technologies, SMEs have been resistant. Several studies have been conducted to investigating the benefits that SMEs perceived they would achieve from adopting digital technologies (Ah-Wong, Gandhi, Patel, Shah, Tran & Targett, 2001; Damanpour & Damanpour, 2001). The following are the perceived benefits of the adoption of information technologies by SMEs.

3.2.4.1 Cost effectiveness

The adoption of technology, especially being part of an intermediary, can make SMEs more cost effective, as they can share information regarding their products and pricing with other firms. Moreover, the collective benefits for SMEs would include the adoption and maintenance of technology such as on-line payment systems, the adoption or development of education, as well as the creation of channels of communication between SMEs, government and large firms. In addition, SMEs benefit from the effectiveness of supply chain management, which includes more streamlined administrative processes. This is especially true of the fields of taxation, invoicing and human resources; hence, saving costs.

3.2.4.2 Competitive advantage

Many SMEs believe that they would gain a competitive advantage if they were among the early firms to have an online presence (Bidgoli, 2003:44-45; Poon, 2000). Even though 'competitive advantage' was quoted by most researchers as being one of the most important potential benefits that SMEs perceived, it just does not come with being the first to employ the use of the Internet and other digital technologies. Thus, for firms that 'do it right', being the first adopters of digital technologies, can

lend them an advantage towards becoming the default service provider in their area of business (Greengard, 2000:41).

3.2.4.3 Strategic alliances and partnerships

The adoption of technology leads SMEs to cooperate and integrate with other firms to form strategic alliances and partnerships (Brown, 2002:3-5). These long-term partnerships and alliances enable SMEs to also take greater responsibility for speeding up the rate of technology adoption in their own firms, while focusing on the changes and costs (Damanpour & Damanpour, 2001). Thus, one of the early benefits of the adoption of technology, to SMEs, is that technology adoption promotes synergetic strength in SMEs, the promise of critical mass and, ultimately, competitive control against larger firms. Therefore, SMEs involved in the adoption of technology, such as portals, could benefit from gaining a competitive force with which to oppose larger firms and, consequently, establish better contractual arrangements with corporate firms (OECD, 2000). The next section focuses on the barriers to technological marketing adoption in SMEs

3.2.5 Barriers to Technological marketing Adoption for SMEs

Comparable to the research on factors that enable technological marketing adoption, several studies have been conducted to investigate the factors that impede the full deployment and implementation of these digital technologies in firms (Begin & Boisvert, 2002; Brown, 2002; Sawers *et al.*, 2008:172). Many of the factors that act as barriers to the adoption of technological marketing result from the fear of the unknown or stem from a lack of awareness. Others are genuine concerns that are based on experience, either of the SME owners/managers themselves, or of others they know, or that have been reported in the media. Different studies support the contention that there is a commonality of reasons that may discourage SMEs from adopting marketing technologies (Begin & Boisvert, 2002; Brown, 2002). Some of the barriers to technological marketing adoption are discussed below:

3.2.5.1 Costs of adopting marketing technologies

The collective cost of adopting a technology was considered a significant contributory barrier to technological marketing adoption in SMEs. The cost includes: the cost of the technology itself, the time commitment of personnel and financial resources (Bhide, 2002:124). These costs are what an SME needs to consider before

accessing a marketing technology and the electronic marketplace. Both consumers and businesses, particularly SMEs, believe that they cannot afford these costs as they often gain insufficient financial returns to justify outlaying the cost of the investment in a marketing technology.

3.2.5.2 Availability of capital

Several scholars, such as Ah-Wong *et al.* (2001:102) and Bhide (2002:128), have highlighted the need to have adequate access to capital in order to fund the adoption of innovation. A firm with sufficient profits can either fund such investment internally or it can attract funds from external sources. However, a firm that attempts to grow from a small base has little chance of making the required investment from its own resources and will often have difficulty in attracting funds, whether in the form of debt finance or equity finance (Hamilton & Fox, 1998). This is the major challenge that SMEs face in adopting marketing technologies in their business.

3.2.5.3 Education and training

Education and training are important areas of business development, in a technological business environment. In Great Britain, access to higher education institutions for education and training was essential in the development of SMEs ready to engage in the adoption of technology (Evans, 2002:963-964). Brown (2002:26) highlights that the most significant component in the adoption and deployment of technology, by SMEs, is training. Education and training are reciprocal in nature. Thus, in addition to being the major contributors to the development of the infrastructure of skills upon which technology develops, education and training are rapidly becoming a business area within their own right. The users of technology must be adequately educated and trained to enhance the adoption process. More so, the educational qualifications of technology promoters are also important to ensuring a technologically inclusive SME.

3.2.5.4 Security and privacy issues

The Internet and other digital technologies were not originally conceived for use in a commercial environment. Moreover, many of the particular legal, administrative and technical elements required for trade and commerce have been slow to develop, or have developed in an uncoordinated and chaotic fashion. Above and beyond the technical problems, like bandwidth availability and network reliability, there have been

serious problems in ensuring the security and privacy of commercial transactions on the Internet and other digital technologies. According to CIO Custom Publishing (2001:S18), in Australia, 30-40% of Internet savvy consumers still prefer to send orders by fax when submitting credit card numbers. With \$27 billion credit card transactions conducted annually, estimates suggest that 2%, or \$540 million, of these transactions are conducted over the Internet. Unfortunately, the boom in online spending comes hand-in-hand with an increase in on-line business credit card fraud. The statistics say that on-line business fraud is 10 to 20 times more likely than face-to-face fraud, with some research claiming rates as high as 5-10% (Caunter, 2001).

Privacy is important to consumers as well as firms, since firms are concerned about the privacy of their customers' information. Security and privacy are inseparable. They have been seen as major issues in on-line business by a number of researchers (Ah-Wong *et al.*, 2001:103; Bidgoli, 2003:206-212). Security and privacy issues are closely related to legal issues.

3.2.5.5 Legal issues

Despite re-assurances from a number of authors, legal issues remain a matter of concern to many SMEs (Bidgoli, 2003:346-348). Technological marketing is difficult and even impossible to contain within geographically defined trading areas and national regulatory as well as administrative borders. Thus, as electronic network facilities increase in sophistication, they tend to become oriented to an international trading context, but this is, unquestionably, one of the major attractions of electronic marketing. On-line business facilitates the globalisation of business by providing more economical access to distant markets, and by supporting new opportunities for firms to increase economies of scale and scope by spreading their production and distribution assets internationally. The most troublesome conceptual aspect of technological marketing is, probably, that it can be very difficult to define the exact location at which a transaction actually takes place and, therefore, the jurisdictions to which it may be subjected. The non-territorial bounds and intangible nature of technology highlight the inadequacy of existing law enforcement mechanisms that are still, for the most part, geared towards tangible products and national legislation. Therefore, there is a need to ensure that any future legislation regarding consumer protection laws and regulations are closely coordinated with developments in

technological marketing, so that both consumers and firms are protected internationally (Ah-Wong *et al.*, 2001:103).

3.2.5.6 Time poverty

One of the major factors discouraging SMEs from adopting technology when marketing their products/services, is lack of time. SMEs lack the time to enquire about the adoption of technological marketing, the time to learn how it operates, the time to hire consultants, and to arrange the purchase of necessary equipment, as well as training, while still meeting all the other demands of their business (Price Water House Coopers, 1999:12). Moreover, SMEs are so busy just keeping their organisations operating that they do not have any time to spare for other activities, even when those activities could impinge on the success of what they do (Muecke, 2000). Most SME owners/managers are currently preoccupied with survival, a vision tightly focused on the short term, and with profit, tax, competition and regulations.

3.2.5.7 Strategic planning

Although most SMEs have strategically planned their entrance into business, most of them have not translated this same need for strategic planning to the on-line situation. They often start businesses to seize short term opportunities without thinking about long term strategies (Bhide, 2002:123). In reality, the whole technological business environment is different, creating pitfalls and challenges that are quite different from the traditional forms of commerce. A large number of researchers into the barriers and inhibitors facing the successful adoption of technology in business practice highlighted the need to plan strategically before adoption and deployment (Damanpour & Damanpour, 2001).

3.2.5.8 Lack of personal contact

Many SMEs believe there is no substitute for the personal approach to customers, and that technological marketing is too impersonal. Indeed, some firms rely entirely on personal contact. They thus prefer the traditional ways of doing business instead of making use of the more advanced electronic ways. Many also believe that word-of-mouth recommendations will be lost with the adoption of technological marketing and its deployment (Colvin, 2001; Singh & Slegers, 1998:29).

3.2.5.9 Not suited to the business

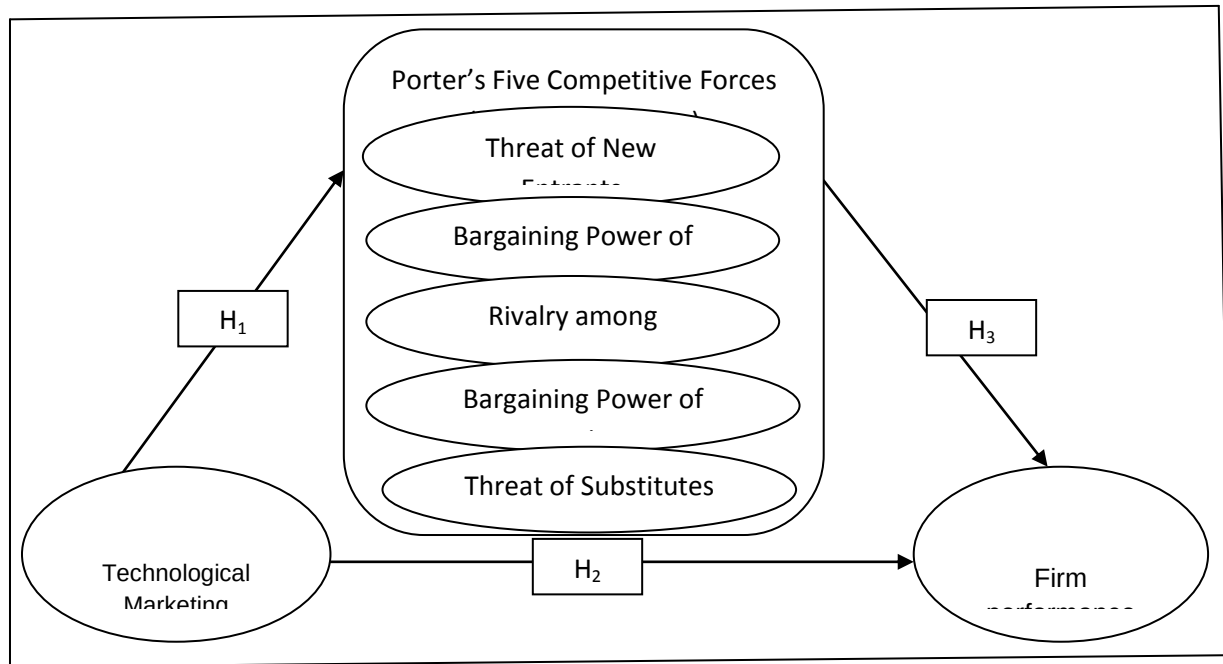
SME owners/managers often feel that their firms are not suitable, considering the demands of technological marketing, because they only serve a local community, because technological marketing is too complex for their firms, or because their firms are of a nature that negates using technological marketing (such as a personal hands-on service) (Poon, 2000). This often stems from a lack of awareness of the capabilities of technology, and what it can offer in terms of their particular markets (Ihlstrom & Nilsson, 2001:175).

3.3 THE CONCEPTUAL MODEL

The next section provides a figure illustrating the conceptual model of the study, revealing the hypothesised linear relationships between technological marketing and Porter's five forces (H_1), technological marketing (capability) and firm performance (H_2) in SMEs, as well as the relationship between Porter's five forces and firm performance (H_3) (as shown in Figure 3.1, on the next page).

Figure 3.1, depicts technological marketing as the hypothesised antecedent of the research. Porter's five competitive forces model or industry structure is presented as the potential interaction effect for technological marketing's ability to drive the firm performance of SMEs. Finally, firm performance is presented as the outcome of successful technological marketing (capabilities) and its impact on Porter's five competitive forces model or industry structure. The following is a description of these constructs and a discussion of their interrelationships.

Figure 3.1: 'The' Conceptual Framework of the Study



Sources: Adapted from Trainor *et al.* (2011:164); Porter, (2008)

3.4 TECHNOLOGICAL MARKETING AND PORTER'S FIVE COMPETITIVE FORCES

As noted earlier, technological marketing involves deploying and utilising the Internet and other digital technologies to facilitate rich interaction with customers (Trainor *et al.*, 2011:163-164). It is developed by three main elements, which are; market orientation, technology orientation and the competitive environment. It is important to first consider the relationships between technological marketing and the three elements, before considering the relationship between technological marketing and Porter's five competitive forces. The next section, therefore, offers a discussion of the relationship between technological marketing and market orientation.

3.4.1 Technological Marketing (Capability) and Market Orientation

In the contemporary business world, market orientation is conceptualised to represent a particular firm-level resource that enables SMEs to sense marketplace requirements and develop new capabilities that connect them to their external environments (Song, Benedetto, & Mason, 2007:20). Trainor *et al.* (2011:165) describe market orientation as the capability of an SME to sense and respond to customer requirements. It comprises three main elements, which are: customer orientation, competitor orientation and interfunctional coordination. The fundamental

principle underlying market orientation is customer oriented and it is stipulated that customer-related activities are the manifestation of the beliefs and culture of an SME. The argument of this study is that an SME market-oriented culture drives its development of technological marketing capabilities; this is consistent with the opinion of Trainor *et al.* (2011:165). The basis of this study's notion is that an SME which is market-oriented will exhibit flexibility and openness towards the development of its new capabilities which will establish strong and durable connections with customers. Therefore, this study posits that market orientation is positively related to technological marketing capabilities. The next section focuses on the relationship between technological marketing capability and technology orientation.

3.4.2 Technological Marketing (Capability) and Technology Orientation

Zhou, Yim and Tse (2005:43) refer to technology orientation as the capability of an SME to recognise and adopt emerging technology. SMEs that are technology-oriented place a greater investment in research and development and promote commitment to the deployment and utilisation of new technology within the firm (Trainor *et al.*, 2011:166). The key component of this study's conceptualisation of technological marketing capability is the implementation of new technology within an SME. This viewpoint was supported by the suggestion, made by Zhou *et al.* (2005:44), that customer-connection is, inherently, a technology-based innovation in the instance where the deployment of new technologies is crucial to the establishment of technological marketing capability.

A study by Srinivasan, Lilien and Rangaswamy (2002:59) proposes a positive relationship between technological opportunism and the capability of an SME to sense and respond to new technologies, as well as technology deployment and utilisation. In addition, the study of Srinivasan *et al.* (2002:59) reveals a positive relationship between SME owners'/managers' promotion of new technology and technology opportunism. This study's model suggests that SME owners'/managers' commitment is a complementary human resource that is necessary for the development of technological marketing capabilities (Powell & Dent-Micallef, 1997; Trainor *et al.*, 2011:167). Thus, a positive relationship between technology orientation and technological marketing capability has been established in previous studies (Trainor *et al.*, 2011:167). Therefore, this study posits that there is a positive relationship between technology orientation and technological marketing capability.

The next section presents a discussion of the relationship between technological marketing capability and the competitive environment.

3.4.3 Technological Marketing and Competitive Environment

The ability of an SME to adapt to its competitive environment depends on the deployment and utilisation of its resources and capabilities. As previously noted, the competitive environment, which is also referred to as the task or industry environment, comprises many factors that are particularly relevant to the strategy of an SME (Dess *et al.*, 2010:56). This environment involves obtaining feedback from multi-directional stakeholders, such as the customers as well as the potential and existing competitors and suppliers. The reaction to factors of the competitive environment may impact the decision of an SME to deploy and utilise technological marketing strategies (Trainor *et al.*, 2011:167). It is imperative for SMEs that are market-oriented to take note of both their competitive and customer environments. Thus, these SMEs can gain awareness of opportunities for greater access to new markets as well as advancements in technological initiatives made by competitors, by constantly monitoring changes in these dynamic environments (Rapp, Rapp & Schillewaert, 2008:26).

SMEs and customers that deploy technological marketing will want to associate with other firms sharing similar capabilities (Srinivasan *et al.*, 2002:60). More so, technological marketing provides SMEs with a unique channel to communicate with both their customers and suppliers. Many customers and suppliers, in certain cases, demand that their channel partners deploy and utilise technological marketing to simplify communication and the transaction process (Trainor *et al.*, 2011:168). Thus, SMEs that decide not to partake in technological marketing capabilities risk losing social legitimacy in their competitive environment (Rapp *et al.*, 2008:27). Consequently, the pressures of competitive environment factors such as suppliers and customers can advocate for the deployment and development of technological marketing capabilities in SMEs. Technological marketing can have a negative impact on a firm's competitiveness (Porter's five forces) especially where the firm does not possess technological marketing as a capability, while its customers, suppliers and competitors possess it as a capability and resource. Conversely, technological marketing can have a positive impact on a firm's competitiveness, especially where the firm possesses technological marketing as a capability. Interestingly, a study by

Trainor *et al.* (2011:171) found that the competitive environment directly influences technological marketing capabilities. In other words, the competitive environment has a positive moderating effect on the relationship between market orientation and technological marketing capability. However, since most SMEs usually lag behind in adopting and developing capabilities such as technological marketing, this study posits that the competitive environment has a negative moderating effect on the relationship between market orientation and technological marketing. The next section provides a discussion on the relationships between technological marketing and Porter's five competitive forces model.

3.4.4 Technological Marketing and Porter's Five Forces

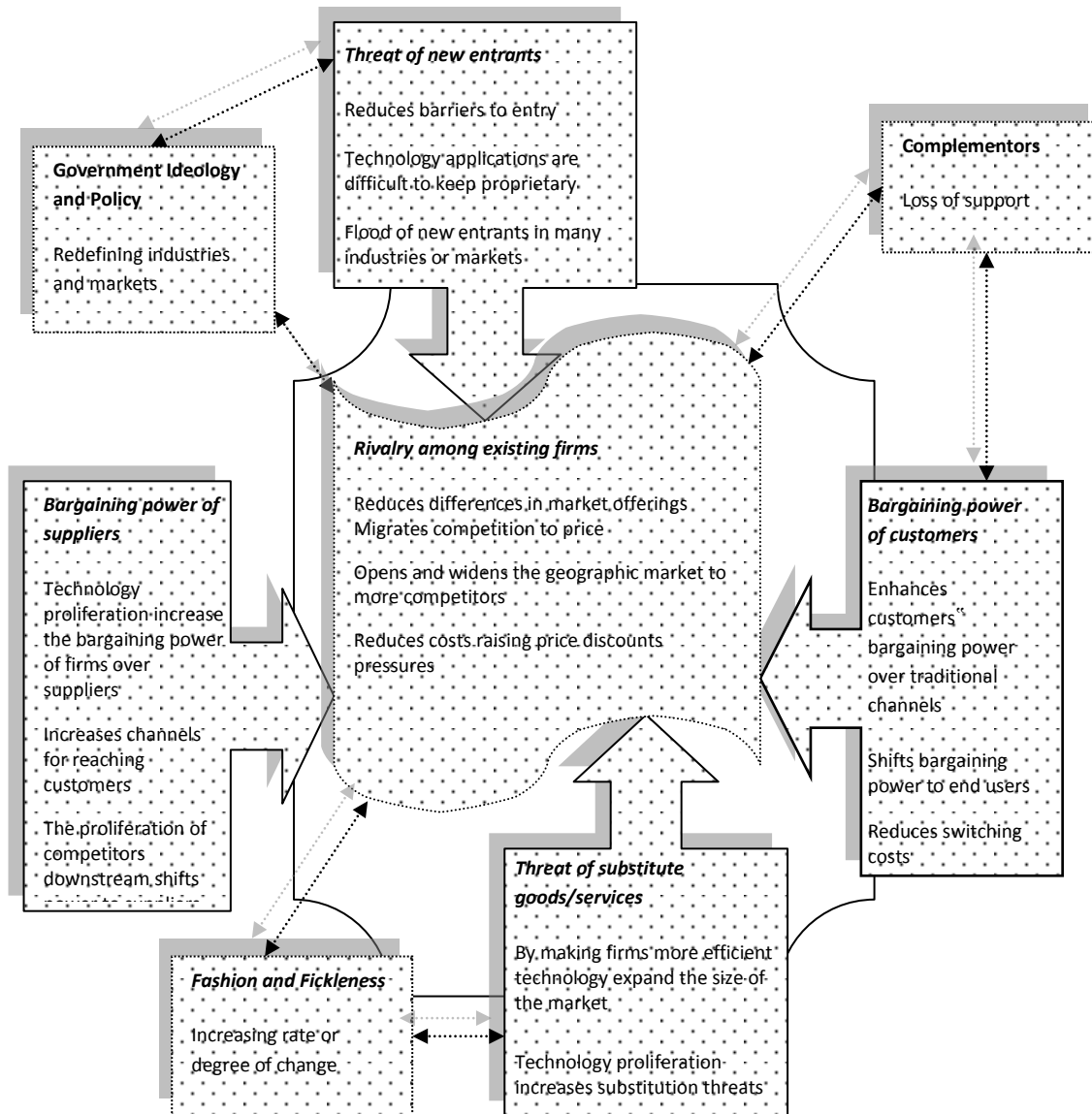
The discussion of the relationship between technological marketing and Porter's five competitive forces, is a continuation of the previous section's discussion on the relationship between technological marketing and the competitive environment. Porter's model is based on the insight that a corporate strategy, especially the competitive strategy, should meet the opportunities and threats in the SMEs external environment and should be based on an understanding of industry structure. The five competitive forces model provides a solid base for developing business strategies that generate strategic opportunities. From a competitive perspective, technological marketing can change the rules of competition in various ways. Since technology dramatically affects these competitive forces, technology-oriented SMEs should consider these forces when formulating their strategies. An SME develops its business strategies in order to obtain a competitive position over its competitors and this position is achieved by responding to the five competitive forces (Porter, 2008:7-8). The next section provides an overview of how technology has generally impacted on the original Porter's five competitive forces framework, leading to the addition of a sixth force.

3.4.4.1 The general redefinition of the original Porter's five competitive forces framework by Technology

In this context, a revision of Porter's five competitive forces framework is conducted in analysing the impact of technology in the market environment, simultaneously building a theory on the relatedness of suppliers and customers in technology environments. The task environment includes only those factors in the general environment that directly affect a firm's growth, success and survival, thus, it

encompasses the competitive and technological forces (Hellriegel *et al.*, 2004:104-105). Figure 3.2, on the next page, provides an illustration of how technology has generally redefined the original Porter's five forces framework, resulting in the addition of a sixth force.

Figure 3.2: Technology Redefinition of Porter's Five Competitive Forces Model



Source: Adapted from Wheelen and Hunger, (2002:61)

In Figure 3.2, on the previous page, technology redefined the original Porter's five forces and introduced a sixth force (either the government ideology and policy; the complements or fashion and fickleness) in addition to the other four original forces impacting on rivalry among the existing firms. These redefined forces are explained in detail in the next section.

a) The redefined threat of new entrants

According to Porter (2008:66), the Internet (and other digital technologies) mitigate the need for things such as an established sales force or access to existing channels, hence, reducing barriers to entry to the SME industry. This may encourage more entrants who, because of the lower start-up costs, see an opportunity to capture their market share by offering a product or performing a service more efficiently than existing competitors. Thus, a new cyber entrant can use the savings provided by the Internet to charge lower prices and compete on price, despite the incumbent's scale advantages. Alternatively, because digital technologies often make it possible for young firms to provide services that are equivalent or superior to an incumbent, a new entrant may be able to serve a market more effectively with more personalised services and greater attention to product details. A new firm may be able to build a reputation in its niche and charge premium prices. By so doing, it can capture part of an incumbent's business and erode profitability (Dess *et al.*, 2010:62; Louis & Venter, 2010:218). Technology and the redefined threat of new entrants lead to the redefinition of the bargaining power of suppliers.

b) The redefined bargaining power of suppliers

The utilisation of the Internet and other digital technologies, to speed up and streamline the process of acquiring supplies, is already benefiting many sectors in the economy. However, the net effect of the Internet on supplier bargaining power will depend on the nature of competition in a given industry. The effect of the Internet and digital technologies on the bargaining power of suppliers is two-pronged. On one hand, suppliers may find it difficult to hold onto customers because the buyers can do comparative shopping and price negotiations so much faster on-line. This is especially damaging to supply-chain intermediaries, such as product distributors, who cannot stop suppliers from directly accessing other potential business customers. More so, these technologies inhibit the ability of suppliers to offer highly differentiated products or unique services. Most procurement technologies can be imitated by competing suppliers. In addition, the technologies that make it possible to design and customise new products rapidly are being used by all competitors.

On the other hand, a number of factors may contribute to stronger supplier bargaining power. The growth of web-based business, may create more downstream outlets for suppliers to sell to. More so, the suppliers may be able to create web-

based purchasing arrangements that make purchasing easier and discourage their customers from switching. Also, the use of proprietary software, that links a buyer to a supplier's website, may create a rapid, low cost ordering capability that discourages the buyer from seeking other supply sources. Lastly, suppliers will have greater bargaining power, to an extent that they can reach end-users directly without intermediaries. Technology and the redefined bargaining power of suppliers serve as the determinants of the redefined rivalry amongst existing firms in the market.

b) The redefined rivalry among existing firms

Rivalry among existing firms is likely to be more intense, because of the Internet and other digital technologies that create more tools and increase the means of competing. Only those SMEs that use digital technologies and the web to market their products and services and give themselves a distinct image, are likely to capture greater profitability by making use of new technology. Such gains are hard to sustain, however, because new technologies can be easily and quickly imitated in most cases. Thus, the Internet and digital marketing technologies tend to increase rivalry amongst existing SMEs by making it difficult for SMEs to differentiate themselves using product features and by shifting customer attention to issues of price (Dess *et al.*, 2010:66).

Rivalry among existing competitors in SMEs tends to be more intense, especially when switching costs are low and products or service differentiation is minimised. Since the new digital technologies make it possible for customers and firms to compare products from one firm to the other, it has commoditised products that might previously have been regarded as rare or unique. In addition, because these new technologies reduce the importance of location, products that previously had to be sought out in geographically distant SMEs, are now readily available on-line. This then makes competitors or SMEs in cyberspace seem more equally balanced, thus intensifying their rivalry (Porter, 2008).

