

Sophistication of consumer demand and its impact on emerging market firms'
innovation capabilities, sources of information and strategies.

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Abstract

This study investigates the impact of consumer sophistication on emerging market firms' ability to innovate. Three constructs, namely, innovation capabilities, sources of information and strategies, were identified as critical factors in the innovation process. By leveraging off these factors emerging market firms may gain sustainable competitive advantages in a highly competitive environment. The context of the study was South African based software development firms competing in more developed markets (wealthier), less developed markets (poorer) and domestic markets only (middle income). Data collection took place via telephonic survey. It was found that the size of the firm as measured by the number of employees is related to the consumer sophistication. Firms in less developed markets tend to be significantly larger than firms in more developed markets and the domestic market. Suppliers and clients as sources of information that impact the firms' innovation development were found to be statistically significant. Firms in the more developed markets made considerable use of international clients for innovation ideas whereas firms in the domestic market leveraged ideas off local suppliers. The firms' resource strategy was found to be significantly different across the three groups. Domestic market firms considered themselves ahead of the industry compared to less developed markets who considered themselves average with regard to having the latest equipment.

Keywords

Innovation, innovation activity in South Africa, software development industry, innovation strategies, innovation capabilities, sources of information, sophistication of consumer demand

Declaration

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Masters of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

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1. Chapter 1 Introduction to Research Problem

How do emerging market firms innovate to compete both locally and globally? This study will seek to establish if emerging market firms' innovation capabilities, sources of information and strategies are impacted on depending on the level of consumer sophistication and this should provide some insight into how these firms conduct business in domestic, developing and developed markets. Evidence will be sought to understand to what degree local firms innovate to compete both locally as well as globally within markets that are either more or less developed than South Africa's market.

Due to globalisation, deregulation, increasing competition both locally and globally as well as the advent of new technologies, competition for firms is increasing dramatically (Akman & Yilmaz, 2008). In order for firms to stay competitive on a sustainable basis and enhance performance in such a dynamic environment firms are required to innovate (Porter, 1990). Innovation is regarded as a key factor for competition (Hamel & Prahalad, 1994) and therefore innovation becomes a strategic requirement.

Emerging market firms are caught up in this highly competitive environment both on a domestic level as well as globally and it is a case of 'adapt or die'. An

emerging market can be defined as “newly industrialised countries plus those with the potential to become newly industrialized” (Wild, Wild, & Han, 2000, p. 132). The success of an emerging market firm’s penetration into a developed nation’s market appears to be dependent on the firm’s ability to appeal to the foreign market demand (Brouthers, O’Donnell, & Hadjimarcou, 2005). The firm’s appeal or attractiveness can be translated into how a firm’s behaviour or innovation capabilities are harnessed to produce products / services that respond to consumer demand. Businesses who are listening to their customers’ needs and wants and who are able to convert those identified needs and wants into innovative products and services will be more successful and sustainable than those who do not (Porter, 2008).

Customers’ needs and wants in an emerging or less developed market are different to customers’ needs and wants in a more developed market. For example, more developed countries prefer quality and variety: Japan’s market values image, brand, product support, uniqueness and quality (Ojala & Tyrvaïnen, 2008); the European Union’s market values premium products and services (high quality) (Brouthers, O’Donnell, & Hadjimarcou, 2005). Literature has identified various strategies for emerging market firms to follow but, “Future efforts need to propose and test additional strategies EMF’s can use to successfully penetrate Triad nation markets” by investigating additional emerging market firms (Brouthers, O’Donnell, & Hadjimarcou, 2005, p. 240). Ojala & Tyrvaïnen (2008) also identified the gap in the literature on what the

best practices that software firms “should implement in order to succeed in various foreign markets” (p. 52).

In contrast, India’s market values price as the most significant factor in purchasing decisions (Javalgi & Dixit, 2007). Being able to identify the nature of consumer demands will ultimately affect how a firm will organise and arrange its innovation capabilities and determine its strategy. Research on innovation and its relationship with market orientation (including customer orientation) have focused mainly within the context of manufacturing industries as summarised by Akman & Yilmaz, (2008). This study serves to fill the gap as identified by Akman & Yilmaz (2008) by increasing the knowledge base of innovation capabilities among software firms in a middle income developing country.

This study investigates emerging market firms’ innovation capabilities, sources of information and strategies and whether the level of consumer sophistication impacts the way these firms operate in domestic, more developed and less developed markets. It argues that a firm’s level of innovation will vary depending on the market it chooses to operate in. Firms who do business in a more developed market will innovate differently compared to firms who do business in local and less developed markets due to the varying level of consumer sophistication.

The study's main findings are briefly highlighted. It was found that there is a relationship between consumer sophistication and the size of the firm as measured by the number of employees. Firms in less developed markets tend to be significantly larger than firms in more developed markets and the domestic market. Less developed markets tend to be more unpredictable with a less developed infrastructure and it therefore makes sense that larger firms tend to compete into these markets. Larger firms have more resources to combat the impact of a more tumultuous environment. All the firms in the more developed markets were classified as small (1 – 249 employees). In order to compete in these highly developed competitive markets firms need to be agile and flexible and have the ability to innovate quickly. Small firms are far less hierarchical and structured allowing for quick decision making and adaptability to the changing market demands. In addition, it seems likely that these firms offer niche products for a generally well-developed market.

Suppliers and clients as sources of information that impact the firms' innovation development were also found to be statistically significant. Firms in the domestic market leveraged off local suppliers whereas firms in the more developed markets made considerable use of international clients for innovation ideas. International, sophisticated consumers who demand variety and uniqueness in products and services are therefore a vital source of information for more developed market firms as opposed to domestic firms who focus on

local clients. This makes sense as purely domestic market firms have not moved into international markets and are not reliant on international consumers to compete domestically. More developed market firms who are able to meet the challenge of identifying consumer needs are in a stronger position to enhance their innovation capabilities to better serve their market. This insight helps more developed market firms realise that in order to gain a sustainable competitive advantage they should leverage off the international client base. Clients in more developed markets are a valuable source of ideas that may contribute significantly to the firms' innovation activities.

The firms' resource strategy was also found to be significant and differed according to the level of sophistication of the markets where they were operating. Domestic market firms considered themselves ahead of the industry compared to less developed markets who considered themselves average with regard to having the latest equipment. Domestic market firms may be overstating themselves as they have not been exposed to international markets and hence perceive themselves to be ahead of the industry based on their narrow world view. Less developed market firms have had exposure to international markets and therefore are able to realistically evaluate themselves as average as they have a benchmark to which to compare themselves against.

The remainder of this dissertation explores previous literature, explains the methodology used to investigate the effect of a more versus less developed consumer base and discusses the findings in detail.

2. Chapter 2 Literature Review

2.1 Firm Strategy

“Innovation creates long-lasting advantages and produces dramatic shifts in competitive positioning; being good at it will provide a competitive advantage, being great at it can result in major industry wide disruptions.” (Dobni, 2008). The ability to innovate successfully is undeniable a powerful strategy to compete in the ever changing dynamic global environment.

Organisations that have accomplished successful international leadership employ strategies that are essentially the same. They have achieved “competitive advantage through acts of innovation” (Porter, 1990).

Research has shown that firms in an emerging market generally compete internationally based on price / cost strategies and as a result the products are perceived as commodities (Brouthers, O'Donnell, & Hadjimarcou, 2005). Due to the highly competitive nature of mature markets, emerging market firms have a tendency to enter less competitive emerging markets or enter developed markets either through partnerships or by offering low cost products and services which result in lower profitability (Brouthers & Xu, 2002; Brouthers, O'Donnell, & Hadjimarcou, 2005). Lower profitability due to low cost or price

strategies is not necessarily the most viable and profitable route to follow and research has shown that alternative strategies can achieve higher levels of performance (Brouthers, O'Donnell, & Hadjimarcou, 2005).

Customers' perceived value of a product or service is the "measure of how much a customer is willing to pay for it" (Aurum & Wohlin, 2007, p. 111). Firms that are better able to understand and interpret their customers' needs and wants will be able to employ strategies that are not just based on price / cost factors. Aurum & Wohlin (2007) emphasize the value creation approach in software development by considering customers' requirements throughout the development process. Yet these arguments presuppose a more developed context where there is relatively greater price sensitivity. The logic may work somewhat differently in a less developed context.

The investigation of alternative strategies (Brouthers, O'Donnell, & Hadjimarcou, 2005), such as quality, innovation (new products / services), resource allocation and strategic partnerships in comparable emerging markets such as South Africa is required to determine how emerging market firms can successfully penetrate mature markets as well as developing markets.

2.2 Sophistication of Consumer Demand

Prior literature has shown that there is a tight link between the influence of demand upon innovation (demand-pull theories) and it has been proposed that users' sophistication drives a firm's incentives to innovate (Guerzoni, 2010).

Due to extreme demands and challenges of the external environment, organisations are able to gain a competitive advantage by its capability to innovate. Organisations can benefit from strong competitors, aggressive suppliers and a highly demanding customer base (Porter, 1990). Once an organisation attains a competitive advantage over a rival through innovation the sustainability thereof is only attainable through relentless improvement (Porter, 1990). Innovation is therefore driven not only by the firm's capabilities, but also by external factors of supply (suppliers) and demand (customers). A highly demanding customer base will ensure that continuous improvement occurs or else the competitive advantage will be lost. The organisation's strategy to innovate should be aligned with the market's demands.

Customer power is the ability for customers to demand high quality, sophisticated products in return for 'patronage'. An organisation should focus on customer needs so as not to lose them to rivals. Customers are more empowered than ever and are a competitive force that should shape the

organisation's strategy. Porter (2008) identifies five such forces, i.e. barriers to entry; power of suppliers; power of buyers; industry rivalry; and substitutes and compliments. The focus of this study will be on customer demand (the power of buyers). In order to counteract customer power the organisation needs to innovate by expanding or improving products / service (Porter, 2008).

In order to pull innovation (rather than push innovation from inside the firm), demand "provide(s) firms with relevant knowledge about needs and wants" (Guerzoni, 2010, p. 122). Firms who are able to meet the challenge of identifying consumer needs and wants are in a better position to enhance their innovation capabilities to better serve the market. By providing innovative products and services to meet the identified needs, firms will be more successful than firms that do not meet the consumer demands.

