

The Delineation of Porter's Five Competitive Forces Model from a Technological Marketing Perspective: A Case Study of Buffalo City Metropolitan Municipality

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ABSTRACT Primarily, this paper seeks to uncover the compatibility of Small and Medium Enterprises' (SMEs) competitiveness and modern technologies in the marketing of SME products and services. The main objective of this paper is to investigate whether the adoption of new marketing technologies have redefined Porter's five competitive forces model (industry structure) and how it has manifested in the Buffalo City Metropolitan Municipality SMEs. The study followed a quantitative paradigm with data collection from a sample size of 211 SMEs in the Buffalo City Metropolitan Municipality, South Africa. A Confirmatory Factor Analysis (CFA) and a Structural Equation Modeling (SEM) were performed using AMOS 7 to analyse data. The principal finding in this paper shows a negative insignificant influence of the adoption and deployment of new marketing technologies on Porter's Five Competitive Forces Model, implying that technology is insignificantly redefining SME competitiveness. These findings have important implications on best strategies of improving SME competitiveness, efficiency in SME funding by financial institutions and sustainability of costs of marketing technologies in general.

INTRODUCTION

In the modern digital and computer revolution, within business practices, 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.

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). It 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 et al. 2002). 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; Brady et al. 2002).

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). 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

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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 (Jaya-chandran et al. 2005).

A review of the literature shows that studies of competitiveness and industry structure redefined from a technological marketing perspective have largely been conducted in developed countries such as Australia and America. Only sketchy evidence of such studies in the South African context could be obtained especially on SMEs. In addition, empirical evidence on technological marketing is insufficient and focuses primarily on business-to-business (B-2-B) markets. Therefore, the focus of this study is on Business-to-Customer markets where less has been done in terms of research. Business-to-Customer e-business entails the use of Information and Communication Technologies to enable forms of commerce between businesses and their customers (Phan 2003).

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). Decisively, SMEs have been lagging in the adoption and utilisation of new technology in their business practices (Quayle 2002). 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). 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 and Schindler 2006).

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 technolo-

gies, 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 present study raises awareness on the importance of this phenomenon amongst SME owners/managers. The expectation of this paper is that this approach would improve SME competitiveness in this digital era and result in their success. To this end, this paper provides a baseline for future marketing and strategy studies.

Objectives

The main objective of this paper is to investigate whether the adoption of new marketing technologies have redefined Porter's five competitive forces model (industry structure) and assess how it has manifested in the Buffalo City Metropolitan Municipality SMEs. This objective translates into the following research objectives:

- To investigate whether technological marketing has a negative or positive impact on Porter's five competitive model.
- To determine the significance of the negative or positive impact of the adoption of marketing technologies on Porter's five competitive model.

The 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 and Lioukas 2001). According to Porter (2008), 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 inventive systems (Porter 2008).

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 and Lioukas 2001). 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). These forces determine the profit potential of an industry or its segment (Spanos and Lioukas 2001). From such a perspective, as posited by Rivard et al. (2006), 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) 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).

Most IT researchers have adopted a market-based view to examine the potential and actual influence of IT on firm performance. Porter (2001) 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 et al. (1999) 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). The market-based view in contemporary business markets has been complemented by the resource-based view.

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 (Weeks 2002). A scholar, like Weeks (2002), posits that technology impacts marketing in many ways, and marketers as well as managers ought therefore to have knowledge competence extended towards the effects thereof. Chen (2001), in support, argues that everything that essentially constitutes a market has been re-defined, including products, industry structures, competition, regulations and laws within the modern and highly technological environments.

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). 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). 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 initia-

tives made by competitors, by constantly monitoring changes in these dynamic environments (Rapp et al. 2008).

SMEs and customers that deploy technological marketing will want to associate with other firms sharing similar capabilities (Srinivasan et al. 2002). 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). Thus, SMEs which decide not to partake in technological marketing capabilities risk losing social legitimacy in their competitive environment (Rapp et al. 2008). 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) 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.

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 SME's 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). 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.

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).

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.

• *The Redefined Threat of New Entrants*

According to Porter (2008), the Internet (and other digital technologies) mitigate the need for things such as an established sales force or ac-

cess 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; Louis and Venter 2010). Technology and the redefined threat of new entrants lead to the redefinition of the bargaining power of suppliers.