Rivalry among existing SMEs is more intensified for marketers because of the presence of shopping robots and informediaries that search the web for the best prices. The concept of the informediary or portal is the on-line equivalent of a traditional Industrial District or Marketplace in the "bricks and mortar" world where information about products and their pricing is obtained (Van Beveren, 2002b). More so, there are consumer websites like mySimon and PriceSCAN that seek out all the

web locations that sell similar products and provide price comparisons. This, therefore, focuses the customer exclusively on price. There are some intermediaries, such as the BizRate and the CNET, that allow consumers to compare services as well as price. As for the firms (SMEs), however, they increase rivalry by consolidating the marketing message, that consumers use to make a purchasing decision, into a few key pieces of information over which the selling firm has little control (Dess *et al.*, 2010:66). Technology and the redefined rivalry among existing firms in the market complement the redefined bargaining power of buyers.

c) The redefined bargaining power of buyers

It is also noted that new digital technologies may increase the bargaining power of buyers by providing them with more information to make buying decisions, and by lowering switching costs. Unfortunately, these technologies may also suppress the power of traditional buyer channels that have concentrated buying power in the hands of a few, giving buyers new ways to access sellers. There are two types of buyers that need to be distinguished in order to have a clear picture on the impact of these new digital technologies on the bargaining power of buyers. These are the end-users and the buyer-channel intermediaries. End-users are the final customers in a distribution channel, while the buyer channel intermediaries are the wholesalers, distributors and retailers who serve as intermediaries between manufacturers and end-users (Dess *et al.*, 2010:64).

The bargaining power of end-users is likely to be increased by the new digital technologies for several reasons. The digital technologies provide large amounts of consumer information; this gives end-users the information they need to shop for quality merchandise and bargain for price concessions. In addition, these technologies potentially reduce the end user's switching costs as switching may involve only a few clicks of the mouse to find and view a competing product or service on-line (Dess *et al.*, 2010:64).

In contrast, digital technologies may cause a decrease in the bargaining power of the buyer-channel intermediaries. These technologies make it much easier and cheaper for firms to reach customers directly. Thus, the digital technologies may enhance the power of existing firms relative to that of traditional buyer channels (Dess *et al.*, 2010:64). Technology and the redefined bargaining power of buyers are also related to the redefined threat of substitutes.

c) The redefined threat of substitutes

Digital technologies create new substitutes by enabling new approaches to meeting the same needs and performing functions (Porter, 2001:62). As such, consumers will generally choose to use a product or service until a substitute that meets the same needs at a lower cost is available (Hall, 2004:8). The economies created by these digital technologies have led to the development of numerous substitutes for traditional ways of doing business (Dess *et al.*, 2010:66). However, firms in the market can still create a competitive advantage to reduce the threat of substitutes using switching costs to buyers. This is best explained using the example of Amazon.com, an on-line retailer. Amazon develops a unique profile of shopping and purchasing habits of each customer that has previously purchased products at Amazon.com. Thus, when the customer repeatedly visits Amazon.com, Amazon begins to offer products tailored to that particular customer based on the customer's profile. If the customer decides to shop elsewhere, there is an associated switching cost because the new on-line retailer will not have the profile of the customer's prior shopping and purchasing information. Consequently, Amazon.com has reduced the threat of substitutes by tailoring customer offerings and creating a 'cost' to the consumer to switch from Amazon to another on-line retailer.

d) The sixth competitive force

Three different options have been suggested by various authors (Macmillan & Tampoe, 2000; Gordon, 2007; Grove, 1996 and Grant, 2002) as the sixth force added to Porter's original five competitive forces. These are: the power of complements, government ideology and policy as well as fashion and fickleness. The sixth force was determined primarily based on whether the factor has a direct impact on industry profitability, rivalry among existing firms and whether the factor can be managed so as to create a competitive advantage for the firm.

(i) The power of complements

The power of complements has been added by Grove (1996), as a sixth competitive force and an extension to Porter's original five competitive forces model. Complementors, as defined by Macmillan and Tampoe (2000:104), are other businesses from which customers buy complementary products. They are allies as long as their interests are aligned. However, new techniques, approaches and technologies can upset such alignments or change the relative influence of

complementors (Adeyemi, 2009:4). The advent of new technology, which results in new techniques and approaches to doing business, increases the sources of complementary products available to buyers. The increased complementary products, in turn, increase the willingness of buyers to pay the highest price for a product or service, thereby directly reducing the bargaining power of buyers. However, the power of complements has an indirect effect on industry profitability and rivalry among existing firms. As such, the force cannot be separately incorporated in Porter's original five forces framework as the sixth force. Therefore, the acceptance of the power of complements as the sixth force added to Porter's original five forces framework has, to some extent, been limited. The power of complements is complemented by government ideologies and policies.

(ii) Government ideology and policy

The adoption of technology by governments causes them to change their ideology and policies rapidly, which impacts on many industry structures. Despite the fact that Porter's five forces framework considers the role of government ideology and policy, as well as regulators, wholly rather than indisputably, the visibility and influence of this force in the South African context has increased considerably over the last few years. In certain industries, the government and regulators maintain barriers to entry. For instance, through exclusive licensing and accreditation systems, the South African government has generally maintained barriers to entry in the telecommunication industry (to Telkom) and electricity supply industry (to Eskom). The government, in some cases, exercises policies on mergers to protect competition. For instance, in the case of Nedcor's attempted takeover of Standard Bank, the South African competitive authorities ruled that the takeover would not be in the general interest of South African consumers. On the other hand, the South African government recently forced several mergers between higher education institutions as a means of consolidating the industry, presumably in the best long term interests of South African citizens. In this way, government forces can sometimes directly influence industry structure and, ultimately, competitive forces in an industry. The government can, thus, have a direct impact on the industry as the sixth force, but can also have an indirect impact or influence by affecting the other five forces, favourably or unfavourably (Adeyemi, 2009:4). Gordon (2007) suggests that government ideology and policy be considered as the sixth competitive force and that it is included in Porter's model if it has the potential to impact on all the other five

forces. Certainly, government intervention, whether through legislation, regulation, purchasing policy or direct support, can be a powerful force (Macmillan & Tampoe, 2000:104). However, Porter (2008), rather than incorporating government ideology and policies as a separate sixth force, maintains that the importance of government and its regulators lies in an ability to affect the other five forces through changes in policy and new legislation. Consequently, government ideology and policies cannot be added as a separate sixth force to Porter's original five forces. Government ideologies and policies can lead towards another possible sixth force: fashion and fickleness.

(iii) Fashion and fickleness

The changing fashion and fickleness of loyalty to brands and lifestyles, especially among the young and affluent, can seriously damage the condition of a business. One of the major effects of new digital technologies, such as the Internet, is that they increase fickleness. These technologies make it easier for consumers to compare a wider range of products and prices and enhance the visibility of choice thereof. Thus, on-line trading has an effect on customers' shopping patterns. Today's customers range from those who prefer browsing when buying items such as books, clothes and motor cars, to those who prefer ordering brand-name products on-line. Consequently, it is necessary for vendors to re-think the nature of their market offerings regarding whether they should be providers of convenience or sources of leisure (Macmillan & Tampoe, 2000:104). Fashion and fickleness, like the threat of complements and government ideology and policies, depends on other forces in Porter's five forces framework. Since it increases the rate of change, increased change in fashion and fickleness creates more substitute products, which increases the threat of substitutes. As such, fashion and fickleness becomes more important when it remains influencing the threat of substitutes, rather than adding it as a separate sixth force to the original Porter's five competitive forces framework.

In conclusion, despite the fact that a sixth force has been added to Porter's original five competitive forces model, the acceptance of this added force has been somewhat limited. This could be for two reasons, which are: there is no exact and/or specific sixth force in all sectors, as it is different for each sector. At the same time, as a sixth force could be defined for all sectors, the influence of this force can also be captured in the other five forces and, thus, the necessity of having it in the framework is less compelling (Adeyemi, 2009:4). The next section provides a discussion of the

relationship between the Porter's original five competitive forces and technological marketing.

3.4.4.2 The relationship between Porter's original five competitive forces and technological marketing

The relationship between Porter's five competitive forces and technological marketing is discussed in the sections to follow:-.

(i) The bargaining power of buyers and technological marketing:-

Weeks (2002:5) asserts that, in this digital era, strategic thinking is averting firms from being products- or service-centred to being customer-centred, with customers being key to strategy formulation practice. As such, customers have only become the consumers of services and products as they now also collaborate with producers in the production of goods and services in order to maximise their satisfaction (Sawers *et al.*, 2008:180). Such collaborations enable customers to pressurise SMEs through their abilities to force down the prices, bargain for better quality or more services and pit competitors against each other (Hellriegel *et al.*, 2004:105).

Customisation favours the deployment and utilisation of modern technologies as this enables firms to identify customer needs on an individual basis (Sawers *et al.*, 2008:181). Thus, SMEs are no exception to this and have to deploy these technologies in order to acquire information on, and efficiently satisfy, the individual needs of customers. Hollensen (2003:398) cites that numerous customers prefer different versions of the same product or service. With the rapid growth in the deployment of technological marketing tools, such as the Internet, these customers can easily access information about the products and its suppliers, thereby enhancing the bargaining power of customers (Porter, 2008:9). However, SMEs can reinforce their bargaining power over their customers and suppliers by increasing their customers' switching costs and, resultantly, decreasing their own costs for switching suppliers. This study then hypothesises that the deployment and utilisation of technological marketing expands the bargaining power of customers. The next section provides a discussion of the relationship between the bargaining power of suppliers and technological marketing.

(ii) The bargaining power of suppliers and technological marketing

According to Hellriegel *et al.* (2004:106), all firms play the role of the supplier and customer in their competitive environments and each firm needs to balance its position as a customer as well as a supplier. As noted earlier, suppliers can exercise bargaining power on the incumbent SMEs of an industry, by raising prices, or by cutting their own costs through a reduction in the quality of purchased goods and services (Hellriegel *et al.*, 2004:106). The bargaining power of suppliers tends to be strengthened when suppliers are concentrated or they contribute the larger component of the products that are bought by the customer. In addition, Malcolm and Martin (2003:98) advocate that competition from suppliers is increased when suppliers threaten to amalgamate in a forward manner.

The ongoing debate in the contemporary business world is that the bargaining power of suppliers can be considered as neither high nor low in marketplaces with firms that deploy and utilise recent technologies. The visible impact of technology on many firms is made possible through the addition of new channels for distributing products. SMEs can generate greater efficiency in terms of low and reduced costs by integrating recent technological marketing with traditional methods of conducting business and by supplying adequate information to all members of the value chain (Chen, 2001:17). The deployment and utilisation of technological marketing offers supplying firms the potential to attend to customers on a more personal basis. In addition, this provides a channel for suppliers to reach final-users, thus reducing the influence of intermediary firms. More so, technology-oriented procurement and digital markets tend to provide all firms with equal access to suppliers, and they diminish procurement to undifferentiated products. This leads to reduced barriers to entry and an increased number of competitors, which results in the shifting of the bargaining power to suppliers (Porter, 2001:66). This study, therefore, hypothesises that the deployment and utilisation of technological marketing transfers the bargaining power to suppliers. The next section provides a discussion of the relationship between the threat of new entrants and technological marketing capability.

(iii) Threat of new entrants and technological marketing

The extent of the threat of new entrants depends on existing barriers to entry and the combined reactions of existing competitors. The main purpose of entry impediments has always been to secure a protective business environment for existing SMEs, by

moderating competitive threats into the business. While the conventional assumption inherently, or precisely, hypothesises that entry barriers offer general protection against various types of new entrants; the evidence accrued over the years increasingly justifies a qualification to this principle (Han, Kim & Kim, 2001:3).

As previously noted, entry difficulties may provide a less-than-watertight obstacle for the marketplace, particularly when bargaining against the challenges from new entrants that deploy and utilise technological marketing capabilities (Ruef, 1997:852; Tushman, 1997:16). The argument in this study is that an inability to differentiate competition, on the extent of the deployment and utilisation of technological marketing by firms, conceivably comprises one source of the argument surrounding the value of entry barriers. For instance, some authors are of the notion that the deployment of technological marketing by firms, raises the barriers to entry and these obstacles restrict entry into business (Porter, 2008:7), while others are against the notion (Zahra, Nash & Bickford, 1995:27-30, Han *et al.*, 2001:3). In other words, if the deployment of technology by the new entrants begins to moderate the value of the entry barriers, as is increasingly concluded, consistence may be compromised. Consequently, by combining the existing evidence from a moderated-effects perspective, this study posits that the number of competitors entering the SME industry is a resultant combination of two opposing influences: the presence of barriers and the deployment of technological marketing capabilities by new competitors. Thus, in this study, entry barriers are hypothesised to have a restricting effect on the entry of new competitors into the industry. More so, the pre-emptive value of entry barriers is posited to be negatively moderated by the deployment of technological marketing by the competitive entrants. The next section focuses on the relationship between the threat of substitutes and technological marketing.

(iv) Threats of substitutes and technological marketing

The existence of high quality substitutes in sufficient quantities and at comparable prices intensifies competition. In other words, substitutes that pose a major threat are those that perform better than the existing products or are produced by businesses that earn high profits. Such substitutes normally take the form of new technologies or business models (Stevens, Loudon, Wrenn & Mansfield, 2006:115).

The deployment and utilisation of new marketing technologies can result in new goods and services for consumers, improved existing products, better customer

services, and often lower prices (Boone & Kurtz, 1992:56). In today's world, business momentum has increased as a result of the rapid growth in the use of digital technologies such as the Internet and other faster communication and transport means (Kotler & Keller, 2006:13). Time and again, SMEs need to understand that competition can be seen as a manner of liberally shifting from physical environments towards technology-mediated environments (Hollensen, 2003:395).

Porter (2001:66) posits that the deployment of technological marketing tools such as the Internet moderates the need for an established sales force or access to existing channels. Consequently, new approaches enable management to meet customers' needs and performing functions. As a result, SMEs find it more difficult to maintain their proprietary offerings, hence the imitability of their product offerings and, ultimately, the creation of substitutes. This study, therefore, hypothesises that the deployment and utilisation of marketing technologies by SMEs create substitute products. The next section covers the relationship between the rivalry amongst existing competitors and technological marketing.

(v) Rivalry amongst existing competitors and technological marketing

Rivalry conduct is a characteristic of those SMEs that are competitors, or unconventional suppliers of goods or services (Kitchen, 2000:43). Previous studies on rivalry provide an indication of the current competitive position of a market and these surveys, at least, provide SME owners/managers with an indication of their own competitive stance (Ismail, Jeffery & Belle, 2011:3, Kitchen, 2000:43). Findings from such studies are limited to the rivalry experienced by individual firms in individual markets. However, the measurements of rivalry in this study are adapted from these studies and they provide the basis for an exploration of the hypotheses; the resultant findings should shed some light on the nature of competition in SME markets.

Khandwalla, as cited in Kitchen (2000:43), suggests that rivalry intensifies when the market constitutes many small competing firms, or the firms only have modest market shares with undifferentiated products. Notably, competitors will employ strategies such as price-cutting, improved service delivery and quality (Hellriegel *et al.*, 2004:104). The force of rivalry among existing competitors is determined by SME owner/manager strategies and tactics (Ismail *et al.*, 2011:3). Essentially, SMEs need to focus on their internal activities and competitors' strategies so as to survive in the

present competitive world. This is because SME market competition increases when key competitors combine their strategies with the deployment and utilisation of marketing technologies in product offerings (Malcolm & Martin, 2003:96). Therefore, this study hypothesises that the combination of SME strategies and the deployment and utilisation of technological marketing increases rivalry amongst existing competitors in SME markets.

3.4.4.3 Summary of the relationship between technological marketing and Porter's five forces model/industry structure

The above discussions, on how the items of Porter's five forces model or industry structure relates to technological marketing capability, have laid the foundation for the development of the first hypothesis in this study. Previously, a study by Rivard *et al.* (2006:43) has linked technology support to Porter's five competitive forces and to a firm strategy. The study revealed a positive path coefficient which indicated that increased technology support for strategy is associated with an environment perceived to be more threatening in terms of competitive rivalry, threat of substitutes, and the power of buyers. Despite the existence of some positive trends on the influence of technological marketing capability on Porter's five forces or industry structure, derived from the use of the internet and other digital marketing tools, most of the trends are negative (Porter, 2001:66). Therefore, drawing from the theoretical reasoning and prior empirical evidence this study hypothesises that:

H₁: Technological marketing has an (negative and significant) influence on Porter's five forces model or industry structure. The next section focuses on the relationship between technological marketing capability and firm performance.

3.5 TECHNOLOGICAL MARKETING CAPABILITY AND FIRM PERFORMANCE

The Resource-Based View has been used to comprehend marketing technology as a capability and its impact on firm performance and strategy, in this study. Embedded in strategic management literature, the Resource-Based View of the firm hypothesises that firms compete on the basis of unique, valuable, rare, inimitable and non-substitutable firm resources (Bharadwaj, 2000:170). This view is grounded upon the assumption that the resources needed to envisage, opt for, and execute strategies are variously distributed across firms and that these differences in firms remain constant over time (Bharadwaj, 2000:170).

Promoters of the Resource-Based View broadly define resources to include assets, knowledge, capabilities, and organizational processes. However, scholars like Dess *et al.* (2010:93) and Louw and Venter (2010:251) differentiate resources from capabilities and categorise resources into tangible or physical, intangible, and human resources. On one hand, tangible or physical resources are typically assets that appear on the balance sheet of a firm; these include property, raw materials and production facilities such as plant and equipment (Louw & Venter, 2010:252). Intangible resources include brand value, reputation, product quality, culture and intellectual capital (Dess *et al.*, 2010:93). On the other hand, the term 'human resources' refers to the individual skills, technical know-how and competencies to which a firm has access (Bharadwaj, 2000:170). However, these resources on their own are not particularly productive and, as such, there is a need to assemble resources that work together to create firm capabilities. Firm capabilities refer to the capacity of a firm to deploy tangible or intangible resources using the processes of a firm in order to attain the desired end over time (Dess *et al.*, 2010: 92).

Differences in firm performance are mainly due to the distinctive resources and capabilities embedded in processes and business routines that are valuable, rare, inimitable and non-substitutable. As part of the resource portfolio of a firm, information technology on its own may not meet the Resource-Based View criteria of creating competitive advantage and the superior performance of a firm. This is mainly due to the relatively low barriers to imitation and acquisition by other firms inherent to information technology, which causes the IT-based competitive advantage to substantially decrease fairly quickly (Louw & Venter, 2010:253). As such, the ways in which information technology as a resource can provide a sustainable competitive advantage for a firm that leads to superior firm performance has become one of the key topical research issues in the contemporary business world. In support, a study by Powell and Dent-Micallef (1997:396) points out that the value of IT can be increased only when it is deeply rooted in a firm through resource complements and co-specialisation. Consistent with the notion of Powell and Dent-Micallef (1997:396) is a study by Bharadwaj (2000:172), which describes a hierarchy of firm capabilities, where specialised capabilities are integrated into broader functional capabilities such as marketing, manufacturing, and IT capabilities. In addition, these functional capabilities, in turn, combine to form cross-functional capabilities such as

technological marketing capability, new product development capability and customer support capability.

Broadening the Resource-Based View of firm resources and capabilities to the information technology and marketing function, the technological marketing capability of a firm is defined here as its ability to mobilise, deploy and utilise the Internet and other digital technology-based resources in combination with other capabilities and resources, such as human resources, in order to facilitate rich interactions with customers (Trainor *et al.*, 2011:163-164). Assuming the categorisation of resources by Bharadwaj (2000:173), the main marketing technology-based resources are classified as follows: the tangible resource comprising the physical information technology infrastructure components, the human IT resources comprising the technical and marketing technology skills, and the intangible marketing technology-enabled resources such as knowledge assets, customer orientation, and synergy. Thus, from the resource-based perspective, a sound technology infrastructure appropriately aligned with good human embedded information technology skills form a distinct firm resource known as a technological marketing capability. Such a capability enables a firm to develop its core competencies which leads to a competitive advantage and, ultimately, improved firm performance.

Information technology has been linked to the supply chain in a study by Wu, Yeniyurt, Kim and Cavusgil (2006:494) which examines the implementation of IT in the supply chain communication system. The study suggests that through deeply rooting IT in the supply chain process of a firm, IT can facilitate the development of higher-order firm capabilities, known as supply chain capabilities. These capabilities are firm specific and hard to imitate across firms. Thus, a firm can create a sustainable competitive advantage which, in turn, improves its performance through the adoption of complex technologies and the combined benefits achieved through an integrated system (Bharadwaj, 2000:173).

In addition, a study by Trainor *et al.* (2011:167) linked IT to marketing and to firm performance. This study viewed technological marketing capability as an innovation that represents an effective means to deal with turbulence in the external environment (Trainor *et al.* 2011:167). In addition, the study investigated a direct relationship between, similar to that of this present study, and established a positive influence of technological marketing capability on firm performance in larger firms.

Despite, the significant structural and management practice differences that exist between the small and large firms, this study is of the view that SMEs resemble large firms. Jenkins (2006) assumes that SMEs are 'little big firms'. Thus, advances to engage firms in the adoption of technological marketing and developing it into a firm capability can simply be scaled down to fit SMEs (Jenkins, 2006:243). Therefore, SMEs have the same capacity as large firms to adopt and develop technological marketing capabilities that can positively impact on their firm performance. However, there is a possibility of having a negative influence that stems from the premise that SMEs have weaker market-sensing capabilities which make them to fail to accurately anticipate changes in their markets and to develop appropriate responses. Where SMEs show weaker market-sensing capabilities, the relationship between technological marketing capability and firm performance of SMEs is expected to appear even weaker in turbulent environments, thus having a negative impact on performance. Nevertheless, this study is of the notion that SMEs have average to strong market-sensing capabilities, hence large firms sub-contract their services. Therefore, this study hypothesises that technological marketing capability has a positive and significant impact on firm performance of SMEs, and this is stated as: H₂: Technological marketing capability has an (positive and significant) impact on firm performance of SMEs. The next section focuses on the relationship between Porter's five competitive forces model or industry structure and firm performance.

3.6 PORTER'S FIVE FORCES MODEL AND FIRM PERFORMANCE

Porter (2008:2) asserts that industry structure grows out of a set of economic and technical characteristics that determine the strength of each competitive force. Thus, having adequate knowledge of the competitive forces and their underlying causes provides a framework for anticipating and influencing competition and firm performance as measured by profitability over time (Louw & Venter, 2010:250). Porter (2008:2) thus uses the five competitive forces model to define and explain industry structure and firm performance from a Market-Based perspective. Fundamental to the Market-Based View of strategy is the concept of activities, since it views a firm through its strategy as a bundle of activities. According to Porter (2008:3), a strategy is a constant array or pattern of activities aimed at creating a specific form of competitive advantage for a firm which exists in two basic types, either the differentiation or low cost. More so, a firm needs to understand the sophisticated industry structure before it chooses a strategy. Industry structure thus

affects the sustainability of firm performance, whereas positioning reflects the firm's ability to establish competitive advantage over its rivals. Therefore, a firm can exercise its market power through the gained attractive position in order to create a competitive advantage that enhances firm performance (Spanos & Lioukas, 2001:909).

In addition to the assertions of this view, the existing literature primarily linked industry structure to strategy which, in turn, impacted upon firm performance (Galbreath & Galvin, 2008:114). A study by Spanos and Lioukas (2001:909) has linked industry structure (as determined by Porter's five competitive forces model) directly and indirectly to sustainable strategic positioning which, in turn, links with performance. The study, in other words, posited a relationship between industry forces and the sustainability of above average performance against bargaining and direct and indirect competition. In addition, a study by Rivard *et al.* (2006:43) revealed a link between Porter's five competitive forces and firm performance. It established a negative relationship between a threatening competitive environment (Porter's five forces/industry structure) and the external dimensions of firm performance on which firms have less control. Consistent with the notion and findings of Rivard *et al.* (2006), this study posits a negative relationship between Porter's five competitive forces or industry structure and firm performance, which is stated as:

H₃ : Porter's five forces model or industry structure has an (negative and significant) impact on firm performance of SMEs. The next section summarises this chapter.

3.7 SUMMARY

The relevant definitions, importance and technological marketing in SMEs were discussed in this chapter. The conceptual model and hypotheses development of the study were also discussed in this chapter. The discussions considered the relationships between technological marketing and its constructs, which are: market orientation, technology orientation and competitive environment. The relationship between Porter's five competitive forces and their constructs were also discussed. The ultimate relationship between technological marketing and Porter's five competitive forces model and firm performance was hypothesised. Lastly, the relationships between Porter's five forces model or industry structure and firm performance of SMEs were discussed and hypotheses were developed. The

following chapter (Chapter 4) focuses on the research methodology and design of the study.

CHAPTER 4

RESEARCH METHODOLOGY

4.1 INTRODUCTION

A research methodology is comprised of techniques and mechanisms of formulating the problem statement and obtaining results and conclusions. It entails producing a research design, scope, sample, instrument, as well as validity and reliability testing, and analysis (Cant *et al.*, 2003:65). The purpose of this study is to investigate the impact of technological marketing on Porter's five competitive forces model and firm performance of SMEs in the Buffalo City Metropolitan Municipality. This chapter provides a synopsis of the research methodology used in this study, which lies within a quantitative model. Subsequently, it discusses the research design and plan, population and sampling as well as the data collection and analysis procedure. The chapter concludes with a discussion of reliability and validity issues, ethical considerations and the limitations of the study.

4.2 SCOPE OF THE STUDY

The scope of the research refers to the boundaries and margins which physically and conceptually delineate the source and location of the elements of the study which are supposed to provide the required data (Cant *et al.*, 2003:45-46). This study was conducted in the Buffalo City Metropolitan Municipality, covering two towns, East London and King Williams Town, in the Eastern Cape province of South Africa. The research was conducted in the Buffalo City Metropolitan Municipality for the following reasons:

- The broadband technologies needed to enable high volumes of e-commerce are already in place or are currently being restored. Telkom, the country's leading fixed telephone provider, has recently boosted its optic cable network to deliver broadband technologies across the Metropolitan Municipality.
- The researcher lives close to Buffalo City Metropolitan Municipality, which simplified the task of identifying the population to be studied. The researcher is aware of the Metropolitan Municipality's confines and this helps to reduce overlapping in the target population.

- The Eastern Cape Province is the least developed province in South Africa. Therefore, research findings of this nature will simplify the task of SME development and support in accordance with the problem at hand.

4.3 THE RESEARCH DESIGN

A research design refers to a framework for conducting a marketing research project. It specifies the details of the procedures necessary for obtaining the information needed to structure and/or solve marketing research problems (Malhotra, 1999:83), which gave rise to the study utilising a quantitative approach.

4.3.1 Quantitative Research

Quantitative research refers to an investigation of a phenomenon by testing a theory that can be measured numerically and analysed statistically (Shafeek, 2009:79). Fundamentally, it involves the collection of raw data from a large sample size with the intention of generalising the results to a wider population as well as future courses of action. Thus, it allows researchers to provide statistical facts and estimates about relationships between constructs of the research interest as well as generalising inferences about the defined target population (SMEs). While research methods such as focus group interviews may be useful in identifying the relevant issues to the current research problem, they also have limitations of inconclusive results which create the need to subject the groups to more in-depth and intensive interviews in order for the research findings to be conclusive. More so, the focus group interviews require small groups. Given the nature of SEM data analysis technique employed in this study, which requires relatively larger samples to provide robust results, conducting focus group interviews may lead to a non representative sample, which may make it difficult to generalise the findings to wider populations such as South Africa's SME population as a whole.