Sophistication of consumer demand varies significantly across developing and developed markets. Consumers in a developed market tend to be wealthier than consumers in a developing market and therefore the strategy and innovation capabilities of a firm should be aligned with the market's level of sophistication. "Emerging market economies tend to focus on low factor costs" whereas developed nations' markets tend to be mature and highly competitive (Brouthers, O'Donnell, & Hadjimarcou, 2005, p. 226) requiring unique and high quality products. Yet, whether the challenge is to create high quality products or

to deliver low-cost products to a price-sensitive market, it is expected that firms will need to innovate.

2.3 Innovation Capability

Literature has shown that firms that have a high innovative capability tend to be more successful at developing new capabilities that will result in competitive advantage and superior performance (Hurley & Hult, 1998). Innovation capability has been defined as a special asset of a firm (Guan & Ma, 2003). Akman & Yilmaz (2008) has summarised the literature on the relationship between innovation capabilities and innovation success.

Innovation capabilities as summarised by Akman & Yilmaz (2008) are highly contingent on the type of resources and competencies within the firm. Innovation capabilities are crucial in facilitating firms to enhance or develop new products and services, respond and adapt to the dynamic environment and turn ideas into sustainable business opportunities. “Innovative capability is an absolute requirement for small high-tech firms specifically in developing countries” (Akman & Yilmaz, 2008).

In this study the following constructs as found in the literature summarised by Akman & Yilmaz (2008) will be defined as innovation capabilities: size of the firm (number of employees), patents, collaboration and research and development. There are several other identified capabilities but the questionnaire used for this study has constrained the choice of variables. These variables will be expanded upon in the following sections.

2.3.1 Research and Development

Research and development has been defined as one of the variables that determine a firm's innovation capability. Efficient in-house Research and Development (R&D) departments and laboratories have found to be positively related to innovation (Guerzoni, 2010). Research studies have shown that R&D expenditure and the number of R&D personnel are a measure of innovation success as summarised in Akman & Yilmaz (2008). Because research and development is about creating 'new to the world' innovations, it is likely more relevant for more developed markets with sophisticated consumers compared to less developed markets.

2.3.2 Collaboration

Organisations that cooperate with other organisations with regard to innovation activities are more likely to increase or improve their ability to innovate (De Propriis, 2002). Research has also shown that multi-national organisations “are more likely to exhibit innovation propensity; they are also more likely to engage in innovation activities on a continual basis” (Frenz & Ietto-Gillies, 2007, p. 99).

There is a “growing recognition that few firms can innovate in isolation” and organisations that employ cooperative and collaborative innovation-related activities are more likely to be thriving innovators (Freel & Harrison, 2006, p. 290). Research has found that technological collaborative networks are crucial in achieving a higher degree of novelty in innovation and the more diverse the collaborative networks are the greater the positive impact on innovation (Nieto & Santamaria, 2007). It can be argued that collaboration becomes increasingly important as firms move into foreign markets, especially more developed markets, in order to leverage off the existing experience and knowledge of organisations already operating in those foreign markets.

On the other hand, in less developed markets there may be a need to collaborate in order to overcome “institutional voids”, such as fewer resources (Brouthers, O'Donnell, & Hadjimarcou, 2005). It was also found that developing

market firms “tend to be less competitive than their developed country counterparts, partly because they suffer the disadvantage of operating in home countries with underdeveloped institutions” (Cuervo-Cazurra & Genc, 2008, p. 957). The purpose of collaboration may be different, but it is likely that firms do not successfully internationalise without collaborative relationships.

2.3.3 Patents

Innovation capabilities, according to Akman & Yilmaz (2008) encompass a firm’s ability to generate intellectual property in the form of patents, but literature has shown opposing views of the role of patents in stimulating innovation. Research conducted “suggest that software patents may indeed play a positive role in promoting technological innovation ... Patent laws and practices that extend equal protection to software based inventions offer the best hope for keeping this engine of innovation going” (Smith & Mann, 2004, p. 264). Research conducted by Cockburn & MacGarvie (2006) found that firms who hold patents have increased survival prospects after market entry than firms that do not hold patents.

A counterargument that patents are a deterrent to software innovation and commercialisation has been raised (Tang & Pare, 2003). Tang & Pare (2003) have found that stronger rights may not necessarily lead to a more innovative

industry for three main reasons, namely, software is a cumulative process consisting of multiple incremental steps, the ease of entry may be jeopardised by stronger rights and smaller firms do not necessarily patent for competitiveness or regard patents as a stimulus for innovation. Patents tend to be associated with increased costs in terms of entering a market. Resources are required to patent as well as to defend the patent right against 'big players'.

The opposing views create an opportunity to further explore whether patents have an impact upon an emerging market firm's innovation capabilities in terms of its consumers' sophistication. Specifically, while patents may play a role when sourcing customers in the more developed world, for cost-conscious customers in the less developed world this may be less of a factor.

2.3.4 Size

The size of the firm impacts on its ability to innovate and therefore impacts on the firm's innovation capability. It has been found that smaller firms tend to be more innovative as they are quicker, more flexible and responsive to change in a turbulent environment; however their implementation may be slower than larger firms due to resource constraints (Zaterzalo & Gray, 2000; Akman & Yilmaz, 2008).

In contrast, larger firms internalise more functions, have more resources available and are therefore more self-sufficient (Brouthers, O'Donnell, & Hadjimarcou, 2005).

Research summarised by Gopalakrishnan & Bierly, (2006) highlights the advantages and disadvantages of firm size. Large sized firms hold the advantage that they excel at new product development. They tend to have more control over their environment, have more experience and knowledge, more bargaining power and more resources to improve their technological capabilities. However, large firms tend to be more bureaucratic, less adaptable and flexible, have more inertia to change and lower commitment to innovation. Small firms are nimble and adaptable, are better at communication throughout the organisation and are more receptive to change. However, small firms have fewer resources, less assets and weaker marketing skills.

Empirical analysis has found that despite the smaller size of emerging market firms entering into less developed markets, they tend to be more prevalent than larger foreign firms in these markets as they are used to operating in countries with difficult governance conditions and poorer regulatory quality (Cuervo-

Cazurra & Genc, 2008). Small firms tend to be behaviourally advantaged yet materially constrained (Freel & Harrison, 2006).

Firm size will be determined by the number of employees in the firm as in prior research summarised in Brouthers *et al* (2005). The size of emerging market firms conducting business in domestic, developing and developed nations will be investigated to determine if this variable is significantly impacted by the level of consumer sophistication.

2.4 Sources of information

Hyland, Marceau, & Sloan (2006) researched the sources of information that firms make use of to enhance their competitive advantage. They found that the Information and Communication Technology (ICT) firms that they studied saw their “sales force, customers and suppliers as the most important sources of innovation knowledge and ideas” (p. 182). Other sources of information included research and technology organisations, universities, competitors and publicly funded services.

These sources of information are likely to have a different effect when considering more versus less sophisticated customers. In particular sophisticated consumers are a crucial source of ideas and are able to provide relatively accurate feedback by specifying their needs and wants. Their precise requirements can stimulate a firm's innovation capabilities in order to satisfy the consumer's preferences as summarised in Guerzoni (2010). The more developed markets tend to have the more sophisticated consumers who focus on quality, specialisation and variety, in comparison to the less developed markets whose less sophisticated consumers focus on low-cost.

Research has found that innovative products were invented and prototyped by innovative users before being commercially offered. In such circumstances all firms needed to do was to take advantage of such user effort and only provide product engineering work to achieve a first-to-market product innovation. Such user dominated innovation patterns have shown to play a critical role in computer software product innovation areas (Von Hippel, 1976). Von Hippel (1976) also states that new sources of information can come from any person or group that may have the incentive to innovate such as suppliers. Such information is a valuable resource and is free.

It is likely that these sources of information especially in highly competitive markets allow firms to achieve competitive advantage and sustainability. It was

found that the larger the variety of sources of information that is utilised the more successful the end product (Amara & Landry, 2005). However, in less developed markets, the customers are likely to be less sophisticated and therefore the benefits from customers in terms of innovation are likely to be reduced when compared with more developed markets.

2.5 Type of innovation and degree of novelty

The literature identifies a strategic choice between the production of a standardised product and the generation of variety (Guerzoni, 2010). These two modes of production require different innovative efforts at the firm level namely, a focus on process innovation for the former or a focus on product innovation for the latter. “Standardization requires innovations improving the mechanization in the process of production ...On the other hand variety requires innovation in product design, marketing and customer care” (Guerzoni, 2010, p. 114).

Guerzoni (2010) explains that standardised products require consumers with a low degree of sophistication whereas variety requires consumers with a high degree of sophistication who are able to identify their needs and wants and are prepared to pay for customer satisfaction. “The trade-offs between standardization and variety is a crucial choice for firms’ strategies” (Guerzoni,

2010, p. 114). It can therefore be argued that when firms serve low-income markets, process innovations that serve to lower prices will dominate. In contrast, firms that serve higher-income, more developed markets may focus on product innovations that serve quality and variety.

Several studies as summarised in Ojala & Tyrvaïnen (2008) have shown that the uniqueness of the product is a critical success factor. More developed markets, such as Japan, focus more on the quality, differentiation and uniqueness of the product than on price (Douglas & Craig, 1990). Similarly another study showed that a critical success factor in Japan was product and service quality and innovative products (Shetty & Kim, 1995).

Depending on the level of consumer sophistication the degree of novelty will have varying levels of importance. More sophisticated consumers are willing to pay for novel products and services whereas less sophisticated consumers will not be willing to pay the premium (Guerzoni, 2010). Emerging firms will have to make a strategic choice on the degree of novelty based on the sophistication of consumer demand. However it is likely that firms operating in more developed markets will display a higher degree of novelty than those of less developed market firms.

2.6 Software Industry

The context of this study is the software development industry. Due to the dynamic marketplace and increasing global competition that software firms face there is a huge pressure to achieve and sustain competitive advantage as well as to increase responsiveness to consumers (Aurum & Wohlin, 2007). Software firms who are unable to innovate do not survive.

The software industry is characterised by a fast-paced rate of process and product innovations, rapidly decreasing product life cycles, increased knowledge intensity, significant experience in adoption of innovative practices and global markets (Nambisan, 2002). Based on the software industry's characteristics it presents a valuable context in which to explore and investigate innovation-related issues (Akman & Yilmaz, 2008).