• *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.

• *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).

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 intermediaries that search the web for the best prices. The concept of the intermediary 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). Technology and the redefined rivalry among existing firms in the market complement the redefined bargaining power of buyers.

• *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).

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).

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). Technology and the redefined bargaining power of buyers are also related to the redefined threat of substitutes.

• *The Redefined Threat of Substitutes*

Digital technologies create new substitutes by enabling new approaches to meeting the same needs and performing functions (Porter 2001). 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). 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). 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.

The Sixth Competitive Force

Three different options have been suggested by various authors (Macmillan and Tampoe 2000; Gordon 2007; Grove 1996; 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.

- *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), 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). 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.

- *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). 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 and Tampoe 2000). 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.

- *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. Conse-

quently, 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 and Tampoe 2000). 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). The next section provides a discussion of the relationship between the Porter's original five competitive forces and technological marketing. Previously, a study by Rivard et al. (2006) 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). Therefore, drawing from the theoretical reasoning and prior empirical evidence this paper initially hypothesises that:

H_0 : Technological marketing has a negative impact on Porter's five forces model or industry structure.

H_1 : Technological marketing has a positive impact on Porter's five forces model or industry structure.

H_0 : Adoption of marketing technologies has an insignificant impact on Porter's five forces model.

H_2 : Adoption of marketing technologies has a significant impact on Porter's five forces model.

METHODOLOGY

This paper employs a quantitative research technique that generally involves the collection of primary data from a large number of SME owners/managers in the Eastern Cape Province. This was done with the intention of generalising the results to the wider population of South Africa and the developing nations at large. Quantitative primary research was conducted by utilising semi-personal interviews which administered a questionnaire in the gathering of primary data from 211 retail and manufacturing SME owners/managers. The questionnaire was designed so as to allow the performance of the Confirmatory Factor Analysis Indices (CFAI), such as the Chi-Square/Degree of Freedom (CS/DF), the Comparative Fit Analysis (CFA) and the Incremental Index of Fit (IIF). As such the measures of technological marketing and Porter's five forces (firm competitiveness/industry structure) were adapted from previous studies and modified to suit the purpose of this paper with the consultation of the experts in strategic and marketing management fields as well as with the statisticians. This paper has two main variables which are technological marketing and Porter's five forces (firm competitiveness). Technological marketing was measured using 14 items as a composite construct. The 14 items designed for this construct were adopted from the work of Powell and Dent-Micallef (1997) and Trainor et al. (2011). Porter's five forces were measured using 7 adapted items from Galbreath and Galvin (2008). 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.

Statistical Analysis

The research data gathered for the purposes of this paper was analysed using a two-step procedure suggested by Anderson and Gerbing (1988). 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). SEM was also complimented by linear regression in testing hypotheses by employing SPSS 18. Amos 7 was employed as the computation SEM software. SEM, in this paper, 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. To have a full SEM model, a third variable was added, firm performance, which comes as the ultimate output from the relationship between technological marketing and Porter's five competitive forces model. It is imperative to note that the direct relationship between technological marketing and firm performance was not part of the main objectives in this paper, as such the relationship was mentioned in passing.

Reliability and Validity of the Construct Measures

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 and Churchill 2010:258). This paper employed Item-Total correlation values, Cronbach's coefficient alpha (α), Composite Reliability (CR) and Average Variance Extracted (AVE) to check the measurement reliability. 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. Technological marketing (capability) (TMC) has a Cronbach's alpha of 0.96, while Porter's Five Forces model (PFF) has a 0.97 cronbach's alpha (see Table 1). 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. TMC has a composite reliability of 0.96 while PFF has a 0.95 (see Table 2), and the values were both above the recommended threshold value of 0.7.

Item-to-total values for TMC is 0.66 and 0.92 for PFF, as such, are above the recommended threshold value of 0.3 (often ≤ 0.3) (Dunn et al. 1994:145).

Table 1: Cronbach's coefficient alpha

Variable	Cronbach's alpha	Cronbach's alpha on standardised items	No. of items
TMC	0.957	0.959	14
PFF	0.966	0.966	7

Table 2: Composite reliability

Research construct	Composite reliability
Technological Marketing (Capability)	
TMC (1;2;5;6;7;8;9;10;12;13;14;15;16;17)	0.96
Porter's Five Forces (PFF 4;5;6;8;9;10;11)	0.95
Firm Performance (FP1;2;3)	0.95

TMC had an Average Extracted value of 0.62 while PFF had a 0.72 and are above the Shared Values of 0.56 and 0.11 respectively (see Table 3 for both research constructs), hence, validating the existence of discriminant validity.