Therefore, quantitative research techniques were employed in this study to obtain SME owners'/managers' perceptions of how technological marketing impacts on Porter's five competitive forces model and SMEs' performance in the Buffalo City Metropolitan Municipality. Despite the inadequacy of quantitative research design in generating theory and providing strong in-depth explanations of qualitative enquiry, it was still useful in this study's hypotheses verification, reliability and validity tests (Shammout, 2007:90). The major strengths of quantitative research are that

measurement is reliable, valid, and can be generalised in its clear prediction of cause and effect (Neill, 2007:3). In addition, quantitative research has advantages that the researcher found beneficial, and these are:

- closely follow the original set of research goals, arriving at more objective conclusions, tests hypotheses and determines issues of causality;
- achieving high levels of reliability of gathered data due to controlled observations; and
- eliminates or minimises subjectivity of judgement (Neill, 2007:4).

Therefore, quantitative research was appropriate for this study because the issues in this particular research have been studied by other researchers, hence a substantial body of literature on the subject exists (Shafeek, 2009:79). A cross-sectional study was conducted due to limited time which restricted the use of longitudinal studies.

4.4 RESEARCH INSTRUMENT

The following sections deal with the ways which were used by the researcher in order to physically collect the requisite data. The next section focuses on the research instrument cover letter.

4.4.1 Research Instrument Cover Letter

Cover letters have been becoming a part of most questionnaire surveys. Research by Dillman (2007) has shown that the messages contained in a self-administered questionnaire's cover letter affects the response rate. Accordingly, the questionnaire is accompanied by a cover letter in which a brief introduction and the purpose of the study and the individual, non-commercial academic nature are stressed. Additionally, the significance of the study, the importance of their assistance, and the assurance of confidentiality and anonymity of the response are highlighted. Following the advice from Dillman (2007), a covering letter was designed accompanied the research questionnaire (refer to Appendix 1). The cover letter was provided to the respondents on request. The interviewer was also present to explain the purpose of the research project to the SME owners/managers (respondents).

4.4.2 Questionnaire Design

Questionnaire protocol served as the primary means for data collection from SME owners/managers. Questionnaires are designed to basically achieve three goals (Martins *et al.*, 2002:216):

- to maximise the relevance and accuracy of the data collected;
- To maximise the participation and cooperation of the target respondents;
- To facilitate the collection and analysis of the data.

Shammout (2007:107) defines a questionnaire as a reformulated written set of questions to which respondents record their answers, usually within closely defined alternatives. This instrument was utilised because of its effectiveness in gathering large volumes of empirical data from large samples, as well as the timely collection of predetermined data (Shammout, 2007:107). The literature in this study was used as guidelines for the development of the statements in the questionnaires. Thus, the questionnaire was developed primarily on the basis of instruments used in other studies (as shown in section 4.4.3). Multi-item scaled questions (particularly Likert scales) were used to test the research hypotheses. Thus, most of the questions contained in the questionnaire were 5-point Likert scale questions for the following reasons (Wegner, 2000:86-87):

- They reduce the development of response bias amongst the respondents;
- They evaluate attitudes, beliefs, opinions and perceptions;
- The use of a Likert scale makes the response items standard comparable amongst the respondents; and
- The answers from the Likert scale statements are easy to code and analyse directly from the questionnaires.

A questionnaire containing 35 items was designed, based on previous works which are relevant to this study. The questionnaire items contain three constructs, namely technological marketing (17 items); Porter's five competitive forces or industry structure (15 items) and firm performance (3 items). All the measurement items were measured on a 5-point Likert-type scale that used 1=strongly disagree to 5=strongly agree to express the degree of agreement. Detailed operationalisation and

measurement procedures for each research construct in the proposed model are provided in the next sections.

4.4.3 Operationalisation and Measurements

As previously noted, the research scales were operationalised primarily on the basis of previous works. Minor adaptations were made in order to fit the current research context and purpose. Section A of the questionnaire incorporated 9 statements on personal information of the SME owners/managers. The next section focuses on the measures of technological marketing covered in section B and C of the questionnaire.

4.4.3.1 Technological Marketing

Technological marketing was measured using 17 items as a composite construct. The 17 items designed for this construct were adopted from the work of Powell and Dent-Micallef (1997) and Trainor *et al.* (2011:167-168). Section B of the questionnaire incorporated 11 statements on the use of information technology. The statements are given below:

- a. This firm encourages change and welcomes opportunities to apply new Information Technology developments (TMC1- new IT developments).
- b. Employees in the firm are well trained in the use of new information technology (TMC2- .new IT training)
- c. The firm uses scanners to confirm the receipt of goods (TMC3 –scanners for receipt of goods).
- d. The firm uses scanners at sales points (TMC4- sales point scanners).
- e. The firm has devices to track month-to-date units sold for all items (TMC5- sales tracking devices).
- f. The firm uses a computer-generated sales forecast (TMC6- computer based sales forecast).
- g. The firm uses electronic bookkeeping and reporting (TMC7- e-bookkeeping and reporting).
- h. The firm uses electronic labour planning (TMC8- e-labour planning).

- i. The firm uses an electronic mail to communicate with customers (TMC9-email communication).
- j. Scanners are used in the distribution centers (TMC10-distribution centers scanners).
- k. The firm uses computer data base of customers (TMC11- computer customer data base).

Section C of the questionnaire incorporated the following 6 statements on the effectiveness of Information Technology:

- a. The Owners or managers of this firm have clearly indicated their commitment to information technology (TMC12- management IT commitment).
- b. Information technology planning is included in the overall business plan of the firm (TMC13- IT planning).
- c. Information technology training is a high priority in the firm (TMC14- IT training prioritisation).
- d. The owners or managers do research on the best information technology practices of other firms (TMC15-researching best IT practices).
- e. Information technology project priority has been clearly identified in the firm (TMC16-IT an identified firm priority).
- f. The fundamental effectiveness of the firm's information technology is regularly measured (TMC17- measurement of IT effectiveness).

The entire questionnaire item list is shown in Table 4.1, later in this chapter as well as in Appendix 2. The measures of Porter's five competitive forces or industry structure are discussed in the following section.

4.4.3.2 Porter's five competitive forces (industry structure)

Industry structure or Porter's five competitive forces items (15) were adapted from Galbreath and Galvin (2008) and Porter (2008). As stated in Galbreath and Galvin (2008), industry structure was measured using Porter's five competitive forces. Rivalry was measured using three items, while, ease of entry was measured using three items. Alternatively, the threat of substitute products was measured using a

single item, while the bargaining power of suppliers was measured using four items. Finally, the bargaining power of buyers was measured using four items. Section D of the questionnaire incorporated 15 questions on Porter's Five Forces model and the statements are given below:

- a. The number of firms competing for customers in our area is very high (PFF1-firm concentration).
- b. Price competition is used regularly in the area to a larger extent (PFF2- price competition).
- c. Use of new marketing technologies has improved the firm's competitive position in the market (PFF3- improvement of firm's competitiveness).
- d. The use of technology makes our suppliers acquire their own channels (PFF4-suppliers' own channel acquisition).
- e. The use of technology makes our suppliers by-pass existing intermediaries to final customers (PFF5- suppliers' by-passing of existing intermediaries).
- f. The use of technology brings together our suppliers making them to be dominating and concentrated (PFF6- supplier concentration).
- g. Suppliers have greater ability to charge higher prices for products to firms in our market due to the use of technology (PFF7- suppliers' bargaining power).
- h. New technology in the market allows customers to connive, forming large customer groups that purchase products in large volumes (PFF8- buyers' concentration).
- i. Recent technologies enhance chances of our customers threatening to acquire the supplier (PFF9- customers' acquisition of suppliers).
- j. The use of technology provides customers with information about supplier's pricing structures and input costs (PFF10- suppliers pricing structures).
- k. Customers have a very greater ability to force firms in our area to charge lower prices due to the use of technology (PFF11-.buyers' bargaining power)
- l. The use of technology makes it difficult for customers to switch from one seller to the other in our market (PFF12- switching costs).

m. The use of technology creates the need to invest large financial resources in order to compete (PFF13-capital requirements).

n. The use of technology makes new firms to find it very difficult to enter and compete in our area (PFF14- barriers to entry).

o. The use of technology makes firms to be highly threatened by the existence of products that serve similar purpose as this firm's product. (PFF15- threat of substitutes).

The entire questionnaire item list is shown in Table 4.1 as well as in Appendix 2. The next section focuses on the measures of firm performance.

4.4.3.3 Firm Performance

Firm performance was measured using three (3) subjective measurement items, three (3) of technology-enabled sales growth, profitability and overall performance over a period of three years, adapted from Powell and Dent-Micallef (1997:388) and Trainor *et al.* (2011:168). This study preferred subjective firm performance measures because they have been widely used by many strategy-related researchers (Spanos & Lioukas, 2001; Powell & Dent-Micallef, 1997; Trainor *et al.*, 2011) and because of the target population (SME owners or managers). These studies argue that SMEs financial data is mostly disapproved of as being unreliable and subject to varying accounting conventions or even to managerial manipulation, for reasons such as avoidance of corporate or personal taxes (Powell & Dent-Micallef, 1997:388; Spanos & Lioukas, 2001:916). As such, using objective measures to measure SME firm performance will yield unreliable results. Therefore, subjective measures were found to be appropriate for firm performance in this study. Information on firm performance was incorporated in Section D of the questionnaire, where three statements were given as shown below:

a. Use of new marketing technologies has dramatically increased the sales of this firm over the past 3 years (FP1- sales growth).

b. Use of new marketing technologies has increased the firm's profitability over the past 3years (FP2- profitability growth).

c. The use of new marketing technologies has improved the firm's overall performance (FP3- overall performance growth).

The full item list of the questionnaire on firm performance is shown in Table 4.1, in the section that follows on the next page and in Appendix 2.

Table 4.1: Adapted and Original Measurement Items

Technological Marketing (capability)	RESEARCH MEASUREMENT ITEMS (ADAPTED)		MEASUREMENT ITEMS (ORIGINAL)
	TMC-1	This firm encourages change and welcomes opportunities to apply new Information Technology developments.	A culture that embraces and encourages change and experimentation, minimises fear of failure and welcomes opportunities to apply new IT developments (Powell and Dent-Micallef, 1997).
	TMC-2	Employees in the firm are well trained in the use of new information technology.	Personnel are well trained on existing applications (Powell and Dent-Micallef, 1997).
	TMC-3	The firm uses scanners to confirm the receipt of goods.	Scanners that log the receipt of goods; (Powell and Dent-Micallef, 1997).
	TMC-4	The firm uses scanners at sales points.	Scanners at the point of sale (POS) (Powell and Dent-Micallef, 1997).
	TMC-5	The firm has devices to track month-to-date units sold for all items.	System capacities for tracking month-to-date units sold for all items (Powell and Dent-Micallef, 1997).
	TMC-6	The firm uses a computer-generated sales forecast.	Computer-generated sales forecast (Powell and Dent-Micallef, 1997).
	TMC-7	The firm uses electronic bookkeeping and reporting.	Electronic bookkeeping and reporting (Powell and Dent-Micallef, 1997).
	TMC-8	The firm uses electronic labour planning.	Electronic labour planning (Powell and Dent-Micallef, 1997).

Technological Marketing (Capability)	RESEARCH CONSTRUCTS	RESEARCH MEASUREMENT ITEMS (ADAPTED)	MEASUREMENT ITEMS (ORIGINAL)
	TMC-9	The firm uses electronic mail to communicate with customers.	Electronic mail between firms (Powell and Dent-Micallef, 1997).
	TMC-10	Scanners are used in the distribution centers.	Scanners in the distribution center (Powell and Dent-Micallef, 1997).
	TMC-11	The firm uses computer data base of customers.	Firm computer data base of customers (Trainor <i>et al.</i> , 2011).
	TMC-12	The Owners or managers of this firm have clearly indicated their commitment to information technology.	A clear and visible owner/manager commitment to IT (Powell and Dent-Micallef, 1997).
	TMC-13	Information technology planning is integrated with the overall business plan of this firm.	Integration of IT planning with the overall goals (Powell and Dent-Micallef, 1997).
	TMC-14	Information technology training is a high priority in the firm.	IT training is a visible priority in the firm (Powell and Dent-Micallef, 1997).
	TMC-15	The owners or managers do research on the best information technology practices of other firms.	Actively researching and observing best practices of other firms in activities or processes that need improvement (Powell and Dent-Micallef, 1997).
	TMC-16	Information technology project priority has been clearly identified in the firm.	Clearly identified IT priorities and a plan for development and implementation (Powell and Dent-Micallef, 1997).
	TMC-17	The fundamental effectiveness of the firm's information technology is regularly measured.	Regular measurement of the bottom-line effectiveness of our Information Technology projects (Powell and

			Dent-Micallef, 1997).
Porter's Five Forces	RESEARCH CONSTRUCTS	RESEARCH MEASUREMENT ITEMS (ADAPTED)	MEASUREMENT ITEMS (ORIGINAL)
	PFF-1	The number of firms competing for customers in our area is very high.	The number of competitors vying for customers in our industry is very high (Galbreath and Galvin, 2008).
	PFF2	Price competition is used regularly in the area to a larger extent.	The extent to which price competition is used regularly in our industry is very large (Galbreath and Galvin, 2008).
	PFF-3	Use of new marketing technologies has improved the firm's competitive position in the market.	New information technologies have improved our competitive position (Trainor <i>et al.</i> , 2011; Powell and Dent-Micallef, 1997).
	PFF-4	The use of technology makes our suppliers acquire their own channels.	Supplier acquisition of own channels (Porter, 2008).
	PFF-5	The use of technology makes our suppliers by-pass existing intermediaries to final customers.	Suppliers by-pass existing intermediaries to final customers (Porter, 2008).
	PFF-6	The use of technology brings together our suppliers making them to be dominating and concentrated.	Suppliers domination and concentration (Porter, 2008)
	PFF-7	Suppliers have greater ability to charge higher prices for products in our market due to the use of technology.	The level of bargaining power that our firm has over suppliers is very high (Galbreath and Galvin, 2008).
	PFF-8	New technology in the market allows customers to connive, forming large customer groups that	Customers connive and form large customer groups that are major customers (Porter, 2008).

		purchase products in large volumes.	
Porter's Five Forces	RESEARCH CONSTRUCTS	RESEARCH MEASUREMENT ITEMS (ADAPTED)	MEASUREMENT ITEMS (ORIGINAL)
	PFF-9	Recent technologies enhance chances of our customers threatening to acquire the supplier.	Customers threaten to acquire suppliers (Porter, 2008)
	PFF-10	The use of technology provides customers with information about supplier's pricing structures and input costs.	Internet makes information about supplier's pricing structures and input costs available to customers (Porter, 2008).
	PFF-11	Customers have a very greater ability to force firms in the market to charge lower prices due to the use of technology.	The level of bargaining power that our customers have over our firm is very high (Galbreath and Galvin, 2008).
	PFF-12	The use of technology makes it difficult for customers to switch from one seller to the other in the market.	Higher switching costs to customers (Porter, 2008).
	PFF-13	The use of technology creates the need to invest large financial resources in order to compete.	Large financial investment (Porter, 2008).
	PFF-14	The use of technology makes new firms to find it very difficult to enter and compete in our market.	New firms find it very difficult to enter and compete in our industry (Galbreath and Galvin, 2008).
	PFF-15	The use of technology makes firms to be highly threatened by the existence of products that serve the same purpose as the firm's product.	The degree to which the industry is threatened by substitute products/services is very high (Galbreath and Galvin, 2008).

Firm Performance	RESEARCH CONSTRUCTS	RESEARCH MEASUREMENT ITEMS (ADAPTED)	MEASUREMENT ITEMS (ORIGINAL)
	FP-1	Use of new marketing technologies has dramatically increased the sales of this firm over the past 3 years.	New information technologies have dramatically increased our sales (Benton and Maloni, 2005).
	FP-2	Use of new marketing technologies has increased the firm's profitability over the past 3years.	New information technologies have dramatically increased our profitability (Powell and Dent-Micallef, 1997).
	FP-3	The use of new marketing technologies has improved the firm's overall performance.	New information technologies have improved our overall performance (Powell and Dent-Micallef, 1997).

Source: Adapted from Chinomona (2011)

Table 4.1, on the previous pages, shows a list of the questionnaire items adapted in comparison to the original items, as well as the authors from which they have been adapted. The fully developed and pre-tested questionnaires were then distributed to the targeted population.

4.4.4 Research Instrument Pre-testing

Certain cognitive processes operate when a respondent answers a survey question. A respondent must comprehend (i.e., encode) the question, retrieve information from memory, weigh the information and form a response. If a respondent experiences cognitive difficulties, the response to the question may contain some element of error. A pretest is a small, pilot study to determine how a questionnaire can be improved to minimize response errors (Converse & Presser 1986), such as a respondent misinterpreting a question. Questionnaire pretests can be very important because response and other non-sampling errors are the major contributors to total survey error (Assael & Keon 1982). Individual questions can be pretested for an acceptable level of response variation, meaning, task difficulty, and respondent interest/attention. The overall questionnaire can be pretested to assess the "flow" and naturalness of

the sections, the order of questions, skip patterns, timing, and respondent interest and attention. These tests enable the researcher to identify and

change questionnaire design features, such as vocabulary, response alternatives, and skip patterns, to minimize response errors and non-response errors. Conventional questionnaire pretesting methods focus on directly identifying question defects. For example, Hunt, Sparkman and Wilcox (1982) subjectively coded question defects, such as ambiguous questions.

The researcher pre-tested the questionnaire in Adelaide in the Eastern Cape Province. It was decided not to pre-test in Buffalo City Municipality to avoid sensitising the population. Five manufacturing and five retail SMEs were conveniently chosen for the pilot testing. The respondents were interviewed during their time of choice. There were no material errors or changes proposed by the respondents. The respondents were largely satisfied and understood the questions. They also confirmed that the questions were applicable to their operations and the environments they operated in.

4.5 TARGET POPULATION

SME owners/managers are the target population of this study and it was ascertained that their businesses complied with the definition of a small and medium enterprise in the National Small Business Act of 1996 (Shafeek, 2009:7). The population was obtained from the database of the Small Enterprises Development Agency (SEDA). The SEDA database obviously did not include the entirety of all the SMEs in the Buffalo City Metropolitan Municipality, but it was useful in quantifying the actual number of small and medium firms in the Metropolitan Municipality. According to SEDA, there are 578 retail and manufacturing SMEs (population) in the Buffalo City Metropolitan Municipality. Target population is closely linked with sampling.

4.5.1 Sampling Method and Technique

Determining how the sample units are to be selected is an important decision for a quantitative study and such a decision requires the selection of a sampling method. The choice between probability and non-probability sampling methods often involves both statistical and practical considerations. Statistically, probability sampling allows the researcher to demonstrate the representativeness of a sample, an explicit statement as to how much variation is introduced, and identification of possible

biases (Kumar, Aaker & Day, 2002:306). Therefore, based on the above reasoning, probability sampling is considered appropriate for this survey-based study. To be more precise, SME owners/managers in the Buffalo City Metropolitan Municipality were sampled, using simple random sampling where each population element had a known non-zero chance of being selected. This sampling technique has the following advantages: it is an easy-to-use method, and it minimises the selection bias which enhances the reliability of results.

4.5.2 Sample Size

Sample size determines the statistical precision of the findings. It provides a basis of the estimation of sampling error. Thus, sample size is a function of change in the population parameters under study and the estimation of the quality that is needed by the researcher (Wegner, 2000:23). Generally, larger samples result in more precise and robust statistical findings, while smaller samples result in less precise and unreliable findings (Terre Blanche *et al.*, 2006:236). The determination of the final sample size involves judgment especially where convenience sampling was employed, and calculation where random sampling was used by the researcher. Using a sample size similar to the previous studies' sample sizes provides the researcher with a comparison of other researchers' judgement. According to Kumar *et al.* (2002:318), four factors determine the sample size: the number of groups within the sample, the value of the information and the accuracy required of the results, the cost of the sample, and the variability of the population.

Sample size has a direct impact on the appropriateness and the statistical power of structural equation modeling to be used in the current study (Jackson, 2003). While the technique does not use individual observation, sample size plays an important role in the estimation and interpretation of SEM results (Hair *et al.*, 2006). There is universal agreement among researchers that larger samples provide more stable parameter estimates, however, there is no agreement as to what constitutes an adequately large sample size (Raykov & Marcoulides, 2000). As such, the question of sample size is a deceptively difficult one to answer (Jackson, 2003). While Darlington (1990) argues that it would be very difficult to conduct the technique with fewer than 50 cases, Kline (2005) considers sample sizes under 100 to be invalid in SEM. Similarly, Hoyle (1995) recommends a sample size of 100-200 and Kelloway (1998) recommends 200 observations. In an empirical investigation of the effect of

sample size on the stability component patterns, Guadagnoli and Velicer (1988:274) concluded that „a sample size of 150 observations should be sufficient to obtain an accurate solution“ . Hutcheson and Sofronion (1999) recommend between 150 and 300 cases, with 150 recommended when there are few highly correlated variables. The sample size of this study of 211 SMEs calculated using the Raosoft sample size calculator and selected using simple random sampling falls within these recommendations.

Hair *et al.* (2006) caution that sample size is not a clear cut rule of thumb. When considering the estimation process chosen, the most common method and the Maximum Likelihood (ML), a minimum sample size of 100-150 is required. This sample size may need to be increased in cases where the model suffers from specification errors or departures from normality. However, where the sample increases above 400-500, the method becomes too sensitive and almost any difference is detected, as a result almost all goodness of fit tests indicate poor fit (Hair *et al.*, 2006).

4.6 DATA ANALYSIS

As noted earlier, data analysis is not an end in itself, and its purpose is to produce information that will help address the problem at hand (Malhotra, 1999:434). The University of Fort Hare Statistics department was consulted for the coding of quantitative data, entering and running the data into Amos 7 and SPSS 18. Thus, the research data gathered for the purposes of this study was analysed using a two-step procedure suggested by Anderson and Gerbing (2001). Firstly, the accuracy of multi-item construct measures was assessed, followed by a test of the research model and hypotheses using Structural-Equation-Modeling (SEM). Amos 7 was employed as the computation SEM software. SEM, in this study, relates to three types of models which are the measurement model of confirmatory factor analysis, the path models and the full latent variable model. Data analysis in this study is complemented by the performance of structural equation modeling.

4.6.1 Structural Equation Modeling (SEM)

Structural Equation Modeling is a statistical methodology that takes a confirmatory approach to analyse the structural theory bearing on some phenomena (Byrne, 2001:53). SEM, thus, refers to a multivariate technique that combines aspects of

multiple regression and factor analysis to estimate a series of inter-correlated dependent relationships simultaneously (Sweeney, 2009:186). It employs different types of models to predict relationships among observed variables, with the basic goal of providing a quantitative test of a theoretical model posited by the researcher. The goal of SEM analysis is to determine the extent to which the theoretical model is supported by sample data. Thus, if the sample data supports the theoretical model, then more complex theoretical models can be hypothesised. In contrast, if the sample data does not support the theoretical model, then either the original model needs to be modified and re-tested or other theoretical models need to be developed and tested (Schumacher, 2006:3).

The SEM technique demonstrates and tests the theoretical underpinnings of proposed research and the significance of the relationships between model constructs, as postulated by Hair, Babin, Anderson and Tatham (2010:16). SEM provides an estimation technique for a series of separate multi-regression equations to be estimated simultaneously. It further contains two components, namely the structural model which is the path where independent and dependent variables are being connected and the measurement model which enables this study to use several indicators for a single independent variable (Hair *et al.*, 2010:17). In this study, several attributes were identified as having an effect on firm performance (Kaplan, 2000:5). The SEM technique initially involves performing a confirmatory factor analysis.

4.6.1.1 Confirmatory factor analysis

A measurement model of confirmatory factor analysis (CFA) is a model that focuses exclusively on the link between factors and their measurement variables. CFA seeks to statistically test the significance of a hypothesised factor model developed by the researcher. It assumes that commonalities are initially one, implying that the total variance of the variables can be accounted for by means of its components (or factors) and there is thus no error variance. CFA is appropriately used when the researcher has some knowledge of some underlying latent variable structure. Based on such knowledge of theory, empirical research, or both, the researcher postulates relationships between the observed measures and underlying factors *a priori* and this hypothesised structure, statistically (Byrne, 2001:54). Thus, in CFA, the researcher specifies a certain number of factors which are correlated, and for which observed

variables measure each factor. In this study, CFA is employed since the measures have been adopted from previous literature and have previously been widely used by several researchers.

It is recommended that data screening be performed when conducting CFA. This involves analysing the correlation matrix in order to eliminate variables that are not correlated with any other variables or that highly correlate with other variables (Field, 2005:6). Moreover, sample size must be assessed to ensure that it is sufficiently large (Tabachnick & Fidell, 2007:17). The sample size of this study of 211 is in line with most recommendations of sample size (Trainor *et al.*, 2011; Kline, 2005:93). The next section focuses on the path model. The Confirmatory factor analysis leads to the performance of a path analysis.

4.6.1.2 The path model

The Path Model or a Path Analysis involves the estimation of presumed causal relations among observed variables. According to Kline (2005:94), in path analysis, the researcher specifies a model that attempts to explain why X and Y are correlated. Part of this explanation may include presumed causal effects (e.g. X causes Y), or presumed non-causal relations, such as a spurious association between X and Y. The overall goal of the path analysis is to assess how well the model accounts for the data, that is, the observed correlations or covariance.

To better understand the model, two major types of variables were introduced. First, latent variables or factors were recognised as variables that are not directly observed or measured. They are indirectly observed and are therefore inferred from a set of variables that researchers measure using statistical techniques such as tests or surveys. In other words, the researcher must operationally define the latent variable of interest in terms of the behaviour believed to represent it (Byrne, 2001:7). Therefore, the latent (unobserved) variable is linked to one that is observed, making its measurement possible. In SEM the unobserved latent variable is represented by a circle (or an ellipse). Alternatively, observed or manifest variables are a set of variables that researchers use to define or infer the latent variables (Schumacher, 2006:5). These variables serve as indicators of the underlying construct that they are presumed to represent. In SEM the observed variable is represented by a square (or a rectangle). In addition, these two types of variables can be defined as either independent variables (exogenous) or dependent variables (endogenous). According

to Schumacher (2006:3), an independent variable is a variable that is not influenced by any other variable in the model. A dependent variable is a variable that is influenced by another variable in the model and is illustrated by Figure 4.1, below.