In addition, the software industry presents a significant opportunity for emerging markets that usually have limited resources, as this industry does not require huge capital investments (Akman & Yilmaz, 2008). Software must function well regardless of the context. In other words, software needs to be reliable and stable, it should work no matter where the development takes place or where the products are sold.

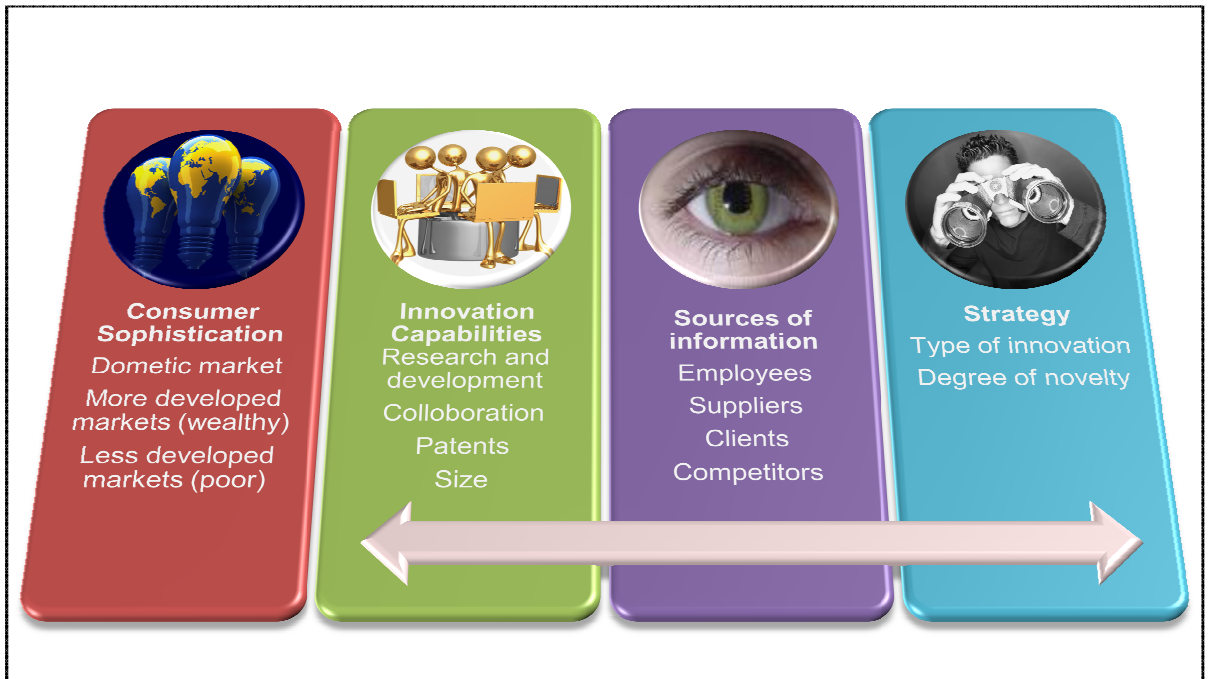
According to Akman & Yilmaz (2008) software is a pivotal sector for developing countries, yet they feel that there is not sufficient research studies related to the software industry. They mention that the software industry is on the boundary between product and services and therefore has a key role to play. Ruokonen (2008) concurs that very little research in the software industry has been conducted. It is therefore the purpose of this study to add to the body of knowledge in this area.

2.7 Conceptual Framework

The conceptual framework as depicted in Figure 1 below highlights the relationship between the constructs in this study, namely sophistication of consumer demand, innovation capabilities and strategy. This high level framework has been considerably adapted from Akman & Yilmaz's (2008) model which will serve as a basis for this work. They proposed that a market-oriented culture (which includes consumer orientation) is positively related to a firm's innovation capability. The firm's innovation strategy in turn influences the firm's innovative capability.

This study will determine if emerging market firms' innovation capabilities, sources of information and strategies are impacted on depending on the level of consumer sophistication.

Figure 1 Conceptual model of the study



3. Chapter 3 Research Hypotheses

Based on the literature review and the conceptual framework three main hypotheses have been identified. Each hypothesis contains several variables which are grouped together to form the main constructs, namely, innovation capabilities, sources of information and strategies.

Innovation capabilities

Hypothesis 1: The firm-specific innovation capabilities of software development firms in an emerging market that sell to consumers in a more developed market will vary significantly with those of less developed and domestic markets in terms of innovation behaviour, namely 1a) Research and Development; 1b) Collaboration; 1c) Patents; and 1d) Size

Sources of information

Hypothesis 2: The firm-specific sources of information of software development firms in an emerging market that sell to consumers in a more developed market will vary significantly with those of less developed and domestic markets, namely 2a) Employees; 2b) Suppliers; 2c) Clients; and 2d) Competitors

Strategies

Hypothesis 3: The firm-specific strategies of software development firms in an emerging market that sell to consumers in a more developed market will vary significantly with those of less developed and domestic markets in terms of 2a) Strategy (quality, cost, new products / services, strategic partnerships, resources); 2b) Type of innovation and degree of novelty.

4. Chapter 4 Research Methodology

4.1 Research Design

To establish how firms differ when they service customers in more versus less developed markets, this study used a quantitative descriptive research methodology. A survey approach was used to collect the data. Data was used from a questionnaire that had previously been designed, developed, distributed and collated. Descriptive statistics, Fishers' Exact test and nonparametric statistics (Kruskal-Wallis one-way analysis of variance) were used to categorise and analyse the collected data.

4.2 Population of relevance

In South Africa the Information, Communication and Technology industry (ICT) is not well organised in terms of industry structures / associations and/or industry directories. Therefore the original estimation of the total population of relevance had been a challenge. Initially, the Johannesburg Centre for Software Engineering (JCSE) was approached for a database of active software firms. Launched in May 2005 the JCSE consists of partnerships between the government, industry and academia. The JCSE promotes "best practice in software development within an African context; growing the country's capacity to deliver world class software; and developing research and training initiatives to strengthen the local software development industry" (The Johannesburg

Centre for Software Engineering, 2010). However, upon deeper investigation it was determined that due to the classification of ICT firms as 'general purpose technology' a number of the main ICT players in the country, e.g. banks and mobile phone companies, were not classified as software firms.

In order to overcome this limitation an alternative approach was followed and the membership database of the Computer Society of South Africa (CSSA) was acquired. The CSSA was founded in 1960 and supports and acknowledges the work of individuals working within the software development arena. The CSSA is widely recognised as a professional body for ICT practitioners in South Africa serving over 3000 members (The Computer Society of South Africa, 2010). Although the CSSA supports individual rather than institutional members, members generally disclose their institutional affiliation, thereby making it feasible to construct a list of firms that are active in the software industry. By means of this 'bottom-up' approach, 355 software development companies were identified.

In summary, the population of relevance was defined as South African software development firms who were indirectly affiliated with the Computer Society of South Africa during 2009 via their members.

4.3 Sampling method and size

The total population of 355 firms was targeted. The target population consists of the “complete group relevant to the research project” (Zikmund, 2003, p. 373) and therefore no sampling method was identified as the total population was used in this study.

4.4 Unit of analysis

The unit of analysis surveyed was the software development firm, in other words the enterprise level. An enterprise in this study may be a single plant firm or a unit which was part of an enterprise group. If the software development firm was part of an enterprise group then the activities of the company pertaining to this study were restricted to the entity based in South Africa only. Parent companies and enterprises outside of South Africa were not included.

4.5 Questionnaire

The questionnaire was originally designed and initiated as part of a much larger international project, conducted under the auspices of the Lund University in Sweden. The base questionnaire was developed by Professor Cristina Chaminade of the Center for Innovation, Research and Competence in the

Learning Economy, at the Lund University in cooperation with Chinese and Indian researchers with the purpose of mapping patterns of innovation in the software industry. Following research collaboration between academics at the Gordon Institute of Science (GIBS), the University of Pretoria Graduate School and industry participants, the questionnaire was then adapted for the South African market at a workshop in South Africa in May 2008. The questionnaire was tailored by a team of South African academics lead by Dr Helena Barnard (GIBS) with input from local Information, Communication and Technology (ICT) industry experts. Refer to Annexure A for the questionnaire.

4.6 Data collection process

Data gathering was conducted in 2009. A graduate student was appointed by Dr Barnard to contact the potential respondents telephonically, and to guide them through the questionnaire. Telephone interviews have the benefit of speeding up the data collection phase, overcoming geographic inflexibilities with low to moderate costs involved and providing quality of data comparable to face-to-face interviews (Zikmund, 2003). The graduate student was offered training about the rationale of the questionnaire, as well as how to conduct telephone interviews. Respondent cooperation has proved to be good through this method and tolerance for the length of the questionnaire is moderate (Zikmund, 2003).

Using this approach, 77 responses were obtained. The benefit of having questionnaires directed by a single individual is that both the interpretation of questions and the coding is consistent reducing potential respondent and interviewer error. Due to the fact that interviewers' abilities and mannerisms often differ significantly, interviewer error and bias is reduced by having just one interviewer involved in the project as this ensures consistency and reliability (Zikmund, 2003). The interviewer verbally explained the purpose of the study to potential respondents and participation was voluntary. Of the 355 firms 278 respondents chose not to participate.

There are usually several CSSA members within one large organisation. The CSSA represents approximately ten times more individual members than the institution represented by them. In those incidents where a company was represented by more than one individual member, an individual was targeted fairly conveniently. This was done by calling the individuals on the list and speaking to the first person who proved to be available. The purpose of the survey was then described and a recommendation about the most appropriate person to contact within the organisation for the purposes of the survey was requested. One respondent per company was therefore identified making use of this 'expert opinion' or 'judgement' approach. Judgement or purposeful sampling is a non-probability sampling technique whereby an experienced person selects individuals based on certain criteria (Zikmund, 2003).

4.7 Response rate

Of the 355 firms, 77 respondents chose to participate. A response rate of 21.7% was therefore attained. A response rate refers to the ratio of the number of completed questionnaires divided by the population or sample (Zikmund, 2003).

Response rates have been debated extensively over the past years and have traditionally been viewed as a quality indicator for survey results (Zikmund, 2003). It has been presumed that higher response rates ensure higher result accuracy. However, various studies have disputed the notion that low response rates imply lower result accuracy (Visser, Krosnick, Marquette, & Curtin, 1996; Keeter, Kennedy, Dimock, Best, & Craighill, 2006; Curtin, Presser, & Singer, 2000). These studies have shown that lower response rates (around 20%) did not necessary imply less accurate results.