Table 3: Average variance extracted

Research construct	Average variance extracted	Shared value
Technological Marketing (Capability)	0.62	0.56
TMC (1;2;5;6;7;8;9;10;12;13;14;15;16;17)		
Porter's Five Forces (PFF 4;5;6;8;9;10;11)	0.72	0.01
Firm Performance (FP1;2;3)	0.86	0.03

Confirmatory Factor Analysis

To validate the research model fitness a confirmatory factor analysis (CFA) was conducted using Amos version 7 statistical software program. Acceptable model fit was indicated by chi-square value over degree of freedom (χ^2/df) of value between 1 and 3, with the values of Goodness-of-Fit Index (GFI), Comparative Fit Index (CFI), Incremental Fit Index (IFI) and Normed Fit Index (NFI) 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 while Root Mean Square Residual (RMR) value to be less than 0.5 (Hair et al. 2006). Recommended statistics for the final overall-model assessment showed acceptable fit of the measurement model to the data: χ^2/df was 2.142; GFI=0.847; CFI=0.961; IFI=0.961; NFI=0.930; RMR=0.088 and RMSEA=0.074 (see Table 4).

Since an acceptable CFA measurement model fit was obtained, the paper proceeded to the next stage of checking the structural model fitness and hypothesis testing.

Table 4: CFA model fit results

<i>Fit index</i>	<i>Results</i>
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 Appropriation)	0.074
NFI (Normal Fit Index)	0.930
TLI (Tucker Lewis Index)	0.952
IFI (Incremental Fit Index)	0.961

Structural Equation Modeling

Structural equation modeling (SEM) was conducted to test the validity of the proposed model and the hypotheses also using Amos 7 statistical software program. Table 5 presents the estimated model, illustrating the direction and magnitude of the impact of the standardized path coefficients. Recommended statistics for the overall structural equation model assessment also showed acceptable fit of $\chi^2/df = 1.899$; GFI=0.874; CFI=0.972; IFI=0.973; NFI=0.944; RMR=0.078 and RMSEA=0.065. The model's fit, as indicated by these indexes, was deemed satisfactory, thereby providing a good basis for testing the hypothesized paths.

Table 5: SEM model fit results

<i>Fit index</i>	<i>Results</i>
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 Appropriation)	0.065
NFI (Normal Fit Index)	0.944
TLI (Tucker Lewis Index)	0.962
IFI (Incremental Fit Index)	0.973

The parameter estimates of the structural model exhibited the direct effects of one construct on the other. A significant coefficient at a certain level of alpha thus reveals a significant relationship among latent constructs (see Fig. 1).

RESULTS AND DISCUSSION

SEM (and linear regression) was used in order to reject or accept hypotheses. As part of

analysis, independent and dependant variables were specified. Marketing technological factors were treated as independent variables while Porter's five competitive forces were treated as dependent variables. Results show that technological marketing has no significant impact on Porter's five competitive forces (firm competitiveness). The paper had hypothesised a negative relationship between technological marketing and Porter's five competitive forces and finally got a negative factor loading (-0.089) (see, Table 6; Fig. 1), confirming a negative relationship. This result is consistent with the theoretical reasoning of Porter (2001) who advocates that the use of the internet and other technological marketing tools have negative trends on Porter's five competitive forces.

Table 6: SEM hypothesis testing results

<i>Path</i>	<i>Hypothesis</i>	<i>Path coefficient</i>	<i>Significance</i>
Technological Marketing → Porter's Five forces	H ₁	-0.089	ns (not supported)

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: * significance level - ***p-value<0.001, ^b significance level- **p-value<0.05, ^a significance level- ^pp-value<0.1, ^{ns} significant level- insignificant (p-value>0.1).

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). 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, firstly, H₀₁ is not rejected in this paper as the factor loading of -0.089 confirms a negative relationship. Secondly, the p-values of greater than 0.1 fail to render support to H₂ which posited a significant impact of technological marketing adoption on Porter's five competitive forces model, hence H₀₂ is not rejected as well, in this paper. Therefore, H₁ and H₂ are both invalid and not supported.