Figure 4.1: An Illustration of the Unobserved and Observed Variables

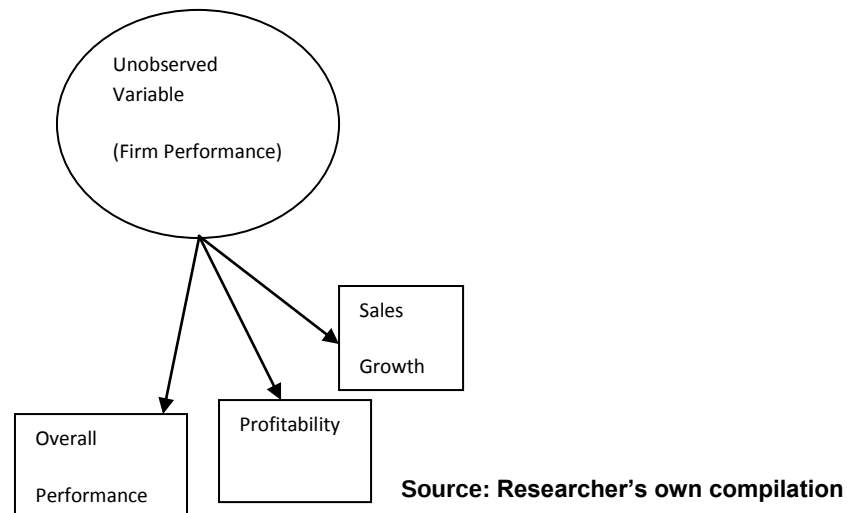


Figure 4.1, is an illustration of the unobserved variables, depicted by circles, as an example of firm performance. The other unobserved variables in this study are technological marketing and Porter's five forces model. The rectangles depict the observed variables or the questionnaire items used to measure the unobserved variable. For example, sales growth, profitability and overall performance are the questionnaire items used by the researcher to measure firm performance.

4.6.1.3 The full latent variables model

The full latent variable model allows for the specification of a regression structure amongst the latent variables. In other words, the researcher can hypothesise the impact of one latent construct on another in the modeling of causal trend. The model is termed full, because it comprises both a measurement model (CFA) and a structural model (depicting the links among the latent variables). The performance of full latent variables analysis complements the reliability and validity of results.

4.7 RELIABILITY AND VALIDITY OF RESULTS

Assorted precautions were applied during the research process to boost the validity and reliability of the data gathered. The reliability of multi-item construct measures in this study is checked by examining item-to-total correlation values, Cronbach's coefficient alpha, Composite Reliability (CR) values and Average Variance Extracted

(AVE) values. The item-total correlation values measure the correlation of each item to the sum of remaining items. Conversely, the Cronbach's coefficient alpha assists in measuring the squared correlation between observed scores and true scores. The Composite Reliability values are used to evaluate the internal reliability of each construct in this research study. Lastly, the Average Variance Extracted value indicates the total amount of variance in the indicators that are explained by the latent construct (Hair *et al.*, 2010:18).

This study measured construct validity using both convergent and discriminant validity. Convergent Validity is concerned with the degree to which the scale items show homogeneity within the same construct measured. Thus, for convergent validity to exist and be validated, an item is expected to highly correlate with other items that measure the same constructs. In this study, convergent validity is assessed by testing whether individual item loadings for each corresponding research construct are above the minimum threshold value of 0.5 (Anderson & Gerbing, 2001:55). In contrast, discriminant validity assessment tests are performed in investigating the multicollinearity of constructs. This is done by comparing the Average Variance Extracted estimates of the construct measures with the square of the parameter estimate between these measures. Where the variance-extracted estimates of the constructs are greater than the square of the correlation between two constructs, discriminant validity exists and is validated (Fornell & Larcker, 1992:45). The next section focuses on the limitations of the study.

4.8 LIMITATIONS OF THE STUDY

During the data collection process, explicit constraints and problems were encountered, amongst others. A budget constraint was the key constraint encountered in conducting this study. The researcher needed more funds than budgeted for in order to travel to East London and King Williams Town, to print questionnaires for the survey. Time constraints were the other limitation encountered. The research span of less than two years was not supportive of a longitudinal study that investigates the long-term effects of technological marketing (for example, long-term technological marketing campaigns) on industry structure and firm performance. Lastly, the researcher does not speak the same language as respondents which made it difficult for effective communication and to obtain maximum cooperation from

respondents. However, interpreters were used, in order to enhance the accuracy of results. The ensuing discussion offers a summary of this chapter.

4.9 SUMMARY

This chapter delineated the research methodology (which covered the research design, population and sampling, data collection methods, data analysis procedures and reliability as well as validity of the data gathered) that the researcher pursued in this study. The study followed a quantitative model. The population consisted of the retail and manufacturing small and medium enterprises, mainly in King Williams Town and East London, in the Buffalo City Metropolitan Municipality. The researcher used the Raosoft sample size calculator to calculate the sample size of 211. In addition, the simple random probability sampling technique was used to select 211 retail and manufacturing SME owners/managers. Self-administered questionnaires were employed for data collection. For data analysis, issues of reliability and validity concerning data collection and analysis for the study were discussed. CFA and SEM were performed using the Amos software package version 7. The next chapter covers the detailed findings and data analysis of the study.

CHAPTER 5

EMPIRICAL RESULTS OF THE STUDY

5.1 INTRODUCTION

The previous chapter presented the research methodology and design. This chapter presents the findings, analysis and interpretation of the quantitative data collected. The SPSS Version 18 was used to formulate frequency tables while Microsoft Word was used to create the descriptive analysis graphs. Amos Version 7 was used for structural equation modelling which encompasses confirmatory factor analysis, path analysis and for the full latent variable model.

5.1.1 The Main Focus and Scope of the Study

The main focus of this study was to investigate the impact of technological marketing capability on Porter's five competitive forces model and firm performance of SMEs in the Buffalo City Metropolitan Municipality. As noted in the previous chapter, quantitative research techniques were employed in gathering data in order to obtain SME owners'/managers' perceptions of how technological marketing impacts Porter's five competitive forces model with specific focus on firm performance of SMEs in the Buffalo City Metropolitan Municipality. As such, the researcher first performed a descriptive analysis which explored the SME owners'/managers' and SMEs' characteristics.

5.1.2 Statistical Procedures

The study followed two statistical procedures, the Confirmatory Factor Analysis and the Structural Equation Modelling. CFA was utilised to evaluate the measurement model's reliability and validity. The researcher performed CFA to explore the item-total correlations, the Cronbach's coefficient alpha, the Composite construct reliability as well as the Average Variance Extracted as tests for reliability. More so, the convergent validity and discriminant validity of the three research constructs: technological marketing capability, Porter's five forces and firm performance were explored using CFA (Hair, Black, Babin, Anderson & Tatham, 2006:21). To complement this, a Structural Equation Modelling (SEM) technique that employed Amos 7 software was then applied to test the conceptual model of this study. SEM

tested the fitness of the proposed conceptual model and proceeded to test the research hypothesis.

The study validated and supported three hypotheses: H₂ (Technology adoption has an impact on firm performance of SMEs in the Buffalo City Metropolitan Municipality), H₄ (SMEs adopt new and advanced technological capabilities in marketing their products/services) and H₅ (SMEs adopt new and advanced technology capabilities to enhance their performance). Lastly, the study did not support the proposed linear relationships between technological marketing capability and Porter's five forces (firm competitiveness/industry structure) as well as between Porter's five forces and firm performance. Consequently, H₁ (Technology adoption has an impact on Porter's five competitive forces model (industry structure) of SMEs in the Buffalo City Metropolitan Municipality) and H₂ (Technology adoption has an impact on firm performance of SMEs in the Buffalo City Metropolitan Municipality) were not confirmed and remain unsupported in this study. The validation or non validation of the research hypotheses is related to descriptive analysis.

5.2 DESCRIPTIVE ANALYSIS

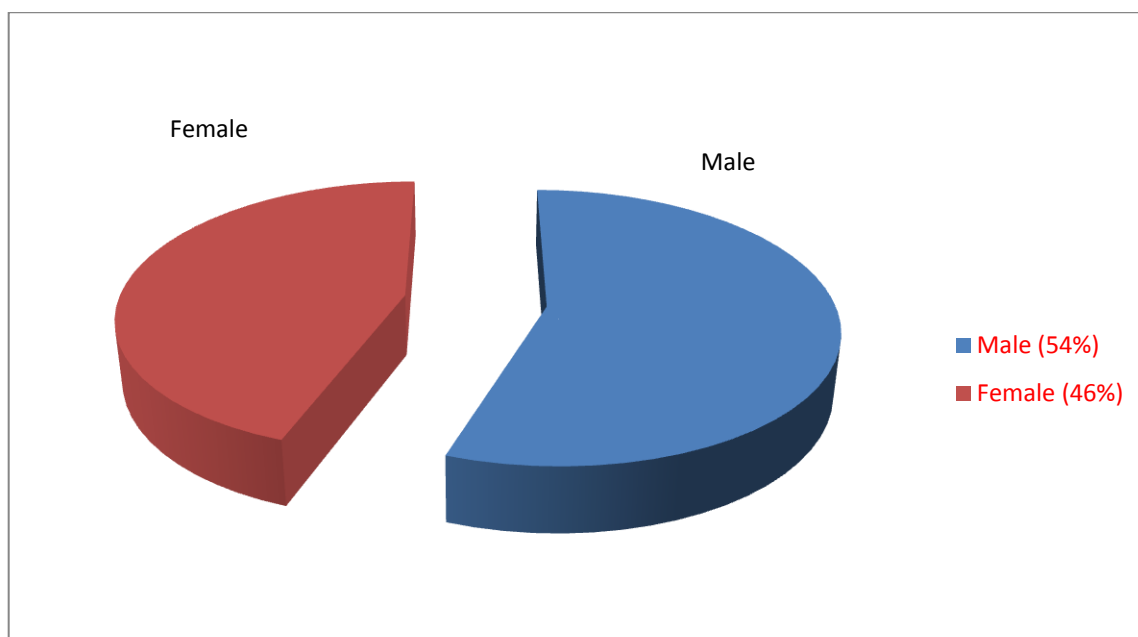
A descriptive analysis incorporating the demographic information regarding the owners/managers and the firm was conducted. This section comprised nine aspects which will be dealt with separately in the next section. The information sought from owners/managers comprised of details related to gender, education and race, while firm information comprised of details related to sales turnover, number of employees, years of operating, nature of business and technology type utilised. It was vital that the researcher first perform a descriptive demographic analysis as it enhanced the researcher's understanding of important aspects of key personnel and the firm. These key aspects have a bearing on the technological marketing capability of the business as well as the firm's performance and competitiveness. The key aspects of the owners/managers, gender, educational level and race contribute to the adoption of marketing technologies in firms.

5.2.1 Gender Representation

The gender of the firm owners/managers influences the adoption and extent of development of technological marketing capabilities in SMEs. The first question, thus,

enquired about the gender of the SME owners/managers and the outcome appears in Figure 5.1 on the next page.

Figure 5.1: Gender Representation



From Figure 5.1, above, it can be seen that in the Buffalo City Metropolitan Municipality, more males own the SMEs, constituting 54%, while females constitute 46%. This might be justified by the fact that women spend most of their time at home taking care of the domestic work. The minority of female business owners, as evident in the findings of this study, is consistent with the findings of Nieman and Nieuwenhuizen (2009), who justify that women are in a minority in business ownership, especially due to the limited access to finance (start-up capital problems) that women experience.

5.2.2 Educational Level

The research study categorised education into three levels, namely: high school, diploma and degree. It is understood that the SME owners'/managers' level of education enhances the understanding and application of marketing technologies. Thus, higher levels of education in SME owners/managers, should enhance higher levels of the adoption and development of technological marketing capabilities in firms. Alternatively, lower levels of education in SME owners/managers are strongly associated with the lower levels of adoption and development of the marketing technologies and their capabilities in firms (Louw & Venter, 2010:12). Response appears in Table 5.1, on the next page.

Table 5.1: Education Level

Education Level		Frequency	Percent
	High School	100	47
	Diploma	69	33
	Degree	42	20
	Total	211	100.0

As shown in Table 5.1, above, only 20% of owners/managers are holders of degrees while 47% only have a high school qualification. In addition, Table 5.1 shows that the majority of SME owners/managers (80%) do not further their education to degree level and this might affect their understanding, adoption and development of the technological marketing capabilities necessary for their firm competitiveness and performance. The next section discusses the distribution of the sample according to race.

5.2.3 Race Distribution

The racial distribution of the ownership/management of the SMEs is depicted in Table 5.2, below. This section inquired about the race of the SME owners/managers based on four categories, namely: black, Indian, white and coloured.

Table 5.2: Race Distribution

Race		Frequency	Percent
	Black	66	31
	Indian	29	14
	White	80	38
	Coloured	36	17
	Total	211	100.0

From Table 5.2, above, it can be seen that white people own 38%, while blacks own 31% of retail and manufacturing SMEs in the Buffalo City Metropolitan Municipality. Thus, the findings show that white people dominate the ownership/management of SMEs in these two sectors (38%), followed by the blacks (31%), then coloureds (17%) and, lastly, by Indians (14%). Such findings contradict the population statistics of South Africa which reveal that black people constitute the majority in South Africa's composite population. The main reason why blacks are not the dominating owners/managers of SMEs might be because of the challenges they face in accessing start-up capital.

5.2.4 Size of Workforce

It is understood that the size of the workforce employed by a firm is a determinant of firm size, as shown in Table 5.3, below. This question inquired about the number of employees that each SME employs. The owners/managers chose from five categories, namely: 5 or less; 6-10; 11-20; 21-50 and 51 employees and above.

Table 5.3: Size of Workforce

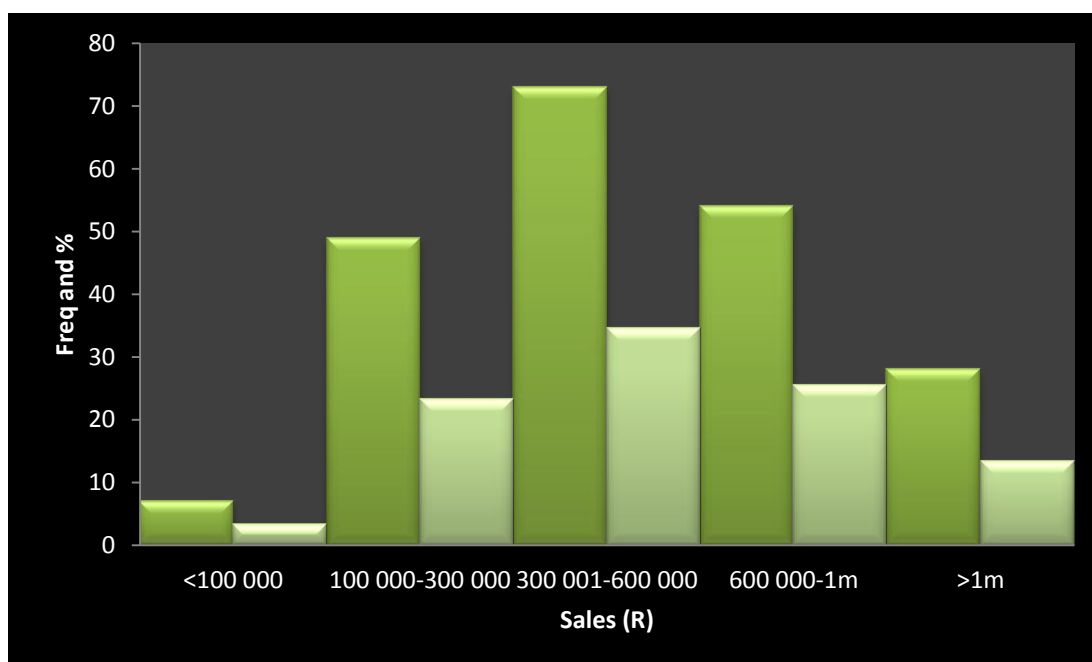
Number of employees		Frequency	Percent	Cumulative Percent
	5 or less	33	16	16
	6-10	63	30	46
	11-20	67	32	78
	21-50	38	17	95
	51 or above	10	5	100.0
	Total	211	100.0	

As indicated in Table 5.3, above, 30% of SMEs employ between 6 to 10 workers while 32% employ between 11 to 20 workers. Only 5% of the sample employ above 50 workers in their firms. Furthermore, Table 5.3 shows that 95% of the firms in the Buffalo City Metropolitan Municipality are either micro or small firms, while only 5% are medium firms based on the number of workers they employ.

5.2.5 Sales Turnover

It is understood that sales turnover can assist in measuring the impact of adopting and developing technological marketing capabilities on firm performance of SMEs (Trainor *et al.*, 2011:167). The respondents (owners/managers) were asked to choose their annual sales range from five categories, namely: less than 100 000; 100 000 to 300 000; 300 001 to 600 000; 600 001 to 1million and above 1million. The findings are shown in Figure 5.2, below.

Figure 5.2: 'Sales' Turnover



The bar graph (Figure 5.2) depicts an almost normal distribution, showing that 3% of SMEs having a sales turnover of below R100 000 and 13% managing sales of over R1 million. The majority of SMEs (35%) have sales of between R300 001 and R600 000. These findings confirm that most firms in retail and manufacturing sectors are either micro or small firms.

5.2.6 Duration in Business

Firm age can depict the learning curve of the owners/managers in using modern technologies and consequently acquiring incremental benefits. The owners/managers were asked about the age of their firms, which they chose from

five categories, as follows: 2years or less; 3-5years; 6-10years; 11-20years, 21-50years and above 50years. The findings are shown in the following table.

Table 5.4: Duration in Business

Number of years in business	Frequency	Percent	Cumulative Percent
2years or less	5	2	2
3-5years	67	32	34
6-10years	65	31	65
11-20years	61	29	94
21 years or above	13	6	100.0
Total	211	100.0	

Table 5.4, above, shows that 65% of the firms are less than 11 years old. This means that most of the firms were established in the post-apartheid era when the government introduced policy interventions to promote SMEs in order to boost the economy (Wickham, 2001:206). The 2% of firms which are less than 2 years old explains the lower rate of SME investment in recent years.

5.2.7 Type of Industry

The type of industry a firm operates in determines the need to adopt and develop technological marketing capabilities. As such, the owners/managers were asked to choose the type of industry into which their firms slot; they could choose between the retail and manufacturing industry. The responses are shown in Table 5.5, below.

Table 5.5: Type of Industry

Industry	Frequency	Percent	Cumulative Percent
Retail	162	77	77
Manufacturing	49	23	100
Total	211	100	

The findings in Table 5.5, above, indicate that 77% of the SMEs are in the retail sector while 23% are in the manufacturing sector. The findings validate the notion that the majority of SMEs in South Africa are in the retail sector (Shafeek, 2009:85).

5.2.8 Marketing Technology Devices

The type of marketing technologies that firms own indicates the extent of development and adoption of technological marketing capabilities by SMEs. The owners/managers were, therefore, asked about the marketing technologies that their businesses own. They were supposed to choose from computers, cellphones, internet, websites and satellites (as shown in Table 5.6, below).

Table 5.6: Marketing Technology Devices

Marketing Technology Devices	Frequency		Percent		
	Yes	No	Yes	No	Total
Computers	194	17	92	8	100
Cellphone	209	2	99	1	100
Internet	112	99	53	47	100
Website	59	152	28	72	100
Satellite	0	211	0	100	100

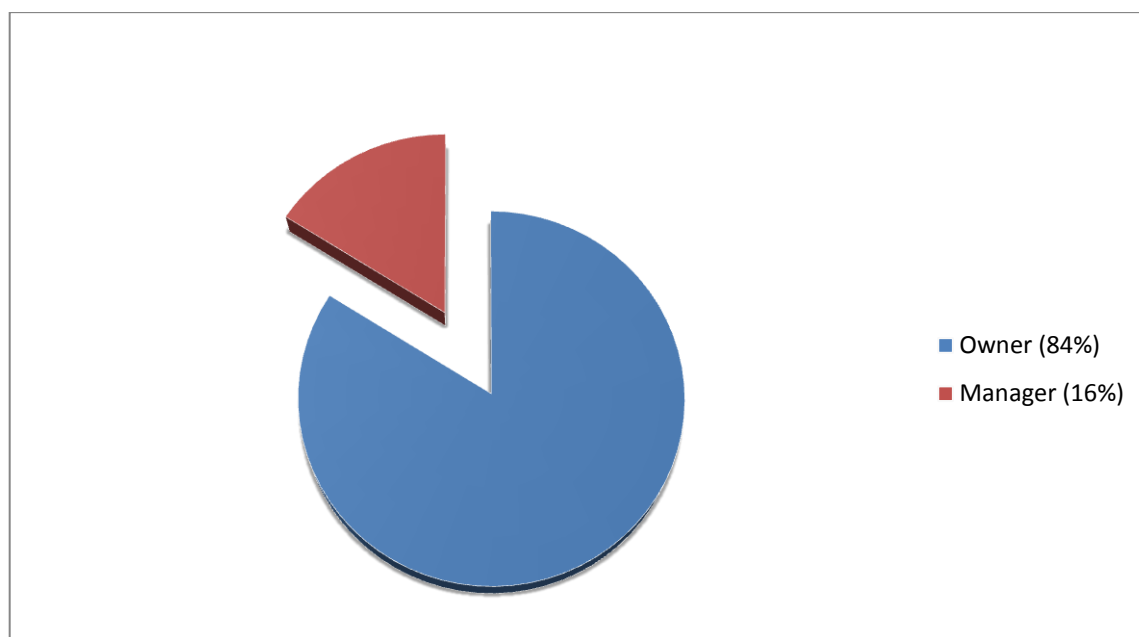
NB: Yes = owned, No = not owned

The results in Table 5.6, above, indicate that the majority of SMEs do not have a website and or a satellite, 72% and 100% respectively. This implies that these SMEs fail to capture the likely benefits posited by using website and satellite technology in marketing their products. However, most SMEs own computers (92%), cell phones (99%) and use the internet (53%). Likewise, this implies that the majority of SMEs in the Buffalo City Metropolitan Municipality are likely to benefit from the use of these technologies in marketing their products.

5.2.9 Owner/Manager Sample Representation

The capacity in which a person runs the business enhances the adoption and development of technological marketing capability of an SME as well as its performance. As such, the respondents were asked if they were running the business in the capacity of a manager or owner. The findings are shown in Figure 5.3, on the next page.

Figure 5.3: Owner/Manager Sample Representation



The pie chart (Figure 5.3) above, shows that most SMEs in the Buffalo City metropolitan municipality (84%) are run by their owners. This can constrain many business operations and the development of technological marketing capabilities of a firm, especially where owners are less educated or skilled (Weir, 2000:97).

Owner/Manager representation was the last aspect addressed under the descriptive demographic analysis section. The study proceeded to the measurement accuracy assessment section, where Sections B, C and D of the questionnaire were addressed. Unlike the descriptive analysis section where the nine questions in section (A) of the questionnaire were addressed individually, the other three sections (B, C, and D) were treated as composite constructs because of the statistical package (Amos 7) used to analyse the data. In other words, all the questions that addressed technological marketing (as shown in section B of the questionnaire) were assessed under technological marketing construct, while questions addressing competition in section C, were assessed under Porter's five forces construct and, lastly, questions measuring firm performance in section D were assessed under the firm performance construct.

5.3 NORMALITY AND LINEARITY BETWEEN VARIABLES

Normality is the most essential assumption in multivariate analysis. Most of the SEM estimation techniques used, assume that the data has been drawn from a continuous

and multivariate normal population (Ullman, 1996; Kaplan, 2000). Multivariate normality is defined as the shape of the data distribution for an individual metric variable and its correspondence to the normal distribution (Hair et al, 2006). The simplest diagnostic test for normality is a visual examination of the histogram and a scatter diagram that compares the observed data values with a distribution approximating the normal distribution (Hair et al, 2006). A histogram of standard residuals should show roughly a normal curve. However, in this study, only scatter diagrams are used to explain both multivariate normality and linearity.

Another common assumption made when using SEM methodology is that the relationships between variables are linear (Raykov & Marcoulides, 2000; Fornell, 1983). Linearity refers to the existence of a straight line relationship between variables (Raykov & Marcoulides, 2000). Subsequently, this study assumed linear relationships to exist between technological marketing and firm performance; technological marketing and Porter's five forces model; and between Porter's five forces model and firm performance. Kolmogorov–Smirnov test was used to test normality while scatter diagrams were used to test linearity between variables.

5.3.1 Kolmogorov – Smirnov Normality Test

The Kolmogorov-Smirnov test, was developed by Smirnov (1939), based upon previous work by Kolmogorov (1933). The Kolmogorov–Smirnov statistic quantifies a distance between the empirical distribution function of the sample and the cumulative distribution function of the reference distribution, or between the empirical distribution functions of two samples. The null distribution of this statistic is calculated under the null hypothesis that the samples are drawn from the same distribution (in the two-sample case) or that the sample is drawn from the reference distribution (in the one-sample case). In each case, the distributions considered under the null hypothesis are continuous distributions but are otherwise unrestricted (Sheskin, 2011). The Kolmogorov–Smirnov test can be modified to serve as a goodness of fit test (Schroer and Trenkler, 1995). In the special case of testing for normality of the distribution, samples are standardized and compared with a standard normal distribution. This is equivalent to setting the mean and variance of the reference distribution equal to the sample estimates, and it is known that using these to define the specific reference distribution changes the null distribution of the test statistic. The sample is from a normal distribution if the variables give a normal statistic value that is close to zero

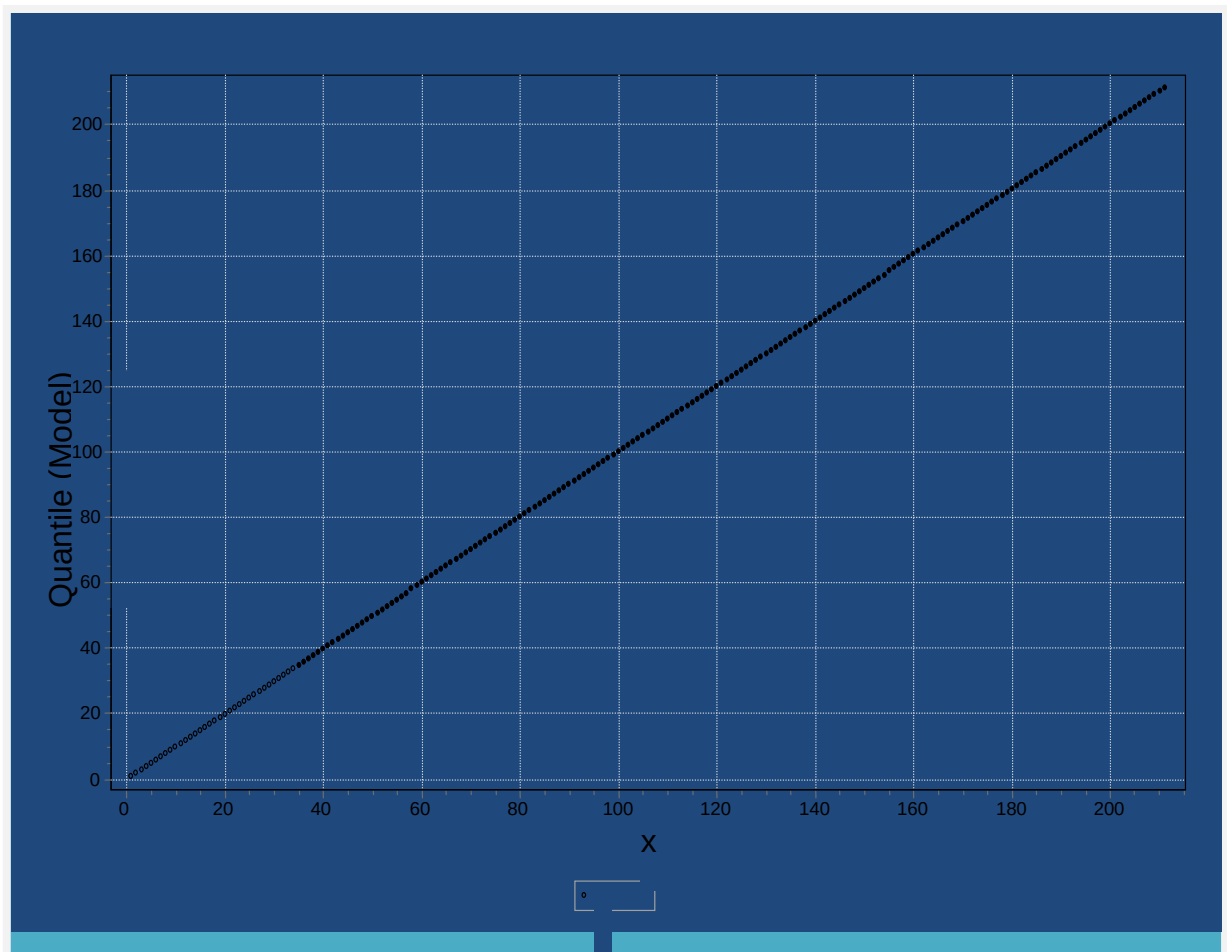
(Law and Kelton, 2000). The following table presents the descriptive statistics on normality.

Table xxxx: Normality Tests Descriptive statistics

Statistic	Value
Sample Size	211
Range	210
Mean	106
Variance	3727.7
Std. Deviation	61.055
Coef. of Variation	0.57599
Std. Error	4.2032
Skewness	0
Kurtosis	0.04
Normal	0.05903
Log normal	0.15138

The normal statistic shown in the table is 0.05903 and is very close to zero. This confirms that the data forms a normal distribution. This is also complimented by a skewness and kurtosis statistic values of 0 and 0.04 respectively. The rule of the thumb says a variable is reasonably close to normal if its skewness and kurtosis have values between -1.0 and $+1.0$ (Casella and Berger, 2001). Normality can also be depicted graphically as shown below by the Normality Q-Q plot.

Figure xxx: Normality Q-Q Plot



The plots for the Normal Q-Q plot forms a straight line which also confirms that the data forms a normal distribution (Law and Kelton, 2000). Conclusively, both statistical values and graphical depiction confirm a normal distribution for the data.

5.3.2 Scatter Plots Linearity Test

In order to proceed with further data analysis in this study, it was also necessary to validate linear relationships between variables by use of a scatter diagram. A scatter diagram is a graph that shows the relationship between two quantitative variables measured on the same individual. Each individual in the data set is represented by a point in the scatter diagram. The independent variable is plotted on the horizontal axis and the dependent variable is plotted on the vertical axis. The scatter plots were formulated in terms of the hypotheses which sort to determine the impact of marketing technology on Porter's five competitive forces and firm performance as well as the impact of Porter's competitive forces on firm performance. Figure 5.4 on the next page, is a plot of the impact of marketing technology on firm performance.

Figure 5.4: Marketing Technology and Firm Performance

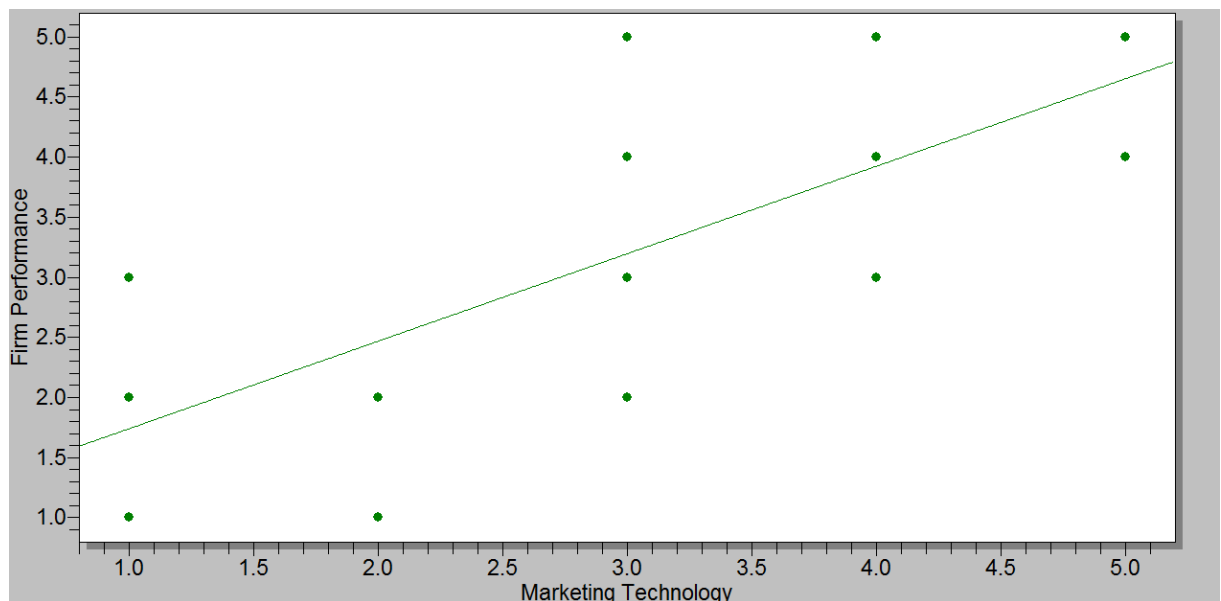
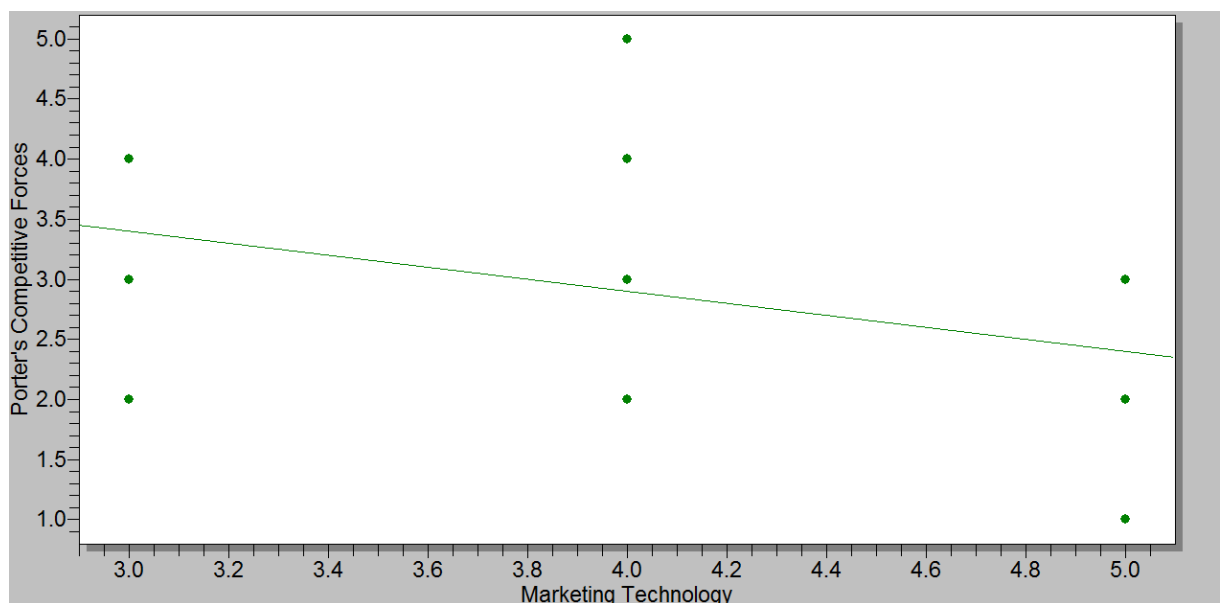


Figure 5.4 above, shows a linear relationship between technological marketing (independent variable) and firm performance (dependent variable). This confirms a positive linear relationship between the variables as shown by the line of best fit. The following Figure (Figure 5.5) is a plot of marketing technology and Porter's competitive forces.

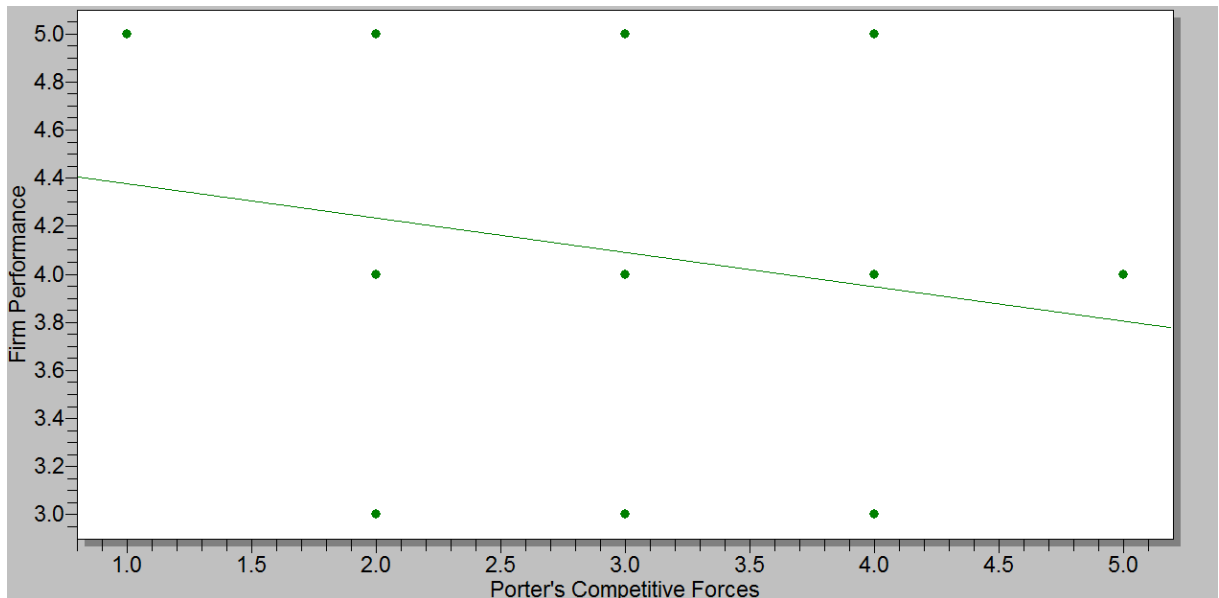
Figure 5.5: Marketing Technology and Porter's Competitive Forces



As revealed in Figure 5.5 above, the plots confirm a negative linear relationship between marketing technology (independent) and Porter's competitive forces

(dependent). This means the marketing technology can be used to negatively predict Porter's five competitive forces model. The next scatter plot in Figure 5.6 below depicts the relationship between Porter's competitive forces and firm performance.

Figure 5.6: Porter's Competitive Forces and Firm Performance



The scatter plot in Figure 5.6 reveals and confirms a negative linear relationship between Porter's competitive forces as the independent variable and firm performance as the dependent variable. All the scatter diagrams have best fit lines which supported the existence of either a negative or positive linear relationship between the independent and dependent variables. Positive linear relationship occurs when above-average values of one variable are associated with above-average values of the corresponding variable. That is, two variables are positively associated if, whenever the values of the predictor variable increase, the values of the response variable also increase. However, a negative linear relationship occurs whenever the increase in values of the predictor variables leads to a decrease in values of the response variable. The next sections on CFA and SEM were performed to further investigate the extent of the linearity between the variables.

5.4 MEASUREMENT ACCURACY ASSESSMENT

The reliability and validity of the measuring scales were assessed to ensure a valid data analysis. This is particularly vital for this study because some of the scales have been modified to adapt to the particular research context. A preliminary specification search was conducted in order to provide an acceptable fit; this resulted in the

deletion of some of the items in the constructs scale. The study employed the following overall acceptable CFA model fit indices. In the following section, attention is given to reliability and validity test measures performed in this study.

5.4.1 Reliability Tests

Reliability refers to the similarity of results provided by the independent but comparable measures of the same object or construct, or an index of consistence (Iacobucci & Churchill, 2010:258). The researcher employed Item-Total correlation values, Cronbach's coefficient alpha (α), Composite Reliability (CR) and Average Variance Extracted (AVE) to check the measurement reliability.

5.4.1.1 Cronbach's coefficient alpha

The Cronbach's coefficient alpha is an index that is used to measure the internal consistency of all the items that measure the same construct. It reflects on the method of domain sampling. Thus, the Cronbach's coefficient α is one of the most common internal consistency approaches that determine the mean reliability coefficient for all possible ways of splitting a set of items in half (Iacobucci & Churchill, 2010:259). Consequently, Cronbach α is the most universally used approach for assessing the reliability of a measurement scale with multi-point items. The value of α , which ranges from 0 to 1, signifies the level of reliability in the measurement. The closer the value of α is to 1, the higher the level of reliability. Alternatively, where the value of α is low, there may be too few items or little homogeneity among the items, although there are no fixed rules for evaluating the magnitude of reliability coefficients and, as such, depend on the purpose of the study (Iacobucci & Churchill, 2010:259). The coefficient α for the different constructs in this study is computed using the reliability procedure in the SPSS (version 18) software.

The researcher tested the internal reliability of each construct using the standardised Cronbach's coefficient alpha, where a higher level of Cronbach's coefficient alpha showed higher reliability of the measurement scale. Higher Item-Total correlations were employed in complement of the Cronbach's coefficient alpha and they revealed statistical agreement among the measured items. The results of scale reliability tests are shown in Table 5.7, on the next page.

Table 5.7: Accuracy Analysis Statistics: Cronbach's Coefficient and Item-Total Correlations

Research Construct		Cronbach's Test		Research Construct	Cronbach's Test	
		Item-total correlation	α value	Porter's Five Forces	Item-total correlation	α value
Technological Marketing (Capability) (TMC)	TMC 1	0.76	0.96	PFF4	0.88	0.97
	TMC 2	0.72		PFF5	0.85	
	TMC 5	0.78		PFF6	0.81	
	TMC 6	0.85		PFF8	0.92	
	TMC 7	0.76		PFF9	0.88	
	TMC 8	0.82		PFF10	0.90	
	TMC 9	0.75		PFF11	0.92	
	TMC10	0.69		Firm Performance		0.95
	TMC12	0.79		FP1	0.88	
	TMC13	0.87		FP2	0.91	
	TMC14	0.82		FP3	0.89	
	TMC15	0.66				
	TMC16	0.81				
	TMC17	0.75				

As can be seen in Table 5.7, above, item-to-total values ranged from 0.66 to 0.92 and, as such, were above the recommended threshold value of 0.3 (often ≤ 0.3) (Dunn, Seaker & Waller, 1994:145). Furthermore, Table 5.7, shows that the Cronbach's alpha coefficients ranged from 0.95 to 0.97. This indicates that all the Cronbach's coefficient alpha exceeded the recommended threshold of 0.7 in previous studies (Nunnally and Bernstein, 1994:24) and, thus, satisfies the reliability of the research measures. The item-total correlations and the Cronbach's coefficient alpha are complemented by the composite reliability checks.

5.4.1.2 Composite reliability

Composite reliability (CR) index is one method that is collectively used to check the internal consistency of the measurement model. It is calculated using the following formula: $CR\eta = (\sum \lambda_i)^2 / [(\sum \lambda_i)^2 + (\sum \epsilon_i)]$, where $CR\eta$ = Composite Reliability, $(\sum \lambda_i)^2$ = square of the summation of the factor loadings; $(\sum \epsilon_i)$ = summation of error variances (Hair *et al.*, 2010:22). The resultant coefficient is then compared with and must be similar to that of the Cronbach's α . Consequently, it is recommended that the threshold for the Composite reliability (CR) value be 0.7 (Hair *et al.*, 2010:22).

The researcher performed the Composite Reliability index test to evaluate the internal reliability of each construct. Previous studies by Nunnally and Bernstein (1994:23) and Hair *et al.* (2006:55), advocate that a Composite Reliability index that is greater than 0.7 depicts an adequate internal consistency of the construct. Using the formula given earlier to calculate Composite Reliability, the results were found and tabulated in Table 5.8, below.

Table 5.8: Accuracy Analysis Statistics: Composite Reliability

Research Construct	Composite Reliability
Technological Marketing (Capability) (TMC1;2;5;6;7;8;9;10;12;13;14;15;16;17)	0.96
Porter's Five Forces (PFF4;5;6;8;9;10;11)	0.95
Firm Performance (FP1;2;3)	0.95

The results in Table 5.8, above, indicate that composite reliability (C.R.) indexes were between 0.95 and 0.96. These values are greater than the estimate criteria used by prior studies, thereby confirming the reliability of the constructs of this study (Hair *et al.*, 2006:55; Kline, 2005:45). Composite reliability is also related to the Average Variance Extracted, which is discussed in the next section.

5.4.1.3 Average Variance Extracted (AVE)

The Average Variance Extracted estimate indicates the overall amount of variance in the indicators accounted for by the latent construct (Kline, 2005:47). Thus, the latent construct is well represented and revealed by higher values for the variance

extracted estimate (greater than 0.50). Average Variance Extracted (AVE) is calculated using the formula below: $V\eta = \sum \lambda_i^2 / (\sum \lambda_i^2 + \sum \epsilon_i)$; where $V\eta$ = Average Variance Extracted (AVE); $\sum \lambda_i^2$ = Summation of the squared of factor loadings; $\sum \epsilon_i$ = Summation of error variances (Hair *et al.*, 2010:17). The Average Variance Extracted (AVE) estimates in this research study are shown in Table 5.9, below.

Table 5.9: Accuracy Analysis Statistics: Average Variance Extracted

Research Construct	Average Variance Extracted
Technological Marketing Capability (TMC1;2;5;6;7;8;9;10;12;13;14;15;16;17)	0.62
Porter's Five Forces (PFF4;5;6;8;9;10;11)	0.72
Firm Performance (FP1;2;3)	0.86

Table 5.9, above, indicates that the overall value of variance (ranging from 0.62 to 0.86) in the indicators was accounted for by the latent construct. Higher values for the Variance Extracted Estimate (greater than 0.40) revealed that the indicators represent the latent construct well. Generally, all AVE values were above 0.4 with most of them being close to 0.9. Therefore, based on the recommended threshold AVE estimate value, all the AVE values in this study, as shown in Table 5.9, were marginally accepted (Fraering & Minor, 2006:285). These results provided evidence for marginal to acceptable levels of research scale reliability. In all, the construct reliabilities and the average variance extracted estimates suggest that the measurement scales were internally consistent.

5.4.2 Validity Tests

Validity is concerned with whether an instrument or test actually measures the attributes that it is supposed to measure, given the context in which it is applied. It can be defined as the extent to which differences in observed scale scores reflect true differences between objects on the characteristics being measured, rather than systematic or random errors (Cant *et al.*, 2003:235). Validity is concerned with the accuracy of a measurement. Since one never has direct evidence of the 'true' value of the concept under measurement, validity assessment is a complex issue. Hence,

there are three basic approaches employed to estimate the validity of an instrument: content validity, predictive validity, and construct validity. However, for the purposes of this study, the focus is primarily on testing construct validity.

5.4.2.1 Construct validity

Construct validity lies at the very heart of scientific and pragmatic progress (Iacobucci & Churchill, 2010:257). It is concerned with the extent to which a measure relates to other measures to which it should be related (Hair *et al.*, 2006:45). To establish this type of validity, two categories of construct validity normally need to be determined: convergent validity and discriminant validity. Factor analysis is a common evaluator of both convergent and discriminant validity. Factor analysis is an interdependence analysis tool that simplifies data analysis by taking advantage of the correlations among the p-variables, extracting the data that overlaps and reducing the problem to just a few core variables (Iacobucci & Churchill, 2010:491). Convergent validity is an element of construct validity.

a) Convergent Validity

Convergent Validity refers to the extent to which the scale items show homogeneity within the same construct being measured. Preferably, an item is expected to highly correlate with other items that measure the same constructs (convergent validity). In contrast, it is expected that these items do not correlate too highly with items which measure different constructs (discriminant validity) (Iacobucci & Churchill, 2010:258). Convergent validity was assessed by checking whether individual item loadings for each corresponding research construct were above the recommended value of 0.5 (Anderson and Gerbing, 2001). The results are shown in Table 5.10, on the next page.

Table 5.10: Accuracy Analysis Statistics: Factor Loadings

Research Construct		Factor Loading	Research Construct	Factor Loading
Technological Marketing (Capability) (TMC)	TMC 1	0.75 ^c	Porter's Five Forces (PFF)	
	TMC 2	0.72 ^c	PFF4	0.98 ^c
	TMC 5	0.80 ^c	PFF5	0.93 ^c
	TMC 6	0.82 ^c	PFF6	0.94 ^c
	TMC 7	0.74 ^c	PFF8	0.79 ^c
	TMC 8	0.81 ^c	PFF9	0.73 ^c
	TMC 9	0.77 ^c	PFF10	0.76 ^c
	TMC10	0.68 ^c	PFF11	0.77 ^c
	TMC12	0.79 ^c	Firm Performance (FP)	
	TMC13	0.90 ^c	FP1	0.91 ^c
	TMC14	0.85 ^c	FP2	0.93 ^c
	TMC15	0.73 ^c	FP3	0.94 ^c
	TMC16	0.83 ^c		
	TMC17	0.80 ^c		

Note: ^c significance level - ***p-value<0.001, ^b significance level- **p-value<0.05, ^a significance level- *p-value<0.1.

As indicated in Table 5.10, above, the factor loadings ranged from 0.68 to 0.98. Therefore, all the items finally used had a loading of more than the recommended threshold of 0.5, indicating acceptable individual item convergent validity, as more than 50 percent of each item's variance was shared with its respective construct. This evidence supported the convergent validity of all scale items. Moreover, the Composite Reliability was above the recommended threshold of 0.6 and, therefore, further validates the existence of convergent validity. Convergent validity complements discriminant validity.

b) Discriminant Validity

Discriminant validity refers to the extent to which scale items show heterogeneity between different constructs (Malhotra, 1999:397). It ensures that measures of

different constructs load on separate constructs. This study employed the correlation matrix and the Chi-square CFA Test methods to check the discriminant validity of the research constructs.

- Correlation Matrix:

Where research constructs are different their correlation (pair-wise) value should be less than one (1.0). Nevertheless, a correlation value between constructs, of less than 0.7 is advocated for in the empirical literature to confirm the existence of discriminant validity (Nunnally & Bernstein, 1994:10). Alternatively, discriminant validity related to the correlation matrix can be tested by checking whether the Average Variance Extracted (AVE) for two constructs is greater than the square of the correlation between the constructs. The discriminant validity of the research constructs in this study was checked by evaluating whether the correlations among the latent constructs were less than 1.0. Table 5.11, below, provides examples of assessing discriminant validity.

Table 5.11: Correlations between Constructs

	FP	PFF	TMC
FP	1.000		
PFF	-.162	1.000	
TMC	.749	-.089	1.000

As indicated in Table 5.11, above, the inter-correlation values for all paired latent variables are less than 1.0, thus, confirming the existence of discriminant validity. However, since the correlation value of technological marketing capability (TMC) and firm performance i.e. (0.749) was close to 1.0, it exceeded the recommended threshold value of 0.7 (Nunnally & Bernstein, 1994:12) (see Table 5.11, above). Therefore, further tests (i.e. AVE-SV test and χ^2 /CFA Test) were performed to establish discriminant validity.

Discriminant validity was also established by checking if the AVE value was greater than the highest Shared Variance (S.V.) value (Fornell & Larcker, 1992:40). Results are shown in Table 5.12, on the next page.

Table 5.12: Accuracy Analysis Statistics: Shared Variance and Average Variance Extracted Values

Research Construct			Average Variance Extracted	Shared Value
Technological Marketing Capability (TMC1;2;5;6;7;8;9;10;12;13;14;15;16;17)			0.62	0.56
Porter's Five Forces (PFF4;5;6;8;9;10;11)			0.72	0.01
Firm Performance (FP1;2;3)			0.86	0.03

As indicated in Table 5.12, above, all the AVE values range from 0.62 to 0.86 and are above the SV values with a range from 0.01 to 0.56 for all the research constructs, hence, further validating the existence of discriminant validity.

5.4.3 Confirmatory Factor Analysis Model Fit/Acceptability

Preceding the testing of the hypotheses, CFA was performed to examine scale accuracy (i.e. reliability, convergent validity, and discriminant validity) of the multiple-item construct measures using AMOS 7. In order to provide an acceptable model fit, as well as the resultant scale accuracy, some items in the construct scales were deleted because their factor loadings were below the recommended threshold value of 0.6.

As stated in Chapter 4, 17 scale items were chosen to measure technological marketing capability (TMC). Three scale items were deleted which are TMC 3 (The firm uses scanners to confirm the receipt of goods), TMC 4 (The firm uses scanners at sales points) and TMC 11 (The firm uses a computer database of customers). Of the 15 previously selected scale items used to measure Porter's five forces (PFF), 7 items were deleted. The deleted items are PFF1 (The number of firms competing for customers in our area is very high); PFF2 (Price competition is used regularly in the area to a larger extent); PFF3 (Use of new marketing technologies has improved the firm's competitive position in the market); PFF7 (Suppliers have greater ability to charge higher prices for products to firms in our market due to the use of technology); PFF12 (The use of technology makes it difficult for customers to switch from one seller to the other in our market); PFF13 (The use of technology creates the need to invest large financial resources in order to compete); PFF14 (The use of technology

makes it very difficult for new firms to enter and compete in our area) and PFF15 (The use of technology poses a threat to firms due to the existence of products which serve the same functions as another firm's product. Finally, of the 3 chosen scale items to measure firm performance (FP), none were deleted.

Various model fit criteria have been developed to help in understanding the CFA and SEM in diverse model-building assumptions. For instance, in the case of other multivariable procedural statistical approaches, such as the analysis of variance, multiple regression and discriminant analysis, the establishment of model fit in CFA and SEM is complex. CFA and SEM fit indices are believed to have no single statistical check of significance that determines a correct model for specified sample data (Schumacher, 2006:78). This is due to the fact that alternative models can exist, and they would yield the exact same data to model fit. Consequently, the researcher employed a different model fit criteria as a combination of assessing model fit (Hair *et al.*, 2006:43). This study employs eight model fit criteria to check the overall fit of the research model starting with the chi-square index and the study follows the works of Kline (2005) as well as Cheung and Rensvold (2002:233-255).

Subsequently, the CFA model fit acceptability was indicated by the following indices: chi-square value over degree of freedom (χ^2/df) of value between 1 and 3, the values of Goodness-of-Fit Index (GFI), Comparative Fit Index (CFI), Incremental Fit Index (IFI), and Tucker-Lewis Index (TLI) equal to or greater than 0.90, and the Root Mean Square Error of Approximation (RMSEA) value to be equal to or less than 0.08 (see Table 5.13, on the next page).

Table 5.13: Model of Fit Criteria and Acceptable Fit Level

Model Fit Criteria	Acceptable Level	Interpretation
Chi-square (χ^2)	Tabled Chi-square values	Compares obtained Chi-square value with tabled value for given df
Goodness-of-fit (GFI)	Value equal to or greater than 0.90	0 (no fit) to 1 (perfect fit)
Norm-fit-index (NFI)	Close to 0 is good	Researcher defines level
Comparative fit index (CFI)	Value equal to or greater than 0.90	0 (no fit) to 1 (perfect fit)
Incremental fit index (IFI)	Value equal to or greater than 0.900 (no fit) to 1 (perfect fit)	0 (no fit) to 1 (perfect fit)
Root mean square error of approximation (RMSEA)	<0.05	Values less than 0.05 indicates a good model fit

Table 5.13, above, outlines the levels of acceptance and the interpretation for six out of the eight model fit indices employed in this study.

Table 5.14: CFA Model Fit Results

FIT INDEX	Results
Chi-Square/ d. f.	2.142
GFI (Goodness of Fit Index)	0.847
RMR (Root Mean Square Residual)	0.088
CFI (Comparative Fit Index)	0.961
RMSEA (Root Mean Square Error of Approximation)	0.074
NFI (Normal Fit Index)	0.930
TLI (Tucker Lewis Index)	0.952
IFI (Incremental Fit index)	0.961

Table 5.14, above, indicates that the measurement model yielded a ratio of chi-square value to degree-of-freedom of 2.142, and GFI, NFI, RMR, IFI, TLI, CFI, and RMSEA of 0.847, 0.930, 0.088, 0.961, 0.952, 0.961, and 0.074 respectively. Based on the recommended statistics in Table 5.13, the overall-model assessment revealed an acceptable fit of the measurement model to the specified sample data, as shown in Table 5.14. The study then proceeded to the hypothesis testing stage through the SEM (using Amos 7 software, after obtaining an acceptable CFA measurement.

5.4.4 SEM Conceptual Model Fit Assessments

In the following section attention is given to Structural Equation Modelling (SEM) which commences by establishing an acceptable model fit using the same indices as in CFA. These are discussed in detail below and the results are shown in Table 5.15, later in this chapter. The Chi-square receives attention in the next section.

5.4.4.1 Chi-square (χ^2)

Chi-square is a very useful index in SEM which is used to evaluate differences between observed and estimated covariance matrices. The main aim in SEM is to achieve a non-statistical significance which reveals a small difference between the sample variance-covariance matrix and the reproduced implied covariance matrix (Schumacher, 2006:83). The difference between these two covariance matrices is enclosed in a residual matrix. A chi-square value of zero signifies a perfect fit or no difference between the values in some covariance matrix and the reproduced implied covariance matrix. Thus, when the chi-square value is close to zero or non-significant, the residual values in the residual matrix are close to zero, revealing that the theoretically specified model fits the sample data (Schumacher, 2006:83). Therefore, a smaller chi-square value (less than 3) and a larger p-value (>0.05) are preferred and recommended.

5.4.4.2 Goodness-of-fit Index (GFI)

GFI ranges between 0 and 1. Nevertheless, the index in theory can yield meaningless negative values. To a certain extent, it is the percentage of observed covariances explained by the model. GFI is similar to R square in multiple regression, except that it cannot be interpreted as the percentage of error explained by the model. In other words, while R square in multiple regression deals with error variance, GFI on the other hand, deals with error in reproducing the variance-covariance matrix. GFI value increases when the sample grows larger. In principle, an acceptable model fit is reached where the GFI value is equal to or greater than 0.90 (Bollen, 1990:446).

5.4.4.3 Root mean square residual (RMR)

RMR stands for the average residual value that results from the fitting of the variance-covariance matrix for the posited model to the variance-covariance matrix of

the sample data (). These residuals are difficult to interpret, since they are relative to the sizes of the observed variance and covariances. Consequently, these residuals are best interpreted in the metric of correlation matrix. The outcome from the matrix embodies the average value across all standardised residuals and varies from 0 to 1. Therefore, an RMR value that is closer to 0 for the tested model improves the model fit (Hu & Bentler, 1995:72).

5.4.4.4 The norm fit index (NFI)

NFI was developed unconventionally to CFI. It ranges from 0 to 1, with 1 representing a perfect fit. NFI reveals the proportion by which the researcher's model improves fit compared to the null model (random variables). In principle, NFI values below 0.90 shows a need to re-specify the model (Hu & Bentler, 1995:76).

5.4.4.5 The comparative fit index (CFI)

CFI is commonly referred to as the Bentler Comparative Fit Index. It is used to compare the existing model fit with a null model that assumes that the latent variables in the model are uncorrelated. The CFI index compares the covariance matrix posited by the model to the observed covariance matrix. In addition, it evaluates the null model with the observed covariance matrix in order to estimate the percentage of lack of fit which is accounted for by going from the null model to the researcher's SEM model. CFI varies from 0 to 1. A CFI value close to 1 indicates a very good model fit. In principle, CFI should be equal to or greater than 0.90 to accept the model, showing that 90 percent of the covariation in the data can be reproduced by the given model (Hair *et al.*, 2006:37).

5.4.4.6 The incremental fit index (IFI)

IFI is basically computed in the same way as the NFI, except that it takes into consideration the degrees of freedom. It was developed by Bollen (1990) to deal with the NFI related limitations in the issues of parsimony and sample size. The recommended value for IFI that gives an acceptable model fit should be greater or equal to 0.9. However, the IFI value can also exceed 1, under certain circumstances (Hair *et al.*, 2006:39).

5.4.4.7 Root mean square error of approximation (RMSEA)

RMSEA is an index whose value answers the question of how well the research model will fit the population covariance matrix if it were available, with unknown but optimally chosen parameter values (Browne & Cudeck, 2002:137-138). It takes into consideration the error of approximation in the population. RMSEA expresses such discrepancies per degree of freedom, hence sensitising the index to the number of estimated parameters in the model. The recommended threshold value for RMSEA that yields a good model of fit should be less than or equal to 0.05. However, a value of less than, or equal to, 0.08 for the RMSEA index gives an adequate model fit (Browne & Cudeck, 2002:138). Table 5.15, below, shows the results.

Table 5.15: SEM Model Fit Results

FIT INDEX	Results
Chi-Square/ d. f.	1.899
GFI (Goodness of Fit Index)	0.874
RMR (Root Mean Square Residual)	0.078
CFI (Comparative Fit Index)	0.972
RMSEA (Root Mean Square Error of Approximation)	0.065
NFI (Normal Fit Index)	0.944
TLI (Tucker Lewis Index)	0.962
IFI (Incremental Fit index)	0.973

From Table 5.15, above, the ratio of chi-square over degree-of-freedom was 1.899. This value is less than the recommended threshold of less than 3.0 and, therefore, confirms the model fit. Additionally GFI, NFI, RMR, IFI, CFI, TLI, and RMSEA values were 0.874, 0.944, 0.078, 0.973, 0.972, 0.962 and 0.065. All these model fit measures were above the recommended marginally accepted threshold of greater than 0.8 for GFI, NFI, RFI, IFI, CFI, TLI and less than 0.08 for RMSEA, which suggested that the proposed conceptual model converged well and could be a plausible representation of the underlying empirical data structure collected in the Buffalo City Metropolitan Municipality. Since the model fit was acceptable, the study proceeded to test the research hypotheses which are both linear and non linear as shown in the conceptual model in the next section.

5.5 SEM RESULTS AND THE CONCEPTUAL MODEL

This section focuses on the linear relationships hypothesised between technological marketing and Porter's five forces, technological marketing capability and firm performance as well as between Porter's five forces and firm performance; as shown in Figure 5.7, below. Also, the hypotheses testing and results are discussed.

Figure 5.7: 'The' Research Conceptual Model

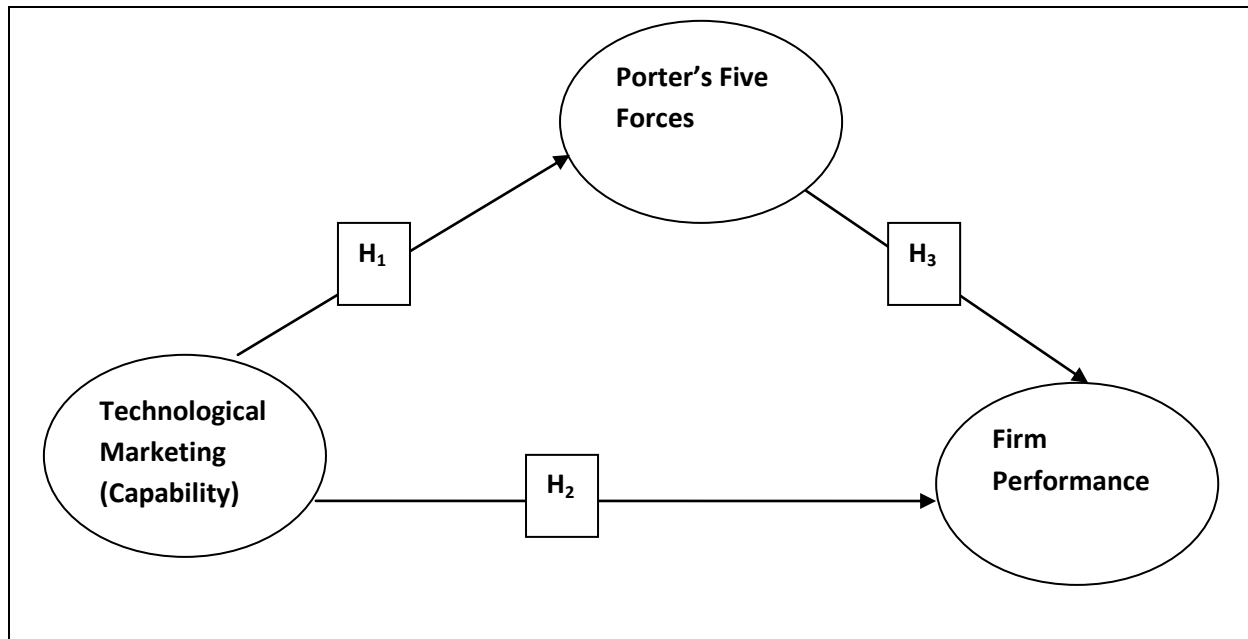


Figure 5.7, above, shows the three hypothesised linear relationships between the three research constructs, namely: technological marketing, Porter's five forces and firm performance. As can be seen from Figure 5.7, above, the first linear relationship posited is between technological marketing and Porter's five forces (H_1). The second linear relationship is between technological marketing capability and firm performance (H_2). The third linear relationship is between Porter's five forces and firm performance. The testing and results of these linear relationships are discussed in the next section.

5.5.1 The Hypotheses Testing Stage and Results

This section states the five tested hypotheses, and addresses their validation or non validation based on the SEM results tabulated in Table 5.15. After the modification of the full conceptual model, and results were obtained from it, the rest of the hypotheses were proved. The following are the results of the hypotheses.

- H_1 : *Technology adoption has an impact on Porter's five competitive forces model (industry structure) of SMEs in the Buffalo City Metropolitan Municipality.*

A linear relationship (negative and significant) was hypothesised between technological marketing and Porter's five forces (industry structure/firm competitiveness). This hypothesis was formulated from the objective that aimed to investigate the impact of technological marketing on Porter's five competitive forces. Results are shown in Table 5.16, below.

Table 5.16: Hypothesis One SEM Results

Path Coefficients	Hypothesis	Factor Loading	Significance
Technological Marketing →Porter's Five Forces	H_1	-0.89 Not supported	ns

Structural model fits: $\chi^2/df=1.899$; GFI=0.874; NFI=0.944; RFI=0.923; IFI=0.973; TLI=0.962; CFI= 0.972; RMSEA=0.065. Note: ^c significance level - ***p-value<0.001, ^b significance level- **p-value<0.05, ^a significance level- *p-value<0.1, ^{ns} significant level- insignificant (p-value>0.1).

As can be seen from Table 5.16, above, technological marketing has no significant impact on Porter's five competitive forces (firm competitiveness). The researcher had hypothesised a negative relationship between technological marketing and Porter's five competitive forces and finally got a negative factor loading (-0.89) (see, Table 5.16, above), confirming a negative relationship. This result is consistent with the theoretical reasoning of Porter (2001:66) who advocates that the use of the internet and other technological marketing tools have negative trends on Porter's five competitive forces.

However, the validation of each hypothesis under SEM depends on two main criteria. The first is concerned with factor loadings, thus, for a posited positive relationship, the factor loading must be positive and above 0.5; while a negative relationship is confirmed by a negative factor loading (Hair *et al.*, 2006:79). The second criteria requires that the relationship tested has at least one star (*), two stars (**) or three stars (***). The stars indicate significance at three levels, which are: (***) - p-value less than 0.001, (**) - p-value less than 0.05 (*) - p-value less than 0.1. Thus, despite the result of -0.89 meeting the first criteria that validates the hypothesised negative relationship between technological marketing and Porter's five competitive forces, the second criteria is not met. The linear relationship between technological marketing

and Porter's five competitive forces has a p-value greater than 0.1, and is insignificant. As such, the insignificance level renders the hypothesised relationship (H_1) no support and invalid. **Therefore, H_1 is invalid and not supported.**

- H_2 : *Technology adoption has an impact on firm performance of SMEs in the Buffalo City Metropolitan Municipality.*

A positive and significant linear relationship was posited between the adoption of technological marketing capability and firm performance of SMEs. SEM results that validate or invalidate this relationship are shown in Table 5.17, below.

Table 5.17: Hypothesis Two SEM Results

Path Coefficients	Hypothesis	Factor Loading	Significance
Technological Marketing Capability→Firm Performance	H_2	0.775 ^c Supported	^c ***

Structural model fits: $\chi^2/df=1.899$; GFI=0.874; NFI=0.944; RFI=0.923; IFI=0.973; TLI=0.962; CFI= 0.972; RMSEA=0.065. Note: ^c significance level - ***p-value<0.001, ^b significance level- **p-value<0.05, ^a significance level- *p-value<0.1, ^{ns} significant level- insignificant (p-value>0.1).

Table 5.17, above, indicates that there is a significant (^c or *** - p-value less than 0.001) and positive (factor loading of 0.775) linear relationship between technological marketing capability and firm performance. The results in Table 5.17, validate H_2 since the two criteria of significance and positive factor loading are met. As hypothesised, the findings of this study suggest that the successful development of technological marketing capabilities influence the firm performance of SMEs. These findings are consistent with previous research that suggests that technological marketing capability adoption and development can benefit firms by enhancing their performance (i.e. by expanding revenue and reducing costs) (Trainor *et al.*, 2011:171; Powell & Dent-Micallef, 1997:391). Therefore, this study **strongly validates and supports that the adoption of technological marketing capability has a positive and significant impact on the firm performance of SMEs (H_2).**

- H_3 : *SMEs' competitiveness has an impact on their firm performance*

The researcher posited a significant and negative linear relationship between SMEs competitiveness (Porter's five forces) and firm performance. This hypothesis was formulated in an attempt to ascertain whether or not the competitiveness of SMEs

impact on their firm performance. The SEM results that validate or invalidate this hypothesis are shown in Table 5.18, below.

Table 5.18: Hypothesis Three SEM Results

Path Coefficients	Hypothesis	Factor Loading	Significance
Porter's Five Forces→Firm Performance	H ₃	-0.135 Not supported	ns

Structural model fits: $\chi^2/df=1.899$; GFI=0.874; NFI=0.944; RFI=0.923; IFI=0.973; TLI=0.962; CFI= 0.972; RMSEA=0.065. Note: ^c significance level - ***p-value<0.001, ^b significance level-**p-value<0.05, ^a significance level- *p-value<0.1, ^{ns} significant level- insignificant (p-value>0.1).

As shown in Table 5.18, above, there is a negative (factor loading of -0.135) but insignificant (^{ns} – p-value greater than 0.1) linear relationship between Porter's five forces (firm competitive) and firm performance of SMEs. The negative factor loading (-0.135) confirms the existence of a negative linear relationship between Porter's five forces (SME competitiveness) and firm performance. Such results are consistent with the findings of Rivard *et al.* (2006:43), that established a negative relationship between a threatening competitive environment (Porter's five forces/industry structure) and the external dimensions of firm performance on which firms have less control. However, the existence of a negative factor loading accompanied by a p-value greater than 0.1 resulted in the invalidation of H₃. Therefore, **H₃ was not supported and not valid.**

- H₄: *SMEs adopt new and advanced technological capabilities in marketing their products/services.*

The researcher hypothesised a non-linear relationship between the SMEs' adoption of new and advanced technologies and SMEs' marketing of products/services as stated in H₄ above. This hypothesis was formulated in an attempt to determine whether or not SMEs adopt new and advanced technological capabilities when marketing their products/services. This relationship (H₄) was entirely validated based on the positive factor loadings (all above 0.5) for the fourteen tested items of technological marketing capability and their significance level of p-values less than 0.001 (see Table 5.10, on the previous pages). The results on the support of H₄ are shown in Table 5.19, on the next page.

Table 5.19: Hypothesis Four SEM Results

Path Coefficients	Hypothesis	Factor Loading	Significance
Technological marketing capability	H ₄	Supported	C ***

Structural model fits: $\chi^2/df=1.899$; GFI=0.874; NFI=0.944; RFI=0.923; IFI=0.973; TLI=0.962; CFI= 0.972; RMSEA=0.065. Note: ^c significance level - ***p-value<0.001, ^b significance level- **p-value<0.05, ^a significance level- *p-value<0.1, ^{ns} significant level- insignificant (p-value>0.1).

Table 5.19, above, indicates that H₄ is supported. The validation of H₄ is consistent with the findings of previous studies (Trainor *et al.*, 2011:171; Powell & Dent-Micallef, 1997:391) which suggest that firms adopt advanced technologies when marketing their products. Therefore, this study **validates and supports that SMEs adopt new and advanced technological capabilities when marketing their products/services.**

- H₅: *SMEs adopt new and advanced technology capabilities to enhance their performance.*

Finally, the researcher posited a non linear relationship between SMEs' adoption of new and advanced capabilities and their firm performance. This hypothesis was formulated to examine whether or not SMEs adopt new and advanced technology capabilities in order to enhance their performance. H₅ was validated and supported by virtue of the support and validation of the linear relationship between technological marketing capability and firm performance, as shown in Table 5.17, earlier. As noted from Table 5.17, the result of the second path (H₂), there is a strong relationship between technological marketing capability and firm performance because the p-value is less than 0.001 and a positive factor loading of 0.775. Accordingly, for technological marketing capability to positively and significantly impact on SMEs' firm performance, the SMEs first need to adopt and develop the technological marketing capabilities of their firms. Hence, this study **validates the hypothesis that states that SMEs adopt new and advanced technology capabilities to enhance their performance.** Table 5.20, on the next page, provides a summary of the SEM results.

Table 5.20: 'A' Summary of the SEM 'Analysis' Results

Path Coefficients	Hypothesis	Factor Loading	Significance
Technological Marketing →Porter's Five Forces	H ₁	-0.89 Not supported	ns
Technological Marketing Capability→Firm Performance	H ₂	0.775 Supported	c ***
Porter's Five Forces→Firm Performance	H ₃	-0.135 Not supported	ns
Technological marketing capability	H ₄	Supported	C ***
Firm performance enhanced by technology	H ₅	Supported	C ***

Structural model fits: $\chi^2/df=1.899$; GFI=0.874; NFI=0.944; RFI=0.923; IFI=0.973; TLI=0.962; CFI= 0.972; RMSEA=0.065. Note: ^c significance level - ***p-value<0.001, ^b significance level- **p-value<0.05, ^a significance level- *p-value<0.1, ^{ns} significant level- insignificant (p-value>0.1).

Table 5.20, above, shows the 3 hypothesised linear relationships between technological marketing and Porter's five forces: (H₁) technological marketing capability and firm performance (H₂) and between Porter's five forces and firm performance (H₃). Of these 3 posited linear relationships, only one (H₂) was validated because it had a positive factor loading of 0.775 which is greater than the recommended value of 0.5. H₂ was also supported because it was significant, with a significance level of less than 0.001 (^c significance level with 3 stars ***). In Table 5.16, there are two non linear relationships hypothesised: H₄ and H₅. H₄ posited that SMEs adopt new and advanced technological capabilities in marketing their products/services, while H₅ posited that SMEs adopt new and advanced technology capabilities to enhance their performance. H₄ was validated by the positive factor loadings of technological marketing capability items (TMC1, 2, 5, 6, 7, 8, 9,10, 12, 13, 14, 15, 16, 17), which were all above the recommended value of 0.5 (as shown in Table 5.10 on the previous pages (see convergent validity). It was also supported and significant because all the technological marketing capability items tested had a significance level of less than 0.001 (^c significance level with 3 stars ***) (see Table

5.10). Lastly, Table 5.10, shows that H_5 is supported. This is derived from the linear relationship hypothesised between technological marketing capability and firm performance (H_2) which had a positive factor loading and a significant level of less than 0.001 as shown in Table 5.20.

5.6 SUMMARY

Chapter Five attended to six main issues, that is, normality and linearity, descriptive analysis, testing for measurement accuracy and checking that the models fit to the specified sample data. It also addressed the testing of the proposed hypotheses made using Structural Equation Modelling (SEM). Eventually, the SEM results were evaluated. Generally, the measures were found to be adequately acceptable and, therefore, reliable and valid. In addition to this, the findings of the research model constituting this study indicate that the specified sample data fit the conceptualised model well. The study investigated the impact of technological marketing on Porter's five forces and firm performance of SMEs in the Buffalo City Metropolitan Municipality. Of the posited three linear hypotheses (H_1 , H_2 and H_3), only one was supported (H_2), and the other two were not supported. The study also validated the two hypothesised non linear relationships (H_4 and H_5). The implications of these research findings and an overall conclusion are provided in Chapter Six.

CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

6.1 INTRODUCTION

The preceding chapter presented the empirical findings of the study. This chapter presents the ultimate goal of every research study, which is, the theoretical and practical implications of the findings. The chapter starts by giving a summary of all the preceding chapters and subsequently provides the researcher's assessment of the implications of the findings in relation to the body of theory, for future studies. This is followed by policy implications and recommendations to SME owners/managers and policy makers. The chapter concludes by highlighting areas in which no general consensus is reached and which needs further future research.

6.2 SUMMARY AND CONCLUSION TO THE STUDY

The research study targeted retail and manufacturing SMEs in the Buffalo City Metropolitan Municipality. Its main purpose was to determine the impact of the use of information and communication marketing technologies (technological marketing capabilities) on the competitiveness and firm performance of SMEs. The Buffalo City Metropolitan Municipality was targeted mainly because the sole telephone provider in South Africa, Telkom, has installed information and communication technology infrastructures which are necessary for the firms' adoption of marketing technologies in this metropolitan municipality. It is anticipated that the study will contribute towards the body of theoretical work available on the topic for future studies; it is also anticipated that it will assist SME owners/managers and policy makers in understanding the benefits of adopting advanced technologies in marketing. Ultimately, SME owners/managers will also benefit from the practical recommendations of the study.

The research was undertaken using a framework adapted from the models of Powell and Dent-Micallef (1997), Trainor *et al.* (2011) and Galbreath and Galvin (2008). The adapted framework constitutes three main constructs, namely; technological marketing (capability) (TMC), Porter's five competitive forces (PFF) and firm performance (FP). On one hand, the Market-Based View was used to explain the relationship between Porter's five competitive forces and firm performance. On the

other hand, the Resource-Based View was used to explain the linear relationship between technological marketing as a capability and firm performance. The study used a questionnaire to collect the quantitative data measuring these constructs from 211 SME owner/managers in King Williams town and East London's retail and manufacturing industries.

Primarily, the study sought to determine where the linear relationship between the adoption of technological marketing (capability) and firm competitiveness and performance can be found. In addition, the study aimed to ascertain whether SME competitiveness (PFF) has a linear relationship with firm performance. The research was also interested in investigating whether SMEs were using new and advanced technologies to market their products and to enhance their firm performance.

Reliability was measured using the following four reliability tests: standardised cronbach's coefficient alpha which measured the internal consistency of each research construct; higher Item-Total correlations which revealed the statistical agreement among the measured items; composite reliability which was used to check internal consistency of the measurement model used in this study; and higher Average variance Extracted estimates which were used to check how well each construct was represented in the model.

Convergence validity was measured using positive factor loadings above the recommended threshold of 0.5. This was complemented by the higher composite reliability values. In addition, discriminant validity was measured using the correlation matrix which checked whether the correlations among latent constructs were less than 1. This was complemented by the CFA chi-square values.

Normality and linearity among the research variables was measured using the line of best fit in three scatter diagrams. The extent of these linearity relationships among the three research variables were further measured by conducting the CFA and SEM tests using Amos 7. Both CFA and SEM employed the following seven measurement indices: the chi-square which measured how well the theoretically specified research model fits the sample data in this study. Goodness Fit Index dealt with the errors in reproducing the variance-covariance matrix. Root Mean Square Residual revealed the average residual value that resulted from fitting the hypothesised model to the variance-covariance matrix of the sample data. Norm Fit Index showed the proportion by which the researcher's hypothesised model improves fit compared to the null

model. Incremental Fit Index was used to deal with the NFI related limitations in issues of sample size and parsimony. Comparative Fit Index evaluated and compared the null model with the observed covariance matrix in order to estimate the percentage of lack of fit accounted for by going from the null model to the researcher's hypothesised structural equation model. The Root Mean Square Error of Approximation answered the question of how well the research model fitted the population covariance matrix if it were available with unknown but optionally chosen values. In addition to these indices, SEM employed p-values and factor loadings to validate or invalidate the research hypothesis. The validation of each hypothesis under SEM depended on two main criteria. The first was concerned with factor loadings, therefore the hypothesised positive linear relationships were validated by positive factor loadings above 0.5, while posited negative relationships were confirmed by negative factor loadings. The second criteria required that the relationships tested have at least one star (*), two stars (**) or three stars (***). The stars indicated significance at three levels, which are: (***) for p-value less than 0.001, (**) for p-value less than 0.05 (*) for p-value less than 0.1. The next sections focus on the hypotheses individually.

6.2.1 Impact of Technological Marketing on Porter's Five Forces

This conclusion concerns to the primary hypothesis (H_1) which stated that *“technology adoption has an (a negative) impact on Porter's five competitive forces model (industry structure) of SMEs in the Buffalo City Metropolitan Municipality”*. This hypothesis investigated the impact of technology adoption and deployment by SMEs on their firm competitiveness. Porter's five competitive forces are important in analysing the industry in which SMEs operate. Thus, since the SME and its competitors are both in the same industry, the key is in finding the incompatible abilities between the firm and the competition in dealing with these industry forces that impact on it. If the SME can identify the abilities that it owns, which are superior to its competitors, it can use those abilities to establish a competitive advantage. Duly, this section sought to answer the question of whether technology adoption in SMEs increases or reduces an SME's competitiveness in the market. From the beginning, it was presumed that technology adoption primarily results in the reduced SME competitiveness in the market.

The empirical findings produced a p-value greater than 0.1 with a negative factor loading of -0.89. Although a negative linear relationship was confirmed, the p-value greater than 0.1 rendered H_1 , insignificant and invalid. As such the null hypothesis (H_{10}) was not rejected which claimed that technology adoption and development has no impact on Porter's five competitive forces. The invalidation and non-support of H_1 suggests that there is no significant linear relationship between the adoption and development of new and advanced technological marketing and the competitiveness of SMEs (Porter's five forces). This may be due to the fact that although the SMEs adopt, they adopt for the sake of owning a technological device, yet without an aim of improving their competitiveness in the market. More so, adoption of technology without understanding of how to develop the adopted technologies into competitive capabilities explains the existence of a negative but insignificant impact of technological marketing on SME competitiveness. In other words, the SME owners/managers' lack of technological acumen on how to develop the adopted marketing technologies into a competitive capability that provides a competitive edge, results in reduced competitiveness in the market. Above all, the use of advanced technological marketing tools without other supporting non-technological strategies does not give a competitive edge to firms especially SMEs. For instance, the adoption and development of online advertising and other marketing campaigns in SMEs need to be complemented by the presence of a sales force with high technological marketing expertise, in order to create sustainable and competitive brand names that lead to enhanced SMEs performance.

6.2.2 Impact of Technological Marketing Capability on Firm Performance of SMEs

The second hypothesis (H_2) states that *"technology adoption has an impact on firm performance of SMEs in the Buffalo City Metropolitan Municipality."* This hypothesis investigated the existence of a positive linear relationship between technological marketing capability adoption and firm performance of SMEs. The empirical findings confirmed the existence of a significant (c or *** - p-value less than 0.001) and positive (factor loading of 0.775) linear relationship between technological marketing capability adoption and firm performance. The findings are consistent with the previous empirical evidence which suggests that technological marketing capability adoption and development can benefit firms by enhancing their performance (i.e. by expanding revenue and reducing costs). The results validated and supported H_2

since the two criteria of significance level and positive factor loading were met, thereby rejecting the null hypothesis (H_{20}). This means SMEs that adopt and develop their marketing technologies into unique firm capabilities enhances the sales growth, profitability, their general performance and reduce their average costs. For example, SMEs that adopt smart phones, use social networks such as facebook, whatsapp, and twitter and develop their websites and use them for alerting their customers on sales promotions, weekend specials and latest arrivals, can significantly increase their sales growth and profitability while reducing their costs significantly. Therefore, as hypothesised, and suggested by other previous studies, this study concludes that the successful adoption and development of technological marketing capabilities significantly and positively influences the firm performance of SMEs.

6.2.3 Impact of Porter's Five Forces on Firm Performance of SMEs

The third hypothesis (H_3) claims that "*SMEs' competitiveness has an impact on their firm performance*". This hypothesis was derived from an objective that seeks to ascertain whether Porter's five competitive forces have an (a significant and negative) impact on firm performance of SMEs. As such a negative linear relationship was posited between Porter's five forces and firm performance. Although a negative linear relationship between Porter's five forces and firm performance was established from a negative factor loading of -0.135, the p-value of greater than 0.1 rendered the negative relationship insignificant. The confirmed negative linear relationship is consistent with previous empirical findings from Rivard *et al.* (2006:43), that established a negative relationship between a threatening competitive environment and the external dimensions of firm performance on which firms have less control. However, a p-value of greater than 0.1 resulted in the invalidation of H_3 and non rejection of the null hypothesis (H_{30}). This means that the absence of competitiveness in SMEs' objectives when they adopt technology and develop it, makes their competitive position in the market to reduce their sales growth, profitability and general performance. Thus, a better competitive position in the market, mostly influenced by the SME's successful adoption and development of marketing technologies can improve firm performance. In other words, the SMEs' failure to develop their adopted marketing technologies into competitive tools, makes SMEs to experience reduced sales growth and profitability.

6.2.4 Advanced Technology Adoption in SME Marketing

Constant innovation enables firms to efficiently maximise the delivery of customer benefits and satisfaction, which is at the heart of marketing today, and consequently improves marketing strategies and processes. Thus, marketing technology adoption enhances flexibility in firms and enables SMEs to attract customers and efficiently respond to their demands (Lamb, Hair & McDaniel, 2002:637). However, if incorrectly applied, marketing technologies could present significant threats to firms (Walker, Mullins, Boyd, & Larrèchè, 2006:264).

The fourth hypothesis (H_4) posits that *“SMEs adopt new and advanced technological capabilities in marketing their products/services”*. Its related objective seeks to determine whether SMEs adopt new and advanced technological capabilities when marketing their products/services. The empirical findings of the positive factor loadings of above 0.5 for all the fourteen tested items of technological marketing capability and their significance level of p-values less than 0.001, rendered support and validated the posited non linear relationship (H_4). Thus, the null hypothesis (H_{40}) was rejected.

The assumption commonly made is that SMEs do not adopt new and advanced technologies when marketing their products/services. While this is true for some SMEs, a majority of them own basic marketing technologies that are friendly and known to them and these include cellphones (99%), computers (92%) and internet (53%). These SMEs however still lag behind in the adoption of websites and satellites when marketing their products/services. These findings entail that the all-encompassing role of the internet, websites and satellites in the contemporary commercial world is not fully evident in SMEs. In addition, these SMEs still do not understand what marketing technologies such as Internet, a website and satellite are and the benefits that comes with their adoption and implementation. As such SMEs choose to invest their money mostly in mobile marketing technologies such as cellphones for the basic marketing such as using text messages to alert customers on promotions and the latest arrival products in stock. This means that these SMEs fail to capture the likely benefits posited by using Internet, website and satellite technology in marketing their products. Conclusively, SMEs adopt the basic technologies in their marketing activities

6.2.5 Advanced Technology Adoption to enhance Firm Performance of SMEs

The ability of firms to successfully adopt and deploy new marketing technologies such that it yields positive firm performance, creates a unique firm capability known as technological marketing capability. Thus, the availability of a sound technology infrastructure appropriately aligned with good human embedded information technology skills in a firm form a distinct firm resource which leads to a competitive edge and ultimately enhanced firm performance.

The fifth hypothesis (H_5) of this study postulates that “*SMEs adopt new and advanced technology capabilities to enhance their performance*”. Thus, this hypothesis seeks to answer the question on whether SMEs adopt new marketing innovations with the view of improving their firm performance. The empirical findings that validated the linear relationship between technological marketing capability and firm performance accordingly validated and supported H_5 . The validation of H_5 implies that most SMEs adopt new marketing innovations with the view to develop them into firm capabilities that improve their firm performance.

However, as earlier noted, the types of marketing innovations that these SMEs adopt tend to be too basic (cellphones and computers) such that owning such innovation brings no competitive edge to these SMEs. These owners/managers thus, need to weigh and consider the value of adopting, deploying and implementing advanced marketing technologies such as Internet, owning a website, a social network account and a satellite. This will enable SMEs to gain return on their investment and generate sales through e-marketing rather than merely having a social network account (e.g. facebook or twitter) and mere websites for the minority that has it, and never get to win customers and business to their firms. For these SME firms to materialise the return on investment, there is need to employ more time and resources which need to be integrated well with the unique electronic technology implementation skills. Consequently, these SMEs will own professional, well designed and regularly updated marketing technologies such as the websites, internet and even extranets, essential for creating a sustainable competitive edge and ultimately enhancing SME performance.

Conclusively, SMEs in the Buffalo City Metropolitan Municipality are adopting advanced technologies in marketing their products so as to improve performance in terms of sales growth, profitability and general performance. However, SME

owners/managers are not adopting the technologies with a view to improve firm competitiveness as there is no linear relationship between the two. This therefore, implies that firms are using non-technological strategies to compete with each other. Consequently, the adoption and development of various marketing technologies by SMEs only improves their performance, without any increase on their competitive edge against other firms in the market.

6.3 THEORETICAL IMPLICATIONS

As alluded to before, there is limited theory on the impact of marketing technologies on firm competitiveness and performance. Undoubtedly, the study contributes to theory development for future studies. It created the theoretical groundwork for future empirical studies in the country. The main contribution to theories is the confirmation of hypotheses H₂, H₄ and H₅. The research established that SMEs in BCMM adopt advanced technologies in marketing their products so as to enhance their performance. Most importantly, the study confirmed that there is a linear relationship between the adoption of advanced technological marketing capabilities and firm performance. The invalidation of H₁ and H₃ can also assist scholars in formulating more research questions in trying to understand the nature and factors that must be adopted by SMEs to improve their competitiveness. In other words, scholars can now try to investigate possible factors with linear relationships together with firm competitiveness.

6.4 POLICY IMPLICATIONS AND RECOMMENDATIONS

One of the goals of any business-related theoretical research is to find and highlight practical implications to firm owners/managers and policy makers. Being business research on the impact of adopting advanced marketing technologies on firm competitiveness (Porter's five forces) and performance, the study has a number of practical implications.

The findings of the study are particularly important to SME owners/managers. Most importantly, the study provides a better understanding to firm owners/managers on the impact of marketing technologies on firm competitiveness and performance. The study highlights the relationships between marketing technologies and firm competitiveness, marketing technologies and firm performance as well as firm competitiveness and firm performance. Hence, the research helps SME

owners/managers gain a better understanding of the benefits of adopting marketing technologies. This research study will assist SME owners/managers in decision making, especially on whether or not to adopt new and accessible marketing technologies. A positive impact of marketing technologies on competitiveness and performance encourages the owners/managers to adopt the technologies. However, a negative relationship deters SMEs from adopting the marketing technologies. This means a negative relationship entails negative returns on investment on acquiring the technologies. Hence, the study assists SMEs in making good financial management decisions. This is vital as small firms have limited financial resources (Kauffmann, 2005:2).

With the boom in the use of advanced technologies in recent years, SME owners/managers need to make informed decisions based on scientific research on the use and development of such technologies and their capabilities. In the contemporary business world, the use of new and advanced technologies is regarded as being innovative. Innovative owners/managers can be assisted in weighing and considering the benefits and limitations of innovation, as reflected through their technological investments. Therefore, it is imperative that the SME owners/managers understand the benefits and limitations of innovation. This study can also help to dispel the fears of laggards with negative perceptions on the use of new and advanced technologies. Therefore, the study helps to change the attitudes of laggards and innovative owners/managers. On the one hand, a positive relationship either between adoption of marketing technologies and firm competitiveness or marketing technologies and firm performance will create a positive attitude towards the adoption of technologies. On the other hand, a negative relationship will cement the beliefs of laggards while reducing the adoption rate among innovative owners/managers.

The study has far-reaching effects on encouraging SME owners/managers to develop sustainable business models to efficiently and effectively drive their business processes. Both non-adoption and adoption has an impact on the efficiency and effectiveness of how the firms achieve their objectives, since, every business organisation seeks to be competitive, relevant and accessible. Therefore, non-adoption will entail the use of the traditional business model, while adoption means making use of the new business model that represents new and innovative ways of

doing business. SME owners/managers need to use the relevant business model to remain relevant and achieve their objectives.

The study also has strong implications on policy formulation by policy makers. In South Africa, government and quasi-government institutions formulate policies and strategies to improve the competitiveness and performance of SMEs in order to increase their economic contribution. Worldwide, SMEs are seen as the real drivers of achieving economic growth in terms of increasing the Gross Domestic Product and solving the ever-increasing unemployment problem (Nieman, 2001:446). This study provides a strong foundation to policy makers in order to formulate relevant policies. Based on the results, a majority (95.3%) of SMEs in Buffalo City Metropolitan Municipality are either micro or small in size. This means that most SMEs are not reaching their potential in terms of growth. This is collaborated by previous studies (Mbonyane, 2006:1; Calvin, 2002; Megginson, Byrd & Megginson, 2003:34) which state that there is a high failure rate amongst small firms in the country. Hence, the government is interested in ensuring the growth and success of small firms. The government and quasi-government organisations will, therefore, understand if the adoption of marketing technologies can improve the economic contribution of SMEs in the country. Since the advent of democracy in 1994, the government has formulated policies and strategies to ensure the success of SMEs. The study will, thus, assist the government in formulating policies and strategies that are relevant and applicable to the South African context. The validation or invalidation of linear relationships between the research constructs can assist policy makers in formulating effective policies and strategies, thereby solving the slow-moving growth in SMEs or their failure rate. More so, the existence and non-existence of linear relationships between the constructs can assist policy makers in using their resources efficiently to target problematic areas so as to address the poor growth and failure of SMEs in South Africa.

Although the initial objective of the study was to determine whether the adoption of marketing technologies can negatively influence firm competitiveness and performance in Buffalo City Metropolitan Municipality, the ultimate objective is to formulate recommendations to improve the contribution of SMEs to the national economy. This can only be possible after determining the relationships between technological marketing capability, Porter's five competitive forces and firm performance. The recommendations are two-faced, with a view to improve both the

demand and supply side of technological marketing capability policy formulation. These relate to recommendations to SMEs and recommendations to policy makers (government and quasi-government agencies).

6.4.1 Recommendations to SME Owners/Managers

The results of this study indicate a negative linear relationship between technological marketing (capability) and Porter's five competitive forces, as well as between Porter's five competitive forces and firm performance. This implies that SMEs cannot use the adoption and development of advanced marketing technologies to improve their competitiveness in the industry as well as using their industry competitiveness to influence firm performance. Hence SMEs must consider non technological strategies to improve competitiveness. A proper balance of marketing mix strategies gives competitive advantage to a business over other businesses. In line with these observations, the following non technological marketing mix strategies are proposed:

6.4.1.1 Product Strategy

SMEs ought to make their products more appealing and less comparable to competing products. The owners/managers need to make their products non comparable by differentiating them from others. One possible competitive strategy is product bundling. Product bundling promotes the benefits of the whole package, thus keeping buyers from comparing individual items. For instance, Gateway started bundling its Internet services and computers in response to plunging computer prices (Sinha, 2000). By adding more services to a bundle, the company could command a higher price for its bundling service. Moreover, adding services to bundles is financially attractive because it is less expensive to sell an additional service to an existing customer than it is to attract a new customer (Schiesel, 2001). This product (or service) bundling strategy counteracts the threat of product substitutes and rivalry among existing firms.

Another strategy is innovation or the introduction of niche products, which also counteracts the threat of product substitutes, new entrants into the market, and competition among existing firms. SMEs can also collect information on new products desired by small segments of the market. By creating products that meet the needs of consumers in these niche markets, firms can command higher prices (Sinha, 2000). Another strategy associated with niche products or innovation is customer-

centric strategy. Unlike a product-centric strategy, which pushes products to consumers, customer-centric strategy pulls information from consumers to improve and customize products (Viehland, 2000). An expansion into related product lines can also be a good strategy. According to Porter (1987), the expansion into related product lines can exploit transfer of skills or sharing of activities such as promotion and distribution, which will lead to competitive advantage. Sharing can lower costs by achieving economies of scale and effectively utilizing company resources such as market information, managerial or technical expertise, and knowledge. Firms can also expand their product line into areas related to their existing product lines. For example, Amazon.com recently started selling personal computers in addition to its existing line of electronic products such as disk drives and memory (Hansell, 2001). Amazon.com holds no computer inventory and has computers shipped directly from a computer distributor to its customers. This allows Amazon.com to save inventory-holding costs.

6.4.1.2 Price Strategy

Pricing has great influence on competitiveness. SMEs need to employ better pricing strategy to sell their products. Sellers can employ a price discrimination strategy that makes it difficult for buyers to compare the prices of alternative product offerings (Bakos, 1998). By collecting information about buyers, companies can perform more effective price discrimination. For instance, Staples.com charges different prices for different markets by asking customers to enter their zip codes before they can obtain prices. Sinha (2000) suggests two strategies for price discrimination: price lining and smart pricing. Price lining refers to the practice of offering the same products or services at various price points to meet different customers' needs. For example, American Online charges five different rates that vary according to subscriber usage. Smart pricing refers to the practice of charging various prices from market to market, depending on market conditions and differences in how customers value the product. In bundling, a single price is applied to a bundle. If consumers' demands remain heterogeneous even after bundling, then a mixed bundling strategy, which charges different prices for different bundles, can be applied.

Companies can also protect profits by achieving cost leadership in a particular market or industry. If sellers cannot price discriminate, the lowest price they can charge is the marginal cost of production. As competition intensifies, companies may

have to lower their production costs to protect profits. Alternatively companies may have to improve their product or service offerings with added values. Even in intensive price competition, better products or services will raise customers' switching costs and still command higher margins. For example, OfficeDepot.com provides added value to customers' order process (Gulati & Garino, 2000).

6.4.1.3 Promotion Strategy

Promotion strategies have a direct bearing on competitiveness. The SME owners/managers need to employ effective promotional strategies to stay in business. Traditional marketing strategies like trade allowances, discounts, coupons, and sweepstakes are no longer successful, even in consumer-packaged-goods segments, where rival products now differ very little, since consumers can easily acquire information on the price and characteristics of products (Sealey, 1999; Hoffman & Novak, 2000). Sales promotions with coupons and discounts seldom build customer loyalty to brands because customers conclude that the lower prices are a fair reflection of the company's costs. When the promotions are over, customers evidently believe the regular prices are excessive and turn to rival products (Sinha, 2000). Thus traditional marketing and sales promotions result in expensive, inefficient brand management.

In order to manage product brands effectively and efficiently, companies have to employ promotion strategies different from those used by traditional marketing. One tactic is to build a direct link with consumers and enter into a dialogue with them about products (dialogue-based marketing or one-to-one marketing). This allows SMEs to provide customers with information about their products, collect information about their customers, and engage in data mining. They can then customize products to meet customer needs and offer promotions tailored to specific customer groups. This process helps build a base of loyal and profitable customers (Sealey, 2000). Allan and Fjermestad (2000) also argue that the benefits of personalized promotions will be greatest when customers are interested in detailed product information or the product is marketed as state-of-the-art. Companies must formulate customer-centric promotion strategies that respond to new customer power. Allen and Fjermestad (2000) suggest that brand management will be successful only when it is associated with beliefs and experiences such as feelings, associations, and memories. Another promotion strategy for gaining competitive advantage is revenue-sharing marketing

strategy (Hoffman & Novak 2000). A revenue-sharing marketing strategy is an affiliated marketing program with partners based on commissions. For example, Amazon.com launched its affiliate program in 1996 and now has some 400,000 affiliates and Dell Computers also have strong affiliate programs. Revenue-sharing programs allow companies to keep track of purchases made by customers and draw a direct line from marketing expenses to sales performance.

6.4.1.4 Place Strategy

SMEs ought to ensure that products are delivered in the right time and at the right place. Continuous availability of products to customers when needed ensures customer loyalty. One way for companies to differentiate their products from rival companies is faster and more efficient delivery of products to their customers. The owners/managers must develop dependable supply chain or direct channels. Direct sellers like Dell Computer do not rely on wholesalers and retailers to deliver their products to consumers. Instead they contract with third-party providers such as FedEx and UPS, which provide fast, efficient delivery because they have superior logistical expertise and economies of scale in distribution (Bakos, 1998). SMEs must also invest in brick-and-mortar structures to store large quantities of products. By investing in physical assets such as a warehouse, Amazon.com can compete more effectively with Barnes and Noble (Bakos, 1998).

The SME owners/managers must strive towards the improvement of their competitiveness by implementing non-technological policies or strategies. In other words, the traditional business model (use of non-electronic means) is still applicable in improving business competitiveness. SMEs should treat firm performance and competitiveness (Porter's five competitive forces) as independent variables which do not influence each other. This implies that if the firms seek to improve performance or competitiveness, they should apply different factors with comprehensible knowledge that firm competitiveness negatively influences performance. This finding is not in line with previous studies (Ma, 2000; Fahy, 2000:55) that confirm a positive relationship between the two.

However, the existence of a linear relationship between the adoption and development of technological marketing capabilities and firm performance means that SMEs can use innovation to improve their performance in terms of growth, profitability and general performance. SMEs facing slow-moving sales growth can

adopt marketing technologies to boost their sales. According to previous studies (Trainor *et al.*, 2011:66; Powell & Dent-Micallef, 1997), marketing technologies have a positive impact on a firm's sales turnover. Small firms facing profitability challenges or firms experiencing a financial loss can also adopt marketing technologies to improve their profitability positions. The adoption of marketing technologies can have a positive effect on the firm's profitability (Narver & Slater, 2000:28). SMEs facing general performance challenges must acquire new and advanced technologies to improve general performance. There is a positive relationship between the adoption of marketing technologies and firm general performance (Scaglione, Schegg & Murphy, 2009:625). The following strategies by SME owners/managers support the existence of positive linear relationship between marketing technologies and firm performance:

6.4.1.5 Create a consumer-centric e-commerce strategy.

SMEs ought to adopt marketing technologies that give preference to information exchange with customers. They need to recognise that power is shifting to the consumer by adopting technologies that promotes sharing of information with customers. In the one-to-many hierarchical information flow that characterized the Industrial Age, information flowed one way, from the producer to the consumers. The Internet has changed this in three important ways. First the Internet allows consumers to talk to consumers. The Internet allows many-to-many communication flows. Consumer information sites such as The Consumer Democracy (www.consumerdemocracy.com) "is for information on products: quality, praise, complaints, ratings, features, descriptions, reviews, comparisons, discussion, problem reports, information, statistics, rankings, prices, rip-offs, bargains and shady affairs". Planetfeedback.com and eComplaints.com offer similar forums and services. Secondly, consumers can find and access information much easier than before. Thirdly, and most significantly, the Internet enables the information flow to be reversed so customer-centric companies can pull information from consumers to improve and customize products. Compare this with the product-centric company that pushes products to consumers. SMEs need to recognize the power shift to the customer in order to create a customer-centric strategy.

6.4.1.6 Embrace outsourcing to improve business performance.

SMEs must also outsource some marketing functions to companies with capacity or right marketing technologies for effective marketing of their products. For some time companies have outsourced secondary support functions such as payroll, network support and the company cafeteria. However, organizations have traditionally viewed core competencies (like management, marketing, research and development) and primary support functions (e.g., distribution, manufacturing, human resources) as too important to outsource. While core competencies remain resistant to outsourcing (appropriately so), inter-organizational information systems linked by the Internet are enabling companies to outsource primary support services. Reasons for the increasing use of outsourcing include:

- Outsourcing reduces costs and improves services because a firm that specialises in the service and/or engages in bulk buying can achieve cost efficiencies and service delivery that the outsourcing organization cannot.
- Outsourcing enables a company to scale production up and down quickly and cheaply, thus being more responsive to the ever-changing marketplace.
- Intangible benefits from outsourcing include: a beneficial change in corporate culture, access to premium resources and expertise the company could not afford on its own and the ability to implement world-class capabilities and technologies.
- Most significantly for e-business, outsourcing enables an organization to create the virtual enterprise, a key organizational form. Outsourcing has always been used for cost reduction, but these points make clear that businesses are expecting more from outsourcing. Today outsourcing is expected to deliver improved business performance and it is doing so.

6.4.1.7 Continuous Reviewing of Adopted Marketing Technologies

The maintenance of marketing technologies is costly, especially to small enterprises. This calls for SMEs to continuously review the value addition from the adopted technologies. Technologies can become obsolete making them a cost burden to the organisation. SMEs need to continue to behave like new market entrants that continuously look for opportunities for value addition. Large companies tend to rely on simple formulas – lower costs, increase production, open new offices – to deal with impending change. These companies carry legacy systems, they refuse to

cannibalize existing product lines and they do not take risks that change the marketplace. Small enterprises do not face these barriers and they are good at identifying where new value can be found in new technological adoption as well as in existing products and services. Transformational thinking is required from the SME owners/managers. SMEs should have a culture of regularly carrying a cost benefit analysis on the adopted technologies with a view to replace them.

6.4.1.8 Integrating Information Management into Marketing Technologies

Information shapes business organisations. Deficiency of information is detrimental to the operations of a business. SMEs must take technologies as integral to their information collection and management. They should have an information and communication strategy centred on electronic technologies. The Information Age changes how businesses are supposed to be run. In *2020 Vision* Davis and Davidson (1991) suggest that economic life cycles are similar to human life cycles, moving through gestation, growth, maturity and aging stages. Nowadays the Information Age is in the first decade of the maturity stage. In this stage the patriarch of the Information Age – information – reigns supreme. The businesses that represent the "info-structure" of the Information Age – computers, telecommunications, network suppliers – are already well into the maturity stage. All other businesses – retail, media, financial services, government – are now following. Information management will be a key definer of success in the Information Age. Bill Gates (1999) argues: "The most meaningful way to differentiate your company from your competition ... is to do an outstanding job with information. How you gather, manage, and use information will determine whether you win or lose." SMEs must develop information-centric business strategies to participate in the Information Age economy. Information alone is not enough, information technology is required to innovate, entertain and enhance the entire experience surrounding the product, from selection and ordering to receiving.

6.4.1.9 Be a part of an e-business community

SMEs need to be part of e-business trade alliances. This is about creating strong business relationships with stakeholders like suppliers, customers and government agencies that use marketing technologies to a greater extent. An e-business community links businesses, customers and suppliers to create a unique business

organization. These e-business communities form part of business alliances, cooperative networks or outsourcing arrangements in forming or implementing the e-business strategy. The key to success in the new Internet world order lies in being able to share rich information, form dynamic partnerships and make deals in real time (Anonymous, 2000). At the extreme, sometimes the formation of an e-business community is the e-business strategy.

6.4.1.10 Training on E-Business Adoption and Use

The most important person in a SME is the owner/manager. SME owners/managers must enrol for e-business training workshops or courses. This can help them to maximise on the benefits of using marketing technologies through adopting the right technologies for their businesses as well understanding the usage of the technologies fully. An e-business strategy cannot be successful with a leadership that does not understand fully or is not committed to the adoption of the marketing technology. This would seem to be obvious, but too often the strategy is vaguely defined by executive management and left to the information systems or marketing department to implement. Technologists have the in-depth knowledge about specific technologies to meet the identified needs, but strategies come first and for this reason leadership at the top are required to have an understanding and appreciation of the importance of marketing technologies in operations. Executives must take responsibility for understanding the implications of up-and-coming technologies and anticipating when they shall affect business strategy (Kalakota & Robinson, 1999:21).

6.4.2 Recommendations to Policy Makers

Policy makers are generally responsible for creating a conducive environment for the success of SMEs. Good policies and strategies drive small firms to success while poorly formulated policies and strategies spell doom and failure for the firms. As mentioned before, the findings show that the majority of SMEs are either micro or small. Therefore, poorly formulated policies and strategies lead to small firms making an insignificant contribution to the national economy. The South African government and other governments, globally, are concerned with improving the growth and sustainability of SMEs (Abor & Quartey, 2010:1450). In line with the positive relationship between the adoption of marketing technologies and firm performance, policy makers must formulate policies that encourage the adoption of marketing

technologies. The following recommendations are therefore proposed to policy makers to ensure and encourage the adoption of technological innovation:

6.4.2.1 E-Business Financing Arrangement

The government must create a technological fund for SMEs that charges low interest rates. The fund should be used specifically for the acquisition of marketing technologies for small firms facing growth challenges. According to the results of this study, 72% and 100% of SMEs do not have a website and satellite connection, respectively. The results also show that only 53% of SMEs use Internet in Buffalo City Municipality. This finance arrangement can specifically target these technological devices which are not being utilised by the majority of SMEs. Examples of governments' technology funds are found primarily in India, with a few examples in Brazil, Morocco, the Philippines, Ukraine and Vietnam. They include India's National Venture Fund for Software and Information and Brazil's Inovar initiative (Zavatta, 2008:6).

6.4.2.2 Specialised Marketing Hubs

The government can also form provincial or regional marketing centres for SMEs. These centres will be responsible for marketing small enterprises' products and services. The marketing centres should be installed with new and advanced marketing technologies. Marketing centres like the SMEs' CO Promotion Center (SPC) were created in Jakarta and registered success in selling SMEs' products (Small and Medium Enterprises Working Group, 2008:6).

6.4.2.3 Promoting Synergies between SMEs and Technological Vendors

Policy makers can also encourage synergy between large technological vendor companies and SMEs. This is where the vendor companies will assist small enterprises in adopting marketing technologies at lower costs. The technological companies can also advise the small enterprises on the appropriate technologies to adopt. This can be done through tax benefits being made available to large technological companies. Synergies between small firms and large firms can boost the performance of small firms. Strategic alliances have become popular in today's business. A strategic alliance is, according to Yoshino and Rangan (2001:24), an arrangement between two or more firms that come together to pursue a set of agreed-upon goals but remain independent, subsequent to the formation of the

alliance. The principal reasons, as cited in the literature, for entering into strategic alliances include: to achieve economies of scale and of learning, to gain access to the benefits of other firms' assets (such as production capacity, technology, market access, capital, products, or workforce), to reduce risk by sharing the capital requirements of new product development, to reach new markets, to enjoy first-mover advantage by exploiting speed to market, and to achieve transformative synergies *via* process rationalisation, systems improvement and other benefits of learning (Beeby & Booth, 2000; Dyer & Nobeoka, 2000; Kale & Singh, 2000:27).

6.4.2.4 Ensuring Affordability of Marketing Technologies

High costs of marketing technologies are a barrier to the adoption of these technologies. The government should implement direct intervention measures to lower down the prices of the technologies through charging lower taxes and imports duty on technological vendor companies. This can make the vendor companies to subsequently lower the prices of technologies. The government can also enter in private – public partnerships with large technological corporations to supply marketing technologies to SMEs at lower prices. The private sector will provide their technical expertise while the government will provide financial support. The government can achieve this through its international developmental partners like World Bank and African Development Bank. These institutions can provide cheap finance that can allow the government to subsidise the purchasing of marketing technologies by SMEs.

The non-linear relationships between the adoption of marketing technologies and Porter's five competition forces, as well as the relationship between firm competitiveness and performance can also assist in policy formulation. The government can use its financial resources efficiently without targeting these pairs of variables to improve the success of small firms. Considering the high number of SMEs that apply for government funding through quasi-government financial institutions such as Ntsika Enterprise and Khula Enterprise Finance, these finance institutions can formulate lending policies that are based on the research findings, as discussed below, which means that they should:

- reject loan applications that seek to improve firm competitiveness through adopting new and advanced marketing technologies;

- reject loan applications that seek to improve firm performance through improving firm competitiveness; and
- accept loan applications that seek to improve firm performance through adopting marketing technologies.

6.5 FUTURE RESEARCH

The study only targeted retail and manufacturing SMEs and omitted enterprises in other sectors of the economy. It is difficult to generalise the findings across all the economic sectors, as industries have varying policy regimes. The research also only targeted SMEs in the Buffalo City Metropolitan Municipality, ignoring enterprises in other regions. Although this was necessary in the face of time and financial constraints, it is difficult to generalise the findings across all the provinces. This is partly because SMEs in different provinces face different operating conditions, as provincial governments are able to formulate different regulation policies for small firms. Future research must, therefore, target other sectors like mining and service sectors to determine whether the adoption of marketing technologies has a positive bearing on firm performance and competitiveness. Future researchers must also undertake research in other provinces of the country such as Gauteng, the Free State and Limpopo.

According to the findings of this study, there is no positive relationship between the adoption of marketing technologies and firm competitiveness. Consequently, there is a need for future studies to investigate factors that have a positive bearing on the firm's competitiveness. This is because SMEs have to compete with large business organisations to stay in business (Maguire, Koh & Magrys, 2007:38). Although the results of the study indicated that the adoption of marketing technologies has a positive impact on firm performance, it is important to note that there are other non-technological factors that influence the performance of SMEs. Future studies must, therefore, also investigate non-technological factors that influence sales growth, profitability and general performance. Future researchers should also concentrate on the impact of individual marketing technologies on firm performance. This is because not all marketing technologies might have a positive linear relationship with firm performance. This will assist SMEs to acquire the appropriate marketing technologies, in future, without wasting financial resources by purchasing ineffective technologies.

6.6 SUMMARY

This chapter stressed the potential unearthed by the research data findings. It highlighted that the study has both theoretical and practical implications, with the intention that SME owners/managers and policy makers should benefit from the study. In line with non-linear relationships between variables, the study recommended the following to SME owners/managers: to implement non-technological policies and strategies to improve firm competitiveness as well as to treat firm performance and competitiveness as independent factors that do not positively influence each other. In line with the linear relationship between the adoption of marketing technologies and firm performance, the following was recommended to the SMEs, and it was stressed that: enterprises facing slow-moving sales growth, profitability and general performance challenges, should use technological innovation as a remedy for their problems.

In accordance with the linear relationship between technological innovation and firm performance, in order to address the poorly formulated policies, the following recommendations were made to the government and quasi-governmental institutions: create a technological fund and provincial marketing centres and to encourage synergy between large technological firms and SMEs through giving tax reduction benefits to the large firms. The following lending recommendations were also made to government finance houses for SMEs: reject loan applications that target the improvement of enterprise competitiveness through technological innovation, and firm performance through firm competitiveness. However, they should strive to accept loan applications that seek to improve firm performance by adopting marketing technologies. The chapter then highlighted that future research should cover SMEs in other sectors of the economy and those in other provinces of the country. Future researchers should also investigate non-technological factors that influence firm performance and they should concentrate studies on individual marketing technologies. The research findings must have implications on theory development and policy formulation. The chapter ensured the fulfilment of this ultimate goal.

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APPENDICES

APPENDIX 1: COVER LETTER



Re: Request to Participate in an Academic Survey Research

Dear Sir / Madam,

I am Progress Hove, a student currently studying towards a Master of Commerce in Business Management Degree at the University of Fort Hare. I am hereby requesting for your cooperation by participating in my academic research. I would be grateful if you could spare 5 to 7 minutes to answer the attached questionnaire. My research is concerned with investigating the impact of technological marketing on Porter's five competitive forces model and SMEs' performance in Buffalo City Metropolitan Municipality.

The survey results will strictly be held in confidence and only the aggregate results from all of the SME firms participating in the survey will be presented. It is critically important that I obtain your cooperation in order to produce reliable and good research results as well as viable recommendations and complete my research successfully. In return for your participation an option of the synthesised final results is offered, which enables you to profile your firm against others in the industry. Your assistance by participating in this academic research will be kindly appreciated. For further information, please feel free to contact me on the following address or details provided below:

MW18 Dube Houses
Dingumuzi T/ship
Plumtree, Zimbabwe
Cell number: 002778 546 8168
E-Mail Address: proggyhove@gmail.com

Faithfully Yours,

Progress Hove

APPENDIX 2 QUESTIONNAIRE

QUESTIONNAIRE



Dear respondent, the Department of Business Management (University of Fort Hare) is conducting a survey to investigate the influence of technological marketing capability on Porter's five competitive forces model (industry structure) and firm performance of small and medium enterprises in the Buffalo City Metropolitan Municipality. Be informed that your cooperation and contributions in completing the questionnaire is greatly appreciated and valued. Your contributions will be held in confidence. Feel free to express yourself in the next 5 to 7 minutes.

Name: Progress Hove

Signature:

SECTION A: PERSONAL INFORMATION *(Put an X on the appropriate block)*

A1. Gender ☐ Male..... ☐ Female.....

A2. Education ☐ High School..... ☐ Diploma..... ☐ Degree.....

A3. Race ☐ Black..... ☐ Indian..... ☐ White.... ☐ Coloured.... ☐ Other (specify).....

A4. Number of employees ☐ 5 or less..... ☐ 6-10..... ☐ 11-20..... ☐ 21-50..... ☐ 51 or above.....

A5. Amount of money from sales per year in Rands (R) in thousands (T) or millions (M):

☐ Less than R100000..... ☐ R100001-R300000..... ☐ R300 001-R600 000.....

☐ R600 001-R1000 000..... ☐ Above R1000 000.....

A6. The number of years in business since start up:

2years or less..... 3-5years..... 6-10years..... 11-20years..... 21years or above.....

A7. What business are you in? Manufacturing business Retailing business.....

A8. Do you own any of the following marketing technology devices? (Select by marking with an X on the block with the devices you own): Computers.....

Cellphone..... Internet..... Website..... satellite..... other (specify).....

A9. In what capacity do you run the business? Owner..... Manager.....

SECTION B: USE OF INFORMATION TECHNOLOGY

Please circle the level of agreement on each of the items below based on the situation of your firm (SME). There is no right or wrong response, the question asks for your opinion.

1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree

	Making Use of Information Technology	Responses of respondents				
1	This firm encourages change and welcomes opportunities to apply new Information Technology developments.	1	2	3	4	5
2	Employees in the firm are well trained in the use of new information technology.	1	2	3	4	5
3	The firm uses scanners to confirm the receipt of goods.	1	2	3	4	5
4	The firm uses scanners at sales points.	1	2	3	4	5
5	The firm has devices to track month-to-date units sold for all items.	1	2	3	4	5
6	The firm uses a computer-generated sales forecast.	1	2	3	4	5
7	The firm uses electronic bookkeeping and reporting.	1	2	3	4	5
8	The firm uses electronic labour planning.	1	2	3	4	5
9	The firm uses an electronic mail to communicate with customers.	1	2	3	4	5
10	Scanners are used in the distribution centers.	1	2	3	4	5
11	The firm uses computer data base of customers.	1	2	3	4	5

SECTION C: Effectiveness of Information Technology

Please circle the level of agreement on each of the items below based on the situation of your firm (SME). There is no right or wrong response, the question asks for your opinion.

1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree

	Effectiveness of Information Technology	Responses of respondents				
12	The Owners or managers of this firm have clearly indicated their commitment to information technology.	1	2	3	4	5
13	Information technology planning is included in the overall business plan of the firm.	1	2	3	4	5
14	Information technology training is a high priority in the firm.	1	2	3	4	5
15	The owners or managers do research on the best information technology practices of other firms.	1	2	3	4	5
16	Information technology project priority has been clearly identified in the firm.	1	2	3	4	5
17	The fundamental effectiveness of the firm's information technology is regularly measured.	1	2	3	4	5

SECTION D: Competition and Firm performance

Please circle the level of agreement on each of the items below based on the situation of your firm (SME). There is no right or wrong response, the question asks for your opinion.

1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree

	Competition (Porter's Forces)	Responses of respondents				
18	The number of firms competing for customers in our area is very high.	1	2	3	4	5
19	Price competition is used regularly in the area to a larger extent.	1	2	3	4	5
20	Use of new marketing technologies has improved the firm's competitive position in the market.	1	2	3	4	5
21	The use of technology makes our suppliers acquire their own channels.	1	2	3	4	5
22	The use of technology makes our suppliers by-pass existing intermediaries to final customers.	1	2	3	4	5
23	The use of technology brings together our suppliers making them to be dominating and concentrated.	1	2	3	4	5
24	Suppliers have greater ability to charge higher prices for products to firms in our market due to the use of technology.	1	2	3	4	5

	Competition (Porter's Forces)	Responses of respondents				
25	New technology in the market allows customers to connive, forming large customer groups that purchase products in large volumes.	1	2	3	4	5
26	Recent technologies enhance chances of our customers threatening to acquire the supplier.	1	2	3	4	5
27	The use of technology provides customers with information about supplier's pricing structures and input costs.	1	2	3	4	5
28	Customers have a very greater ability to force firms in our area to charge lower prices due to the use of technology.	1	2	3	4	5
29	The use of technology makes it difficult for customers to switch from one seller to the other in our market.	1	2	3	4	5
30	The use of technology creates the need to invest large financial resources in order to compete.	1	2	3	4	5
31	The use of technology makes new firms to find it very difficult to enter and compete in our area.	1	2	3	4	5
32	The use of technology makes firms to be highly threatened by the existence of products that serve similar purpose as this firm's product.	1	2	3	4	5
	Firm Performance	Responses of respondents				
33	Use of new marketing technologies has dramatically increased the sales of this firm over the past 3 years.	1	2	3	4	5
34	Use of new marketing technologies has increased the firm's profitability over the past 3years.	1	2	3	4	5
35	The use of new marketing technologies has improved the firm's overall performance.	1	2	3	4	5

THANK YOU FOR YOUR CO-OPERATION

APPENDIX 3: DATA ANALYSIS TABLES

CFA TABLES

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	78	475.496	222	.000	2.142
Saturated model	300	.000	0		
Independence model	24	6804.060	276	.000	24.652

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.088	.847	.793	.626
Saturated model	.000	1.000		
Independence model	.542	.149	.075	.137

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.930	.913	.961	.952	.961
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.804	.748	.773
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Default model	253.496	194.527	320.215
Saturated model	.000	.000	.000
Independence model	6528.060	6262.663	6799.824

FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	2.264	1.207	.926	1.525
Saturated model	.000	.000	.000	.000
Independence model	32.400	31.086	29.822	32.380

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.074	.065	.083	.000
Independence model	.336	.329	.343	.000

AIC

Model	AIC	BCC	BIC	CAIC
Default model	631.496	652.577	892.941	970.941
Saturated model	600.000	681.081	1605.557	1905.557
Independence model	6852.060	6858.547	6932.505	6956.505

ECVI

Model	ECVI	LO 90	HI 90	MECVI
Default model	3.007	2.726	3.325	3.108
Saturated model	2.857	2.857	2.857	3.243
Independence model	32.629	31.365	33.923	32.660

HOELTER

Model	HOELTER .05	HOELTER .01
Default model	114	121
Independence model	10	11

Standardised Regression Weights: (Group number 1 - Default model)

	Estimate
TMC1 <--- TMC	.747
TMC2 <--- TMC	.723
TMC5 <--- TMC	.804
TMC6 <--- TMC	.820
TMC7 <--- TMC	.739
TMC8 <--- TMC	.808
TMC9 <--- TMC	.768
TMC10 <--- TMC	.679
TMC12 <--- TMC	.792
TMC13 <--- TMC	.896
TMC14 <--- TMC	.847
TMC15 <--- TMC	.730
TMC16 <--- TMC	.833
TMC17 <--- TMC	.799
PFF4 <--- PFF	.979
PFF5 <--- PFF	.931

	Estimate
PFF6 <--- PFF	.936
PFF8 <--- PFF	.794
PFF9 <--- PFF	.729
PFF10 <--- PFF	.756
PFF11 <--- PFF	.772
FP1 <--- FP	.911
FP2 <--- FP	.932
FP3 <--- FP	.937

SCALE RELIABILITY CHECK

Technological Marketing (Capability)

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.957	.959	14

Item Statistics

	Mean	Std. Deviation	N
TMC1	3.5735	.98950	211
TMC2	2.5024	1.12705	211
TMC5	3.2796	1.14331	211
TMC6	2.9810	1.19109	211
TMC7	2.9905	1.25732	211
TMC8	2.9289	1.12108	211
TMC9	2.7346	1.16933	211
TMC10	2.3744	1.31189	211
TMC12	3.5924	.98307	211
TMC13	3.0379	.91469	211
TMC14	2.6161	.96586	211
TMC15	1.9479	1.07444	211
TMC16	2.6161	.96586	211
TMC17	2.5498	1.10890	211

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	2.838	1.948	3.592	1.645	1.844	.208	14
Item Variances	1.211	.837	1.721	.884	2.057	.069	14

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
TMC1	36.1517	134.101	.762	.778	.954
TMC2	37.2227	132.469	.724	.602	.955
TMC5	36.4455	130.724	.784	.672	.954
TMC6	36.7441	128.325	.845	.929	.952
TMC7	36.7346	129.186	.762	.850	.954
TMC8	36.7962	130.382	.816	.860	.953
TMC9	36.9905	131.076	.750	.686	.955
TMC10	37.3507	130.305	.685	.676	.957
TMC12	36.1327	133.544	.793	.796	.954
TMC13	36.6872	133.397	.866	.788	.952
TMC14	37.1090	133.250	.823	.818	.953
TMC15	37.7773	134.812	.664	.633	.956
TMC16	37.1090	133.583	.807	.810	.953
TMC17	37.1754	132.202	.749	.649	.954

Porter's Five Forces

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.966	.966	7

Item Statistics

	Mean	Std. Deviation	N
PFF4	3.5118	.87483	211
PFF5	3.5024	.92774	211
PFF6	3.4929	.94803	211
PFF8	3.6114	.94650	211
PFF9	3.6398	.93255	211
PFF10	3.6256	.88754	211
PFF11	3.6777	.88394	211

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.580	3.493	3.678	.185	1.053	.006	7
Item Variances	.837	.765	.899	.133	1.174	.003	7

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
PFF4	21.5498	25.477	.884	.905	.960
PFF5	21.5592	25.286	.847	.851	.963
PFF6	21.5687	25.437	.807	.861	.966
PFF8	21.4502	24.534	.919	.930	.957
PFF9	21.4218	24.988	.879	.904	.960
PFF10	21.4360	25.276	.895	.907	.959
PFF11	21.3839	25.104	.922	.966	.957

Firm Performance

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.944	.949	3

Item Statistics

	Mean	Std. Deviation	N
FP1	2.4929	1.01122	211
FP2	2.2986	1.07391	211
FP3	2.4597	1.26191	211

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	2.417	2.299	2.493	.194	1.085	.011	3

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
FP1	4.7583	5.127	.878	.775	.929
FP2	4.9526	4.760	.908	.825	.901
FP3	4.7915	4.052	.891	.798	.926

SEM RESULTS TABLES

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	99	381.737	201	.000	1.899
Saturated model	300	.000	0		
Independence model	24	6804.060	276	.000	24.652

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.078	.874	.812	.586
Saturated model	.000	1.000		
Independence model	.542	.149	.075	.137

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.944	.923	.973	.962	.972
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.065	.055	.075	.007
Independence model	.336	.329	.343	.000

HYPOTHESIS-MODEL.

Estimate			
PFF	<---	TMC	-.890
FP	<---	TMC	.775
FP	<---	PFF	-.137

Significance of the hypotheses using p***

PFF	<---	TMC	-.104	.082	-1.270	.204	par_22
FP	<---	TMC	.940	.084	11.182	***	par_23
FP	<---	PFF	-.143	.048	-2.978	.003	par_24

Estimates

Regression Weights: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
PFF	<---	TMC	-.104	.082	-1.270	.204	par_22
FP	<---	TMC	.940	.084	11.182	***	par_23
FP	<---	PFF	-.143	.048	-2.978	.003	par_24
TMC1	<---	TMC	1.000				
TMC2	<---	TMC	1.091	.096	11.363	***	par_1
TMC5	<---	TMC	1.211	.096	12.601	***	par_2
TMC6	<---	TMC	1.295	.099	13.121	***	par_3
TMC7	<---	TMC	1.247	.106	11.721	***	par_4
TMC8	<---	TMC	1.191	.094	12.640	***	par_5
TMC9	<---	TMC	1.182	.087	13.609	***	par_6
TMC10	<---	TMC	1.226	.112	10.928	***	par_7
TMC12	<---	TMC	1.056	.052	20.143	***	par_8
TMC13	<---	TMC	1.067	.075	14.299	***	par_9
TMC14	<---	TMC	1.064	.081	13.143	***	par_10
TMC15	<---	TMC	1.008	.092	11.008	***	par_11
TMC16	<---	TMC	1.046	.081	12.883	***	par_12
TMC17	<---	TMC	1.169	.094	12.448	***	par_13
PFF11	<---	PFF	1.000				
PFF10	<---	PFF	.963	.021	45.102	***	par_14
PFF9	<---	PFF	1.003	.023	42.888	***	par_15
PFF8	<---	PFF	1.031	.021	48.953	***	par_16
PFF6	<---	PFF	.745	.054	13.694	***	par_17
PFF5	<---	PFF	.791	.051	15.615	***	par_18
PFF4	<---	PFF	.805	.044	18.414	***	par_19
FP1	<---	FP	1.000				
FP2	<---	FP	1.082	.046	23.514	***	par_20
FP3	<---	FP	1.282	.056	22.832	***	par_21

Standardised Regression Weights: (Group number 1 - Default model)

			Estimate
PFF	<---	TMC	-.890
FP	<---	TMC	.775
FP	<---	PFF	-.137
TMC1	<---	TMC	.761
TMC2	<---	TMC	.735
TMC5	<---	TMC	.805
TMC6	<---	TMC	.837
TMC7	<---	TMC	.766
TMC8	<---	TMC	.809
TMC9	<---	TMC	.769
TMC10	<---	TMC	.718
TMC12	<---	TMC	.804
TMC13	<---	TMC	.887
TMC14	<---	TMC	.838
TMC15	<---	TMC	.726
TMC16	<---	TMC	.824
TMC17	<---	TMC	.801
PFF11	<---	PFF	.999
PFF10	<---	PFF	.953
PFF9	<---	PFF	.950
PFF8	<---	PFF	.961
PFF6	<---	PFF	.700
PFF5	<---	PFF	.752
PFF4	<---	PFF	.820
FP1	<---	FP	.907
FP2	<---	FP	.938
FP3	<---	FP	.936

Normality Tests: Goodness of Fit

#	Distribution	Kolmogorov Smirnov		Anderson Darling		Chi-Squared	
		Statistic	Rank	Statistic	Rank	Statistic	Rank
1	Beta	0.01095	6	4.0116	24	N/A	
2	Burr	0.08181	25	3.5672	23	12.187	16
3	Burr (4P)	0.06343	17	2.4358	17	13.109	23

4	Cauchy	0.12954	38	5.3866	29	8.2004	12
5	Chi-Squared	0.3513	55	619.39	59	396.66	55
6	Chi-Squared (2P)	0.0642	18	2.3714	15	12.59	19
7	Dagum	0.02141	8	4.1657	26	N/A	
8	Dagum (4P)	0.05843	11	1.6159	9	3.9264	9
9	Erlang	0.10268	34	8.8574	38	31.558	39
10	Erlang (3P)	0.08422	26	2.9446	22	13.5	25
11	Error	0.00473	3	0.01088	2	0.03341	3
12	Error Function	0.5614	59	298.71	58	953.53	56
13	Exponential	0.15653	44	12.597	43	26.41	33
14	Exponential (2P)	0.15507	43	12.301	42	26.391	32
15	Fatigue Life	0.23916	51	24.147	51	55.494	48
16	Fatigue Life (3P)	0.06108	16	2.3579	13	12.545	17
17	Frechet	0.20082	48	19.159	47	42.777	43
18	Frechet (3P)	0.26745	53	22.059	48	N/A	
19	Gamma	0.09989	30	8.8401	37	30.467	36
20	Gamma (3P)	0.06854	21	2.4818	19	12.83	22
21	Gen. Extreme Value	0.04808	10	1.6759	10	7.6712	10
22	Gen. Gamma	0.11091	35	5.7232	31	16.73	27
23	Gen. Gamma (4P)	0.01855	7	0.17353	6	0.52711	6
24	Gen. Pareto	0.00472	2	0.01618	3	0.03336	2

25	Gumbel Max	0.10182	33	6.5649	33	32.595	41
26	Gumbel Min	0.10182	32	6.5649	32	32.595	40
27	Hypersecant	0.0953	29	5.666	30	34.785	42
28	Inv. Gaussian	0.13238	39	33.574	55	56.856	49
29	Inv. Gaussian (3P)	0.25054	52	28.237	54	60.742	51
30	Johnson SB	0.00977	5	0.03612	4	0.11016	5
31	Kumaraswamy	0.03801	9	0.94216	7	1.8152	7
32	Laplace	0.11493	36	8.1977	36	50.898	45
33	Levy	0.31863	54	23.73	50	57.761	50
34	Levy (2P)	0.38713	56	27.651	53	66.384	52
35	Log-Gamma	0.16139	47	15.326	46	30.695	37
36	Log-Logistic	0.15983	46	9.2203	39	21.867	29
37	Log-Logistic (3P)	0.06035	15	2.564	20	12.565	18
38	Log-Pearson 3	0.06903	22	1.0891	8	1.8563	8
39	Logistic	0.08121	24	4.1627	25	24.786	31
40	Lognormal	0.15138	42	9.2808	40	21.986	30
41	Lognormal (3P)	0.0593	14	2.3583	14	12.12	14
42	Nakagami	0.12625	37	12.745	44	46.153	44
43	Normal	0.05903	13	2.3144	12	12.185	15
44	Pareto	0.40785	57	64.149	56	148.66	53
45	Pareto 2	0.15871	45	12.883	45	27.999	34

46	Pearson 5	0.22658	50	23.308	49	54.538	47
47	Pearson 5 (3P)	0.22112	49	24.767	52	52.847	46
48	Pearson 6	0.10035	31	4.869	28	13.19	24
49	Pearson 6 (4P)	0.06614	19	2.3873	16	12.635	20
50	Pert	0.05849	12	2.2872	11	13.621	26
51	Power Function	0.00474	4	0.105	5	0.07109	4
52	Rayleigh	0.08758	27	6.7186	34	28.523	35
53	Rayleigh (2P)	0.07152	23	2.5983	21	11.714	13
54	Reciprocal	0.50445	58	142.98	57	335.29	54
55	Rice	0.09095	28	7.2291	35	31.543	38
56	Student's t	0.96297	60	1576.6	60	N/A	
57	Triangular	0.14088	41	10.057	41	21.646	28
58	Uniform	0.00354	1	0.00881	1	0.03223	1
59	Weibull	0.13602	40	4.3229	27	7.739	11
60	Weibull (3P)	0.06616	20	2.4588	18	12.697	21
61	Johnson SU	No fit					

APPENDIX 4

THE CONCEPTUAL MODEL AND THE SEM RESULTS