4.8 Data analysis approach

Descriptive statistics was conducted to summarise and graphically depict the information about the software development firms. The firms were divided into three non-overlapping groups, namely a) those firms who sell to more developed markets in addition to the domestic market; b) those firms who sell to

the less developed markets in addition to the domestic market; and c) those firms who sell only to the domestic market.

A nonparametric test was used to analyse the data. The advantages of nonparametric tests include: “they avoid the error caused by assuming that a population is normally distributed when it is not; the computations that need to be made are often very simple; and the data may be easier to collect” (Zikmund, 2003, p. 542).

The Kruskal-Wallis test was used to compare the ordinal data of the three groups, namely a) those firms who sell to more developed markets in addition to the domestic market; b) those firms who sell to the less developed markets in addition to the domestic market; and c) those firms who sell only to the domestic market. The groups are independent and this technique is considered the “nonparametric equivalent of analysis of variance” (Zikmund, 2003, p. 544). The Kruskal-Wallis test determines if the three groups “have the same distribution shape and dispersion” (Zikmund, 2003, p. 544).

The Fisher’s Exact test was also conducted. The “Fisher’s exact test is a statistical test used to determine if there are non-random associations between

two (or more) categorical variables” (Weisstein, 2010). This test is used where sample sizes are small and displays the interaction of two or more variables (Foster, 2010). “Fisher exact test computes the exact probability under the null hypothesis of obtaining the current distribution of frequencies across cells, or one that is more uneven” (Basic Statistics, 2010).

4.9 Limitations

The following limitations of the study were identified as follows:

- The questionnaire was already designed and the data collated. The choice of variables was therefore constrained by the current questionnaire design. The author was therefore limited in terms of what could be empirically established.
- Population of relevance was derived through a bottom-up approach as the ICT industry is not well organised in terms of industry structures / associations and/or industry directories. Therefore the original estimation of the total population of relevance had been a challenge. This may impact on the findings.
- Response rate of 21.7% was achieved. This may impact the accuracy of the results.
- Performance measures are self reported as opposed to objective measures of actual performance.
- Research findings will be specific to the South African context and findings can not necessarily be generalised to other emerging markets.

- Research findings are specific to the software industry and cannot be generalised to other industries.

5. Chapter 5 Results

In this chapter the results of the statistical findings will be presented. The first section of this chapter focuses on the descriptive characteristics of the emerging market, software development firms. The subsequent three sections depict the detailed findings clustered around the three main research hypotheses.

5.1 Firm characteristics

The responding emerging market, software development firms were categorised into three independent groups namely, a) those firms who sell to more developed markets in addition to the domestic market; b) those firms who sell to the less developed markets in addition to the domestic market; and c) those firms who sell only to the domestic market.

Where firms sell to both 'more' and 'less' developed markets the market with the highest percentage of sales was used as a determining factor. The groups were categorised as follows:

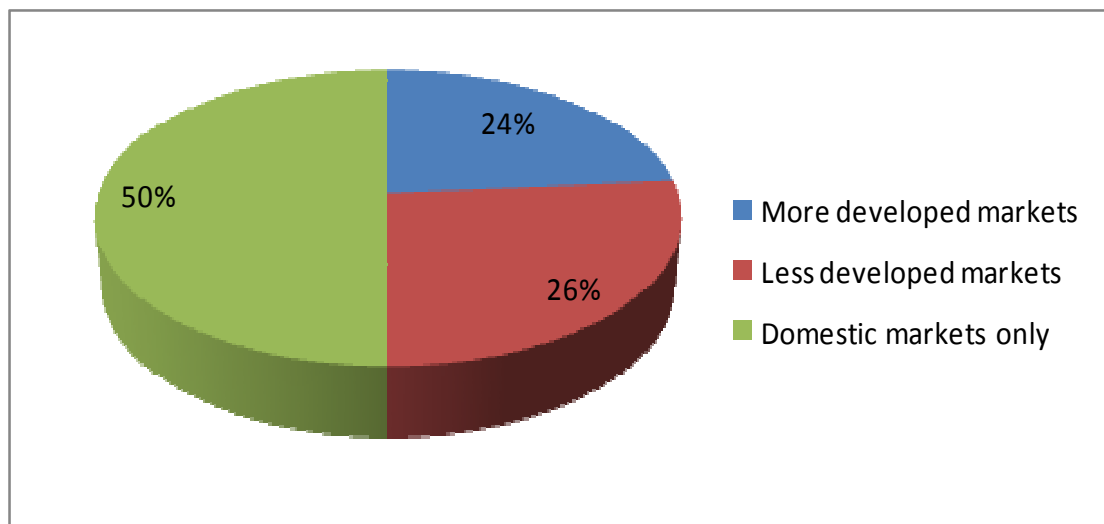
- 36 firms' sales were purely to the domestic market.
- 17 firms were grouped in the more developed markets, namely North America (US and Canada) / Western Europe. This group consisted of

firms whose percentage sales in more developed markets exceeded or was equal to sales in the less developed markets in addition to sales in the domestic market.

- 19 firms were grouped in the less developed markets, namely Asia / Africa. This group consisted of firms whose percentage sales in less developed markets exceeded sales in more developed markets in addition to sales in the domestic market.
- 5 firms had significant missing data or could not be grouped (sales in the relevant markets was not provided).

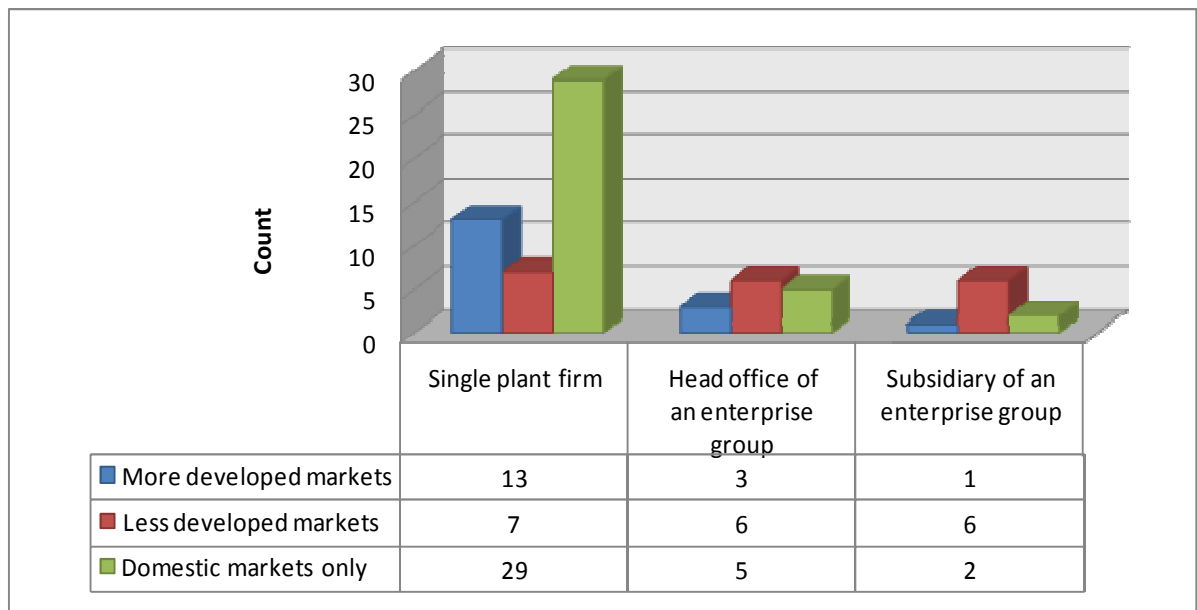
The figure below displays the graphical representation of the three independent groups' frequencies.

Figure 2 Group frequencies



The firms were self-classified into either a single plant firm or as part of an enterprise group (either head office or a subsidiary). The groups that sell mainly to the more developed markets and the domestic markets were predominantly single plant firms, namely 13 firms and 29 firms respectively. However the group that sells to the less developed markets was almost evenly divided between the single plant firm (7 firms), head office (6 firms) or subsidiary (6 firms) of an enterprise group. See figure below.

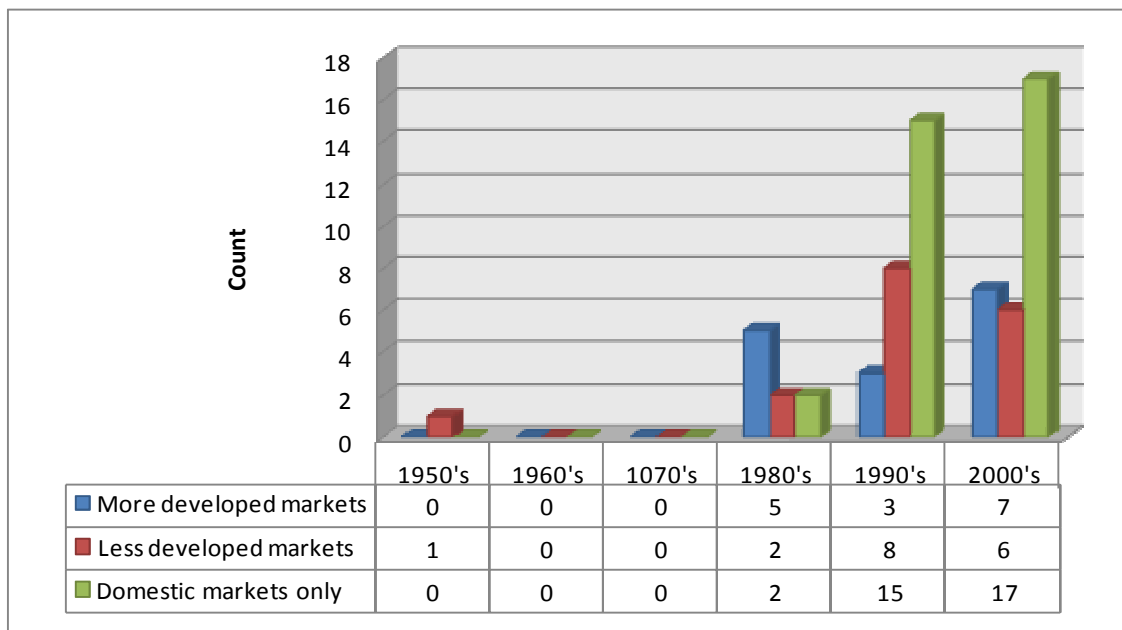
Figure 3 Descriptive frequencies: Single plant / Head office / Subsidiary firms



The location country of the firms' head offices was predominantly South African for all three groups as could be expected. The location city of the firms' South African unit was primarily Johannesburg (41 firms) followed by Durban (8 firms), and Pretoria / Centurion (8 firms).

The year of establishment for most of the responding firms took place between 1980's - 2000's. The majority of firms for all three groups were however established in the 1990's (26 firms) and the 2000's (30 firms). The domestic market firms tended to be younger compared to the more developed market firms as can be seen in the figure below.

Figure 4 Descriptive frequencies: Year of establishment in South Africa

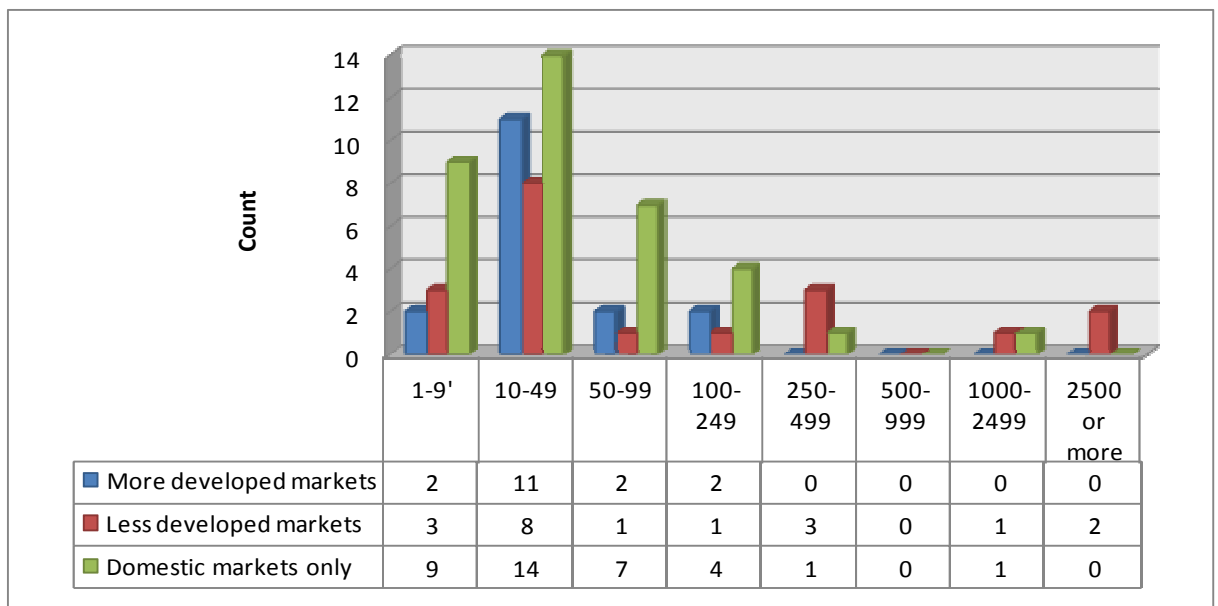


Frequency missing = 6

The number of employees per firm regardless of grouping tended to be small in size with the majority of firms ranging between 10-49 employees (33 firms) and 1-9 employees (14 firms). There were few firms larger than 250 employees and those that were larger than this were mainly firms that operated in the less

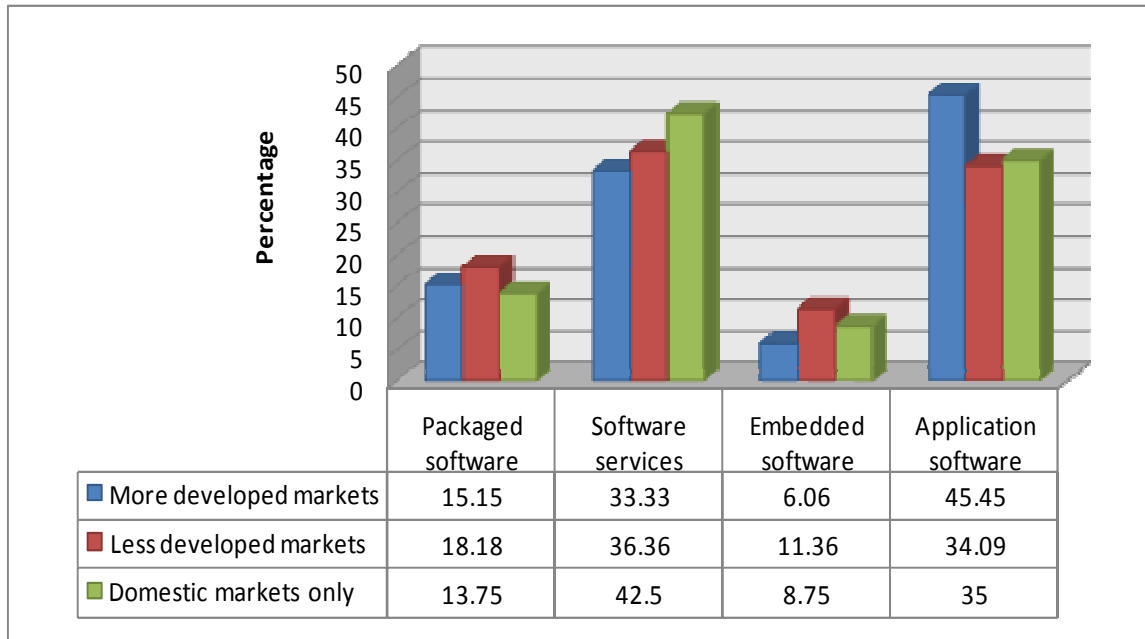
developed markets. Firms that operated in the more developed markets were all smaller than 250 employees. See figure below.

Figure 5 Descriptive statistics: Number of full time employees



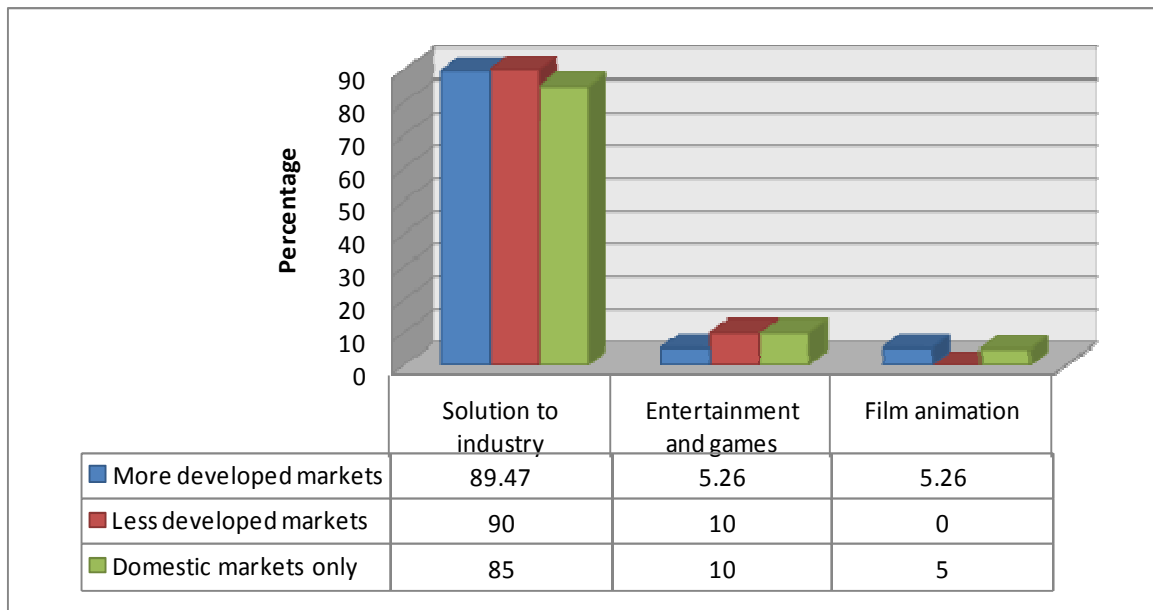
The firms operated predominantly in the 'application software' and 'software services' segments. The more developed market firms focused predominantly on the 'application software' segment compared to the domestic market firms who capitalised on the 'software services' segment. The comparison can be seen in the figure below.

Figure 6 Descriptive statistics: Segment



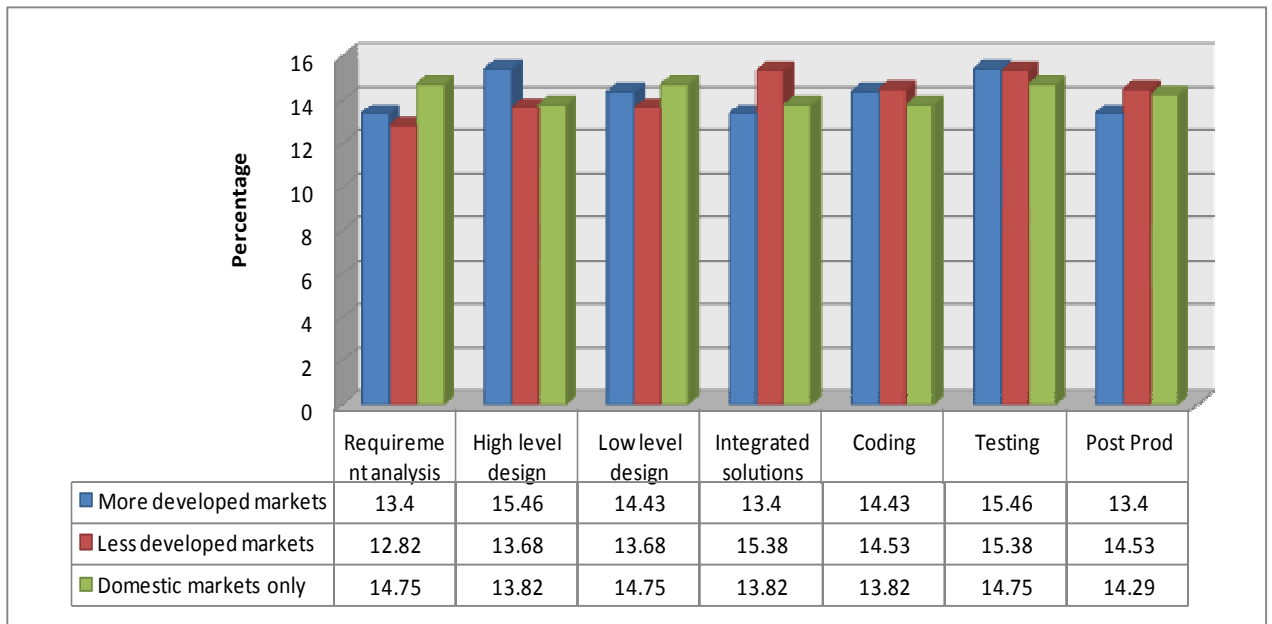
The firms operated largely in the ‘solution to industry’ market for all three groups. The domestic market firms appear to have also started to operate in the other markets but to a much lesser extent as is graphically represented below.

Figure 7 Descriptive statistics: Market



The firms performed relatively homogeneously in the various value chain activities, namely requirement analysis with final customer, high level design (complex), low level design (standard), integrated services or solutions, coding, testing and post production support. The firms in the more developed market had a higher percentage in the 'high level design' and 'testing' activities which are in line with the argument that these firms tend to focus more on quality and variety. The firms in the less developed markets focused more on 'integrated solutions' as well as 'testing' activities. Refer to the figure below for a graphical representation of the comparison between the three groups.

Figure 8 Descriptive Statistics: Value chain activities



5.2 Innovation Capabilities

The data pertaining to the first hypothesis will be presented in this section.

5.2.1 Research and Development

Forty percent of the firms in the study did not have a research department and 60% did (Table 1). Domestic market firms had a higher percentage of firms who did not have an R&D department when compared to the other two groups. It can be argued that as a result of firms moving into other markets (besides the domestic market) R&D becomes more important. However, the findings across the three groups were not significantly different with a probability value of 0.902.

Table 1 Fisher's Exact Test: Research and development department

		Group			Total
		More developed markets	Less developed markets	Domestic markets only	
No	Frequency	6	7	15	28
	Percent	8.57	10	21.43	40
	Row Pct	21.43	25	53.57	
	Col Pct	37.5	36.84	42.86	
Yes	Frequency	10	12	20	42
	Percent	14.29	17.14	28.57	60
	Row Pct	23.81	28.57	47.62	
	Col Pct	62.5	63.16	57.14	
Total		16	19	35	70
		22.86	27.14	50	100

Frequency Missing = 2

Fisher's Exact Test Pr <= P 0.902

5.2.2 Collaboration

Firms relied heavily on internal development for their innovations (65%) and relied on other companies (30%) to a lesser extent (Table 2). Universities / research centres only accounted for 5%. The findings across the three groups followed a similar pattern and were not significantly different with a probability value of 0.9529.

Table 2 Fisher's Exact Test: Innovation collaboration

		Group			Total
		More developed markets	Less developed markets	Domestic markets only	
Internal	Frequency	9	12	23	44
	Percent	13.24	17.65	33.82	64.71
	Row Pct	20.45	27.27	52.27	
	Col Pct	60	63.16	67.65	
With other companies	Frequency	5	6	10	21
	Percent	7.35	8.82	14.71	30.88
	Row Pct	23.81	28.57	47.62	
	Col Pct	33.33	31.58	29.41	
With university / research centre	Frequency	1	1	1	3
	Percent	1.47	1.47	1.47	4.41
	Row Pct	33.33	33.33	33.33	
	Col Pct	6.67	5.26	2.94	
Total		15	19	34	68
		22.06	27.94	50	100

Frequency Missing = 4

Fisher's Exact Test Pr <= P 0.9529

5.2.3 Patents

A total of 38 firms indicated that they registered patents (missing frequency of 34). Across the three groups however no statistical significance was found with a p-value of 0.7003 (Table 3).

Table 3 Kruskal-Wallis Test: Patents per employee

Variable	More developed markets			Less developed markets			Domestic only			Kruskal-Wallis p-value	Sig
	N	Mean	Std Dev	N	Mean	Std Dev	N	Mean	Std Dev		
Patents per employee	10	0.10	0.32	7	0.02	0.04	21	0.26	0.77	0.7003	No

5.2.4 Size

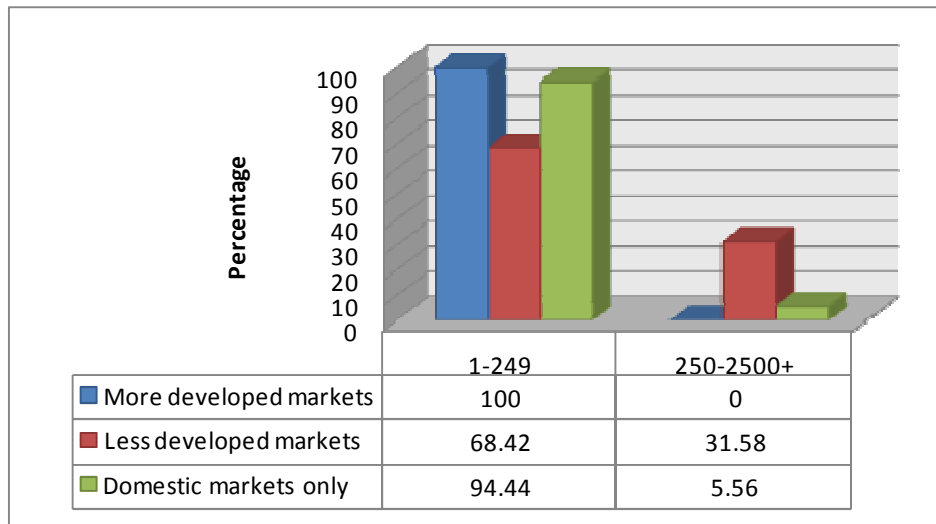
As mentioned under the descriptive characteristics section the majority of firms are small in nature, with the majority (46%) falling in the 10-49 employees category followed by 19% in the 1-9 employees category. Sorting the firms into two categories, namely, small (one to 249 employees) and large (250 to 2500+ employees) a statistical significance was obtained between the three groups (Table 4). Less developed market firms have a larger percentage (32%) of firms who are large compared to the other two groups. All the firms in the more developed markets' group were classified as small. A highly significant p-value of 0.0069 was obtained.

Table 4 Fisher's Exact Test: Size

		Group			Total
		More developed markets	Less developed markets	Domestic markets only	
1-249	Frequency	17	13	34	64
	Percent	23.61	18.06	47.22	88.89
	Row Pct	26.56	20.31	53.13	
	Col Pct	100	68.42	94.44	
250-2500+	Frequency	0	6	2	8
	Percent	0	8.33	2.78	11.11
	Row Pct	0	75	25	
	Col Pct	0	31.58	5.56	
Total		17	19	36	72
		23.61	26.39	50	100
		Fisher's Exact Test		Pr <= P	0.0069

In order to highlight the statistical significance between the three groups a graphical representation is provided below.

Figure 9 Fisher's Exact Test: Size



5.3 Sources of information

The data pertaining to the second hypothesis will be presented in this section. The tables presented below highlight the statistical findings for the sources of information, namely, employees, suppliers, clients and competitors that are important to the firms' product / process innovation development.

Firms (regardless of group) made extensive use of existing employees as a source of information locally (> 86%) compared to internationally (<13.5%). The

more developed market firms had the highest percentage (13%) use of employees as a source when compared to the other two groups. However it should be noted that only two firms accounted for this rating. No statistical significance was obtained across the three groups with a p-value of 0.7355.

Table 5 Fisher's Exact Test: Sources of technology: Existing employees

		Group			Total
		More developed markets	Less developed markets	Domestic markets only	
Local / Domestic	Frequency	13	16	31	60
	Percent	19.7	24.24	46.97	90.91
	Row Pct	21.67	26.67	51.67	
	Col Pct	86.67	94.12	91.18	
International	Frequency	2	1	3	6
	Percent	3.03	1.52	4.55	9.09
	Row Pct	33.33	16.67	50	
	Col Pct	13.33	5.88	8.82	
Total		15	17	34	66
		22.73	25.76	51.52	100

Frequency Missing = 6

Fisher's Exact Test Pr <= P 0.7355

Domestic firms made the most use of existing suppliers as a source of information locally (81%) and the least use internationally (19%) when compared to the other two groups which had an equal percentage (50%) both locally and internationally (Table 6). It makes sense that domestic firms would have a higher percentage locally than internationally and that firms who have moved into foreign markets would have a higher percentage internationally than domestic firms. Marginal statistical significance was obtained at a 10% level of significance across the three groups with a p-value of 0.0877.

Table 6 Fisher's Exact Test: Sources of technology: Suppliers

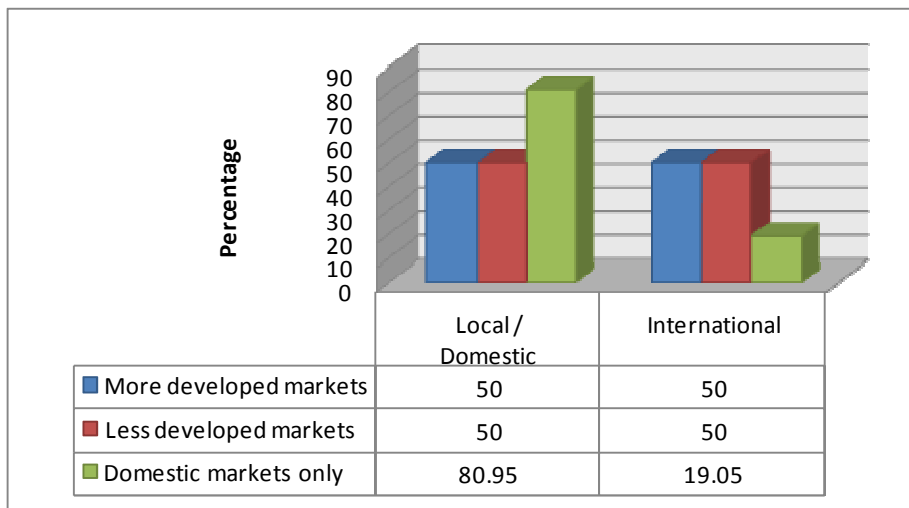
		Group			Total
		More developed markets	Less developed markets	Domestic markets only	
Local / Domestic	Frequency	5	5	17	27
	Percent	12.2	12.2	41.46	65.85
	Row Pct	18.52	18.52	62.96	
	Col Pct	50	50	80.95	
International	Frequency	5	5	4	14
	Percent	12.2	12.2	9.76	34.15
	Row Pct	35.71	35.71	28.57	
	Col Pct	50	50	19.05	
Total		10	10	21	41
		24.39	24.39	51.22	100

Frequency Missing = 31

Fisher's Exact Test Pr <= P 0.0877

In order to emphasize the marginal statistical significance between the three groups a graphical representation of the difference is provided below.

Figure 10 Fisher's Exact Test: Sources of technology: Suppliers



The information source ‘clients’ showed statistical significance between the three groups with a p-value of 0.0285. The more developed market firms’ data pattern differed significantly from the other two groups’ pattern, whereby 38% of international clients contributed to the firms innovations compared to only 12.5% (less developed market firms) and 7% (domestic market firms). Local clients accounted for 93% of domestic market firms’ innovations. See Table 7 below.

Table 7 Fisher’s Exact Test: Sources of technology: Clients

		Group			Total
		More developed markets	Less developed markets	Domestic markets only	
Local / Domestic	Frequency	8	14	28	50
	Percent	13.56	23.73	47.46	84.75
	Row Pct	16	28	56	
	Col Pct	61.54	87.5	93.33	
International	Frequency	5	2	2	9
	Percent	8.47	3.39	3.39	15.25
	Row Pct	55.56	22.22	22.22	
	Col Pct	38.46	12.5	6.67	
Total	Frequency	13	16	30	59
	Percent	22.03	27.12	50.85	100

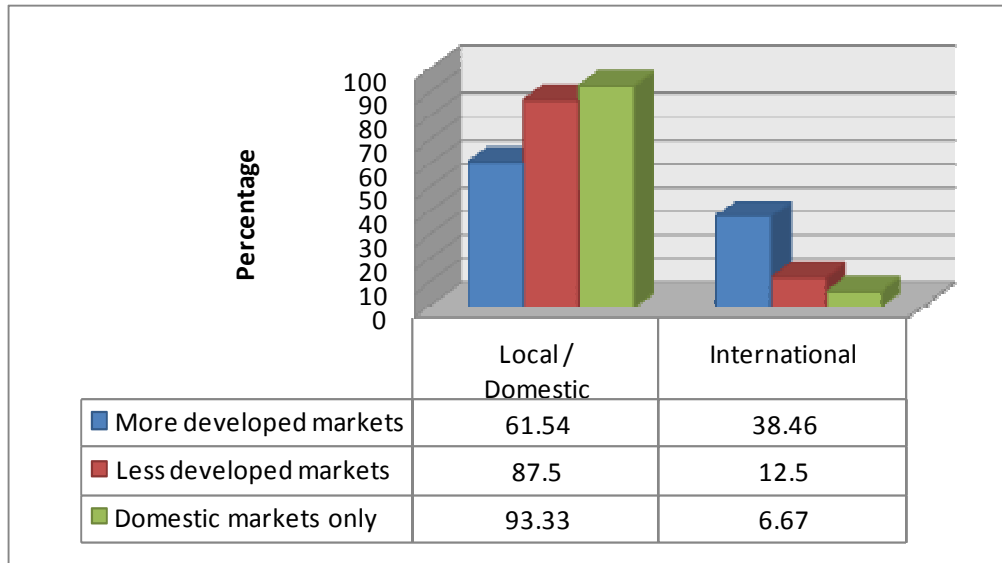
Frequency Missing = 13

Fisher's Exact Test

Pr <= P 0.0285

Below is a graphical representation to accentuate the statistical significance between the three groups. The difference in patterns between the three groups is evident.

Figure 11 Fisher’s Exact Test: Sources of technology: Clients



Innovation in domestic market firms was to a significant extent spurred by local competitors (>85%) while in less developed markets the number was 64% and more developed markets only 40% (Table 8). However, international competitors exerted a considerable effect on the innovativeness of more developed market firms (60%) as would be expected, whereas only 30% of domestic firms relied on international competitors as a source of information. However, a p-value of 0.3286 was obtained and the results are not statistically significant. It should also be noted that only 23 firms indicated that competitors were used as a source of information which may account for the high p-value even though there seems to be a clear pattern.

Table 8 Fisher's Exact Test: Sources of technology: Competitors

		Group			Total
		More developed markets	Less developed markets	Domestic markets only	
Local / Domestic	Frequency	2	7	6	15
	Percent	8.7	30.43	26.09	65.22
	Row Pct	13.33	46.67	40	
	Col Pct	40	63.64	85.71	
International	Frequency	3	4	1	8
	Percent	13.04	17.39	4.35	34.78
	Row Pct	37.5	50	12.5	
	Col Pct	60	36.36	14.29	
Total		5	11	7	23
		21.74	47.83	30.43	100

Frequency Missing = 49

Fisher's Exact Test Pr <= P 0.3286

5.4 Strategy

The analytical data pertaining to the third hypothesis will be presented in this section.

5.4.1 Firm Strategies

Quality as a strategy was essentially the most important variable for all three groups, followed by new product / services and strategic partnerships when accessing the domestic market (Table 9). No statistical significance (p -value = 0.9984) was obtained between the three groups for all four strategies namely, quality, cost, new product / services and strategic partnerships.

Table 9 Fisher's Exact Test: Strategy to access domestic market

		Group			Total
		More developed markets	Less developed markets	Domestic markets only	
Quality	Frequency	12	15	30	57
	Percent	6.59	8.24	16.48	31.32
	Row Pct	21.05	26.32	52.63	
	Col Pct	33.33	30.61	30.93	
Cost	Frequency	7	10	18	35
	Percent	3.85	5.49	9.89	19.23
	Row Pct	20	28.57	51.43	
	Col Pct	19.44	20.41	18.56	
New products / services	Frequency	10	13	25	48
	Percent	5.49	7.14	13.74	26.37
	Row Pct	20.83	27.08	52.08	
	Col Pct	27.78	26.53	25.77	
Strategic partnerships	Frequency	7	11	24	42
	Percent	3.85	6.04	13.19	23.08
	Row Pct	16.67	26.19	57.14	
	Col Pct	19.44	22.45	24.74	
Total		36	49	97	182
		19.78	26.92	53.3	100

Fisher's Exact Test Pr <= P 0.9984

Different strategies were considered important for the three groups when accessing less developed markets, but no statistical significance was obtained between the three groups for all four strategies (cost, strategic partnerships, quality and the launching of new products and services) with a resulting p-value of 0.819 (Table 10).

Table 10 Fisher's Exact Test: Strategy to access less developed markets

		Group			Total
		More developed markets	Less developed markets	Domestic markets only	
Quality	Frequency	2	10	3	15
	Percent	3.08	15.38	4.62	23.08
	Row Pct	13.33	66.67	20	
	Col Pct	14.29	30.3	16.67	
Cost	Frequency	3	8	6	17
	Percent	4.62	12.31	9.23	26.15
	Row Pct	17.65	47.06	35.29	
	Col Pct	21.43	24.24	33.33	
New products / services	Frequency	4	7	3	14
	Percent	6.15	10.77	4.62	21.54
	Row Pct	28.57	50	21.43	
	Col Pct	28.57	21.21	16.67	
Strategic partnerships	Frequency	5	8	6	19
	Percent	7.69	12.31	9.23	29.23
	Row Pct	26.32	42.11	31.58	
	Col Pct	35.71	24.24	33.33	
Total		14	33	18	65
		21.54	50.77	27.69	100

Fisher's Exact Test Pr <= P 0.819

Similarly, when different strategies were considered for the three groups when accessing more developed markets no statistical significance was obtained between the three groups for all four strategies with a p-value of 0.9169 (Table 11).

Table 11 Fisher's Exact Test: Strategy to access more developed markets

		Group			Total
		More developed markets	Less developed markets	Domestic markets only	
Quality	Frequency	6	6	2	14
	Percent	11.32	11.32	3.77	26.42
	Row Pct	42.86	42.86	14.29	
	Col Pct	25	31.58	20	
Cost	Frequency	4	5	2	11
	Percent	7.55	9.43	3.77	20.75
	Row Pct	36.36	45.45	18.18	
	Col Pct	16.67	26.32	20	
New products / services	Frequency	5	4	3	12
	Percent	9.43	7.55	5.66	22.64
	Row Pct	41.67	33.33	25	
	Col Pct	20.83	21.05	30	
Strategic partnerships	Frequency	9	4	3	16
	Percent	16.98	7.55	5.66	30.19
	Row Pct	56.25	25	18.75	
	Col Pct	37.5	21.05	30	
Total		24	19	10	53
		45.28	35.85	18.87	100

Fisher's Exact Test Pr <= P 0.9169

The resource strategy obtained statistical significant results with a p-value of 0.0234. The patterns displayed by all three groups differed significantly from each other (Table 12). Fifty three percent of domestic market firms categorised their resources (machinery and equipment) as 'ahead' of the industry in South Africa, 42% of less developed market firms categorised themselves as average with regard to the SA industry and 47% of more developed markets firms did not know how to categorise themselves. Domestic market firms may be over rating themselves as they have not been exposed to other markets and hence perceive themselves to be ahead of the SA industry based on their limited view.

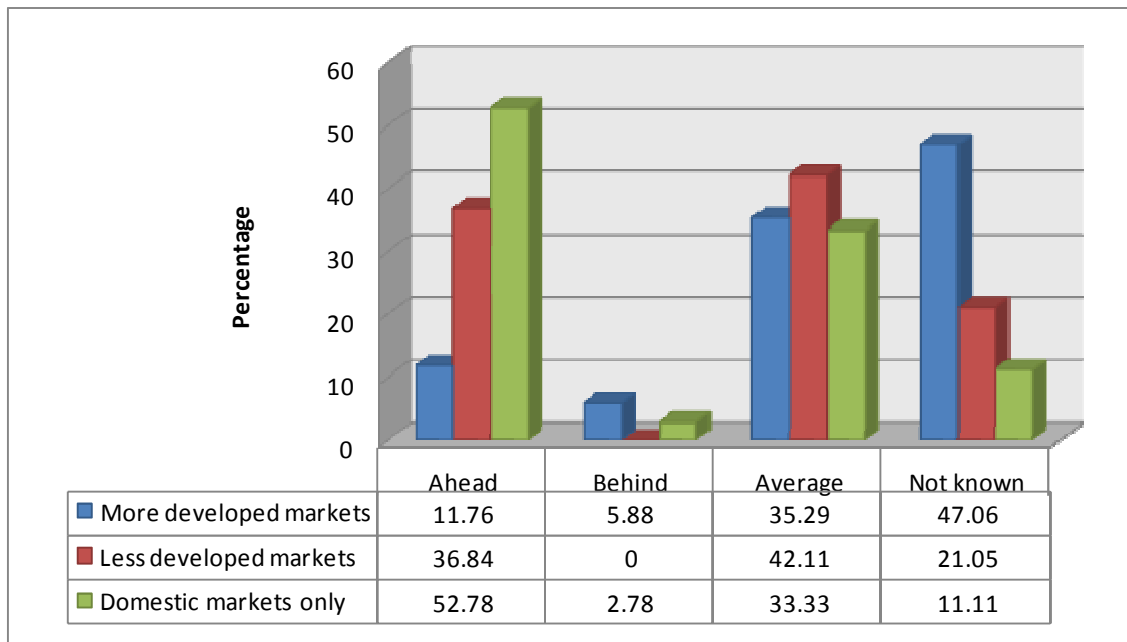
Table 12 Fisher's Exact Test: Resource Strategy

		Group			Total
		More developed markets	Less developed markets	Domestic markets only	
Ahead	Frequency	2	7	19	28
	Percent	2.78	9.72	26.39	38.89
	Row Pct	7.14	25	67.86	
	Col Pct	11.76	36.84	52.78	
Behind	Frequency	1	0	1	2
	Percent	1.39	0	1.39	2.78
	Row Pct	50	0	50	
	Col Pct	5.88	0	2.78	
Average	Frequency	6	8	12	26
	Percent	8.33	11.11	16.67	36.11
	Row Pct	23.08	30.77	46.15	
	Col Pct	35.29	42.11	33.33	
Not known	Frequency	8	4	4	16
	Percent	11.11	5.56	5.56	22.22
	Row Pct	50	25	25	
	Col Pct	47.06	21.05	11.11	
Total		17	19	36	72
		23.61	26.39	50	100

Fisher's Exact Test Pr <= P 0.0234

In order to highlight the statistical significant difference in the patterns between the three groups a graphical representation is provided below.

Figure 12 Fisher's Exact Test: Resource Strategy



5.4.2 Types of Innovation and Degree of Novelty

The tables presented below display the statistical results for the three groups with regard to the various types of innovations, namely product and process as well as the degree of novelty, namely, new to the world, new to domestic market and new to the firm. All three firms displayed similar patterns and no statistical difference was obtained for any of these variables. All three groups mainly innovated with new products and services in the domestic market and internally (new to the firm) with only a few product / service innovations in the 'new to world' category. However, with regard to process innovations, all three groups focused mainly within the firm.

All three groups tended to focus within the ‘new to domestic market’ and within the firm when it came to product innovation (goods) as seen in the table below. The lowest degree of novelty was ‘new to the world’ where all three groups obtained results of less than 27%. A p-value of 0.9789 was obtained.

Table 13 Fisher's Exact Test: Product Innovation (improved goods)

		Group			Total
		More developed markets	Less developed markets	Domestic markets only	
New to world	Frequency	2	5	6	13
	Percent	3.39	8.47	10.17	22.03
	Row Pct	15.38	38.46	46.15	
	Col Pct	15.38	26.32	22.22	
New to domestic market	Frequency	6	8	11	25
	Percent	10.17	13.56	18.64	42.37
	Row Pct	24	32	44	
	Col Pct	46.15	42.11	40.74	
New to firm	Frequency	5	6	10	21
	Percent	8.47	10.17	16.95	35.59
	Row Pct	23.81	28.57	47.62	
	Col Pct	38.46	31.58	37.04	
Total		13	19	27	59
		22.03	32.2	45.76	100

Frequency Missing = 13

Fisher's Exact Test

Pr <= P 0.9789

With regard to ‘improved services’ domestic market firms scored the lowest (30%) in ‘new to the domestic market’ category compared to the other two groups who scored 67% each (Table 14). However, the domestic market firms scored higher (52%) in the ‘new to firm’ category compared to the other two groups. Yet again the lowest degree of novelty was ‘new to the world’ where all

three groups obtained results of less than 18%. The results were not significant with a p-value of 0.1366 and 22 firms did not innovate services.

Table 14 Fisher's Exact Test: Product Innovation (improved services)

		Group			Total
		More developed markets	Less developed markets	Domestic markets only	
New to world	Frequency	1	2	4	7
	Percent	2	4	8	14
	Row Pct	14.29	28.57	57.14	
	Col Pct	8.33	13.33	17.39	
New to domestic market	Frequency	8	10	7	25
	Percent	16	20	14	50
	Row Pct	32	40	28	
	Col Pct	66.67	66.67	30.43	
New to firm	Frequency	3	3	12	18
	Percent	6	6	24	36
	Row Pct	16.67	16.67	66.67	
	Col Pct	25	20	52.17	
Total		12	15	23	50
		24	30	46	100

Frequency Missing = 22

Fisher's Exact Test Pr <= P 0.1366

Process innovation in terms of 'improved methods' was only carried out by 24 firms. None of the firms, in all three groups, improved their process methods in terms of 'new to the world'. A p-value of 0.3245 was obtained and the results are not significant.

Table 15 Fisher's Exact Test: Process Innovation (improved methods)

		Group			Total
		More developed markets	Less developed markets	Domestic markets only	
New to world	Frequency	0	0	0	0
	Percent	0	0	0	0
	Row Pct	0	0	0	
	Col Pct	0	0	0	
New to domestic market	Frequency	1	1	3	5
	Percent	4.17	4.17	12.5	20.83
	Row Pct	20	20	60	
	Col Pct	50	10	25	
New to firm	Frequency	1	9	9	19
	Percent	4.17	37.5	37.5	79.17
	Row Pct	5.26	47.37	47.37	
	Col Pct	50	90	75	
Total		2	10	12	24
		8.33	41.67	50	100

Frequency Missing = 48

Fisher's Exact Test Pr <= P 0.3245

A similar pattern (as above) was found with regard to 'improved logistics' as can be seen in the table below. The firms in all three groups tended to focus on improved processes within the firm with results greater than 80%. It should be noted however that 57 firms did not participate in this type of innovation and a non-significant result was obtained.

Table 16 Fisher's Exact Test: Process Innovation (improved logistics)

		Group			Total
		More developed markets	Less developed markets	Domestic markets only	
New to world	Frequency	0	0	0	0
	Percent	0	0	0	0
	Row Pct	0	0	0	
	Col Pct	0	0	0	
New to domestic market	Frequency	0	1	1	2
	Percent	0	6.67	6.67	13.33
	Row Pct	0	50	50	
	Col Pct	0	14.29	20	
New to firm	Frequency	3	6	4	13
	Percent	20	40	26.67	86.67
	Row Pct	23.08	46.15	30.77	
	Col Pct	100	85.71	80	
Total		3	7	5	15
		20	46.67	33.33	100

Frequency Missing = 57

Fisher's Exact Test Pr <= P 1

5.4.3 Robustness checks

In order to ensure the robustness of the research study several checks were carried out.

Under the research and development variable the intramural and extramural R&D activities were also investigated. Eighty percent of the firms in the study engaged in intramural R&D activities locally whereas 20% engaged in these

activities internationally. The findings across the three groups were not significantly different with a probability value of 0.9056.

Only 21 firms engaged in extramural R&D, of which 66% of the firms engaged in extramural R&D activities locally whereas 33% engaged in these activities internationally. The findings across the three groups were not significantly different with a probability value of 0.6424.

In addition to the innovation collaboration findings mentioned in chapter 5, research collaboration was also checked to ensure that there were no differences between the three groups on this type of collaboration. A total of 34 firms engaged in research collaboration with other firms, of that 74% were local and 27% were international. 86% of domestic market firms collaborated locally (14% internationally) which makes sense as they operate domestically. The other two groups showed a higher percentage (over 33%) when measured on this variable. It can be argued that when firms move into other markets more international research collaboration is required to be successful. No significance between the three groups was however found with a probability of 0.4309.

Ojala & Tyrvaïnen (2008) found that qualifications of personnel played a crucial role for successful operations especially in small sized firms where there was no room for unskilled employees. Similarly, Akman & Yilmaz (2008) concur that software firms especially, require highly skilled personnel that are “technology oriented, innovative and creative” (p.102). Other studies have shown that the educational levels of decision makers as well as the number of well-trained employees all are positively related to firm performance, specifically export performance (Nakos, Brouthers, & Brouthers, 1998). Evidence was therefore sought on whether emerging market firms’ employee education levels differ if they focused on the domestic market, developing or developed markets’ consumers. A robustness check was therefore conducted on this variable. Across the three groups no statistical significance was found with regard to the variable ‘education’ with a probability value of 0.6591 for technical education, 0.7109 for university degree and 0.3476 for post grad studies.

A robustness check was also carried out on the variable ‘sources of information’. Other sources such as consultancy companies, universities and government were also verified. No statistical differences between the three groups were found on these additional sources of information. High missing frequencies was also found. Only 22 firms made use of consultancy companies as a source of information for new products ideas whereas only 16 firms made use of universities and 12 firms made use of government.

The type of innovation and degree of novelty check was conducted on organisational innovation in addition to product and process innovation, namely, new management practices and new methods of organising external relations. Both these type of organisational innovations did not produce any statistical significance with a p-value of 0.575 from new management practices (33 firms) and a p-value of 1 for new methods of organising external relations (24 firms).

The robustness checks were conducted to ensure that there is consistency in the results, and support the pattern found in the data overall. In summary, there are more similarities in firms operating across very different contexts, although a number of important and meaningful differences can be found.

6. Chapter 6 Discussion of Results

In order for firms to meet the relentless demands and challenges of a volatile, dynamic and highly competitive external environment, firms are required to gain a competitive advantage through the ability to innovate. In the literature study it was shown that consumers' sophistication impacts a firm's incentives to innovate.

Sophistication of consumer demand varies significantly across more developed, less developed and domestic markets. Consumers in a developed market tend to be wealthier than consumers in a developing market and therefore the strategy and innovation capabilities of a firm should be aligned with the market's level of sophistication. In turn, even though customers may not be that demanding, in less developed markets the infrastructure is often underdeveloped, so