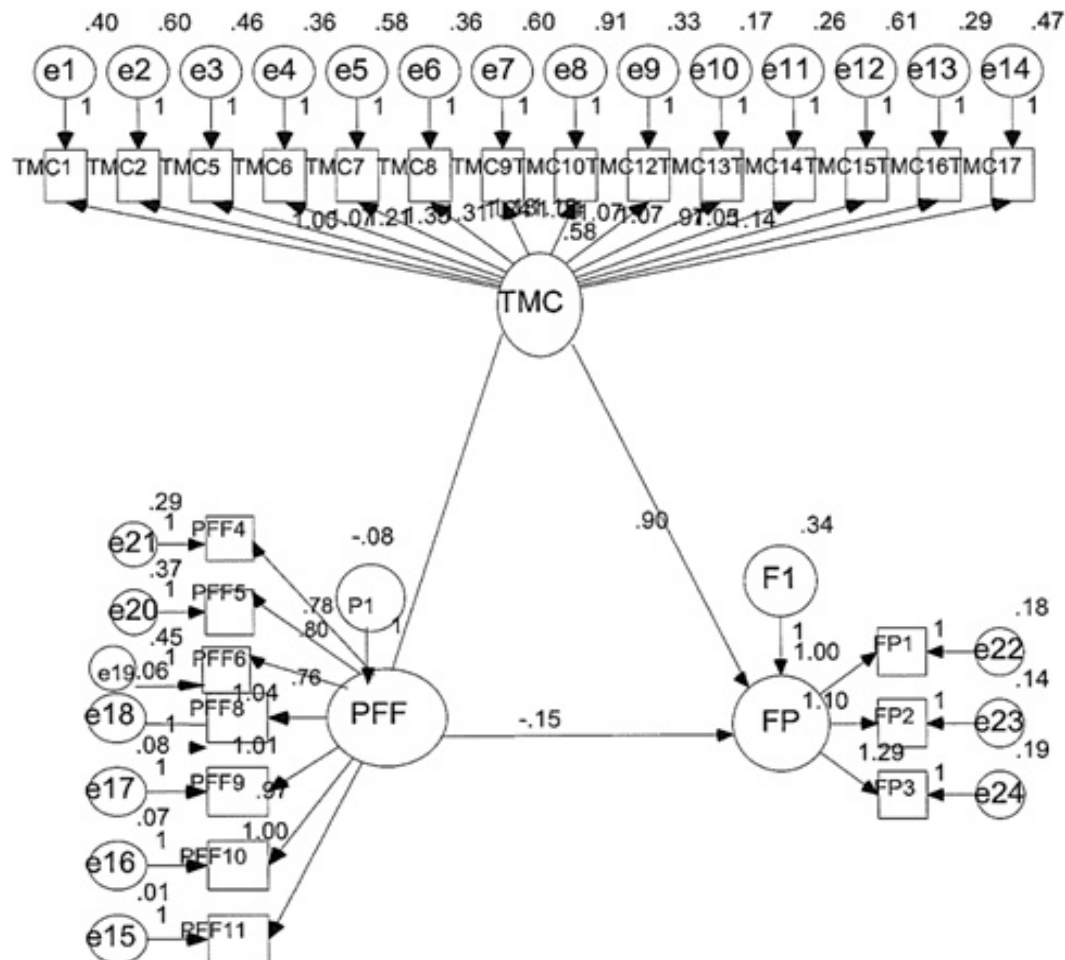


Fig. 1. SEM path analysis results

Regression analysis was also done to control and complement the SEM hypothesis testing in this paper. The results show PFF (Porter's five forces) regressed against the various technological marketing variables (TMC). As can be seen in Table 7, almost all the TMC variables (except one), technological marketing has a negative impact on porter's five competitive forces model, as such, H_{01} is not rejected. Secondly, the P-values for all the variables are greater than 0.05, confirming an insignificant impact of technological marketing on Porter's five forces model, therefore, H_{02} is not rejected as well. The correlation of determination (R^2) is 0.13 (see Table 8). Thus, technological marketing impacts or explains only 13% of the changes that occur in

Porter's five competitive forces. In other words, technological marketing adoption can only explain 13% of the negative redefinition of porter's five competitive forces model. The remaining percentage (87%) has other factors to explain that are non technological and non marketing factors. Therefore, the use of advanced technological marketing tools without other supporting non-technological strategies does not give a competitive edge to firms.

CONCLUSION

The findings of this paper did not support the proposed linear relationships between technological marketing capability and Porter's five

Table 7: Regression of TMC against PFF

<i>Variable</i>	<i>Coefficient</i>	<i>Std error</i>	<i>F-Test</i>	<i>P-Value</i>
TMC1	-0.202	0.108	3.5249	0.161962
TMC10	-0.108	0.118	0.8343	0.362159
TMC 11	-0.114	0.117	0.9582	0.328859
TMC12	-0.150	0.122	0.1652	0.684855
TMC13	-0.049	0.080	0.3732	0.541980
TMC14	0.029	0.120	0.0607	0.805705
TMC2	-0.079	0.071	1.2261	0.269554
TMC3	-0.142	0.066	4.6593	0.092121
TMC4	-0.004	0.076	0.0034	0.953514
TMC5	-0.155	0.121	1.6487	0.200680
TMC 6	-0.091	0.119	0.5856	0.445067
TMC7	-0.078	0.077	1.0256	0.312465
TMC8	-0.056	0.077	0.2804	0.470755
TMC9	-0.237	0.070	0.2804	0.597022
CONSTANT	4.064	0.222	335.1992	0.000000

Table 8: Regression analysis hypothesis testing

<i>Source</i>	<i>df</i>	<i>Sum of squares</i>	<i>Mean square</i>	<i>F-statistic</i>
Regression	15	15.504	1.034	1.976
Residuals	194	101.491	0.523	
Total	209	116.995		

forces (firm competitiveness/industry structure) as indicated in the hypothesis. Consequently, H_1 (Marketing Technology adoption has a positive impact on Porter's five competitive forces model and H_2 (Technological marketing has a significant impact on Porter's five competitive forces model/industry structure) of SMEs in the Buffalo City Metropolitan Municipality) were not confirmed and remain unsupported in this paper.

Conclusively, SMEs in the Buffalo City Metropolitan Municipality are not adopting the technologies with a view to improve firm competitiveness as there is a negative insignificant linear relationship between the two. This therefore, implies that firms are using non-technological strategies to compete with each other, thereby insignificantly redefining Porter's five forces model. Perhaps, the smaller percentage of R^2 (13%) may somehow be suggestive of a positive impact of technological marketing on SME competitiveness, thereby equating SMEs to larger firms that realise a competitive edge from properly adopting and deploying marketing technologies in their daily businesses. In this digital world, the rules of technology affect all firms, organisations and companies regardless of their sizes and concerns. As such the positive resultant im-

pact of technological marketing on SME performance could be also explained by the competitive edge from adopting those basic marketing technologies such as use of sms to inform customers on the weekend specials, promotions and latest arrival.

However, SME owners/managers need to make informed decisions based on scientific research on the adoption and deployment of such technologies and their capabilities. In the modern 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 revealed through their technological investments. Therefore, it is vital that the SME owners/managers have a sound understanding of the benefits and limitations of innovation. This paper can be of use in driving out the fears of those owners/managers with negative perceptions on the use of new and advanced technologies.

RECOMMENDATIONS

In line with these observations, the following recommendations are proposed: 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. These include competitive pricing strategy, diversifying and ensuring products are unique, face-to-face promotions. To some extent, the success to SME competitiveness is through brick-and-mortar structures.

The results of the study can also influence lending policies to SMEs. Finance institutions that are both owned by the government and private sector can improve their lending policies. In the face of inadequate financial capital from the financial institutions there is need for the financiers to reject loan applications that seek to improve SME competitiveness through marketing technologies. Loans can now be channelled to purposes that are highly beneficial to SMEs and the economy.

In the face of the insignificant negative relationship between SME competitiveness and marketing technologies, there is need for the government to introduce policies like subsidising and encouraging synergies between large technologi-

cal vendor companies and SMEs to reduce the costs of marketing technologies. This is because high cost of technologies is not compatible with the usefulness of the technologies in improving competitiveness of SMEs. This can help with improving the rate of return of marketing technology investments to SMEs.

The synergy between SMEs and large technological 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. Strategic alliances have become popular in today's business. A strategic alliance is 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.

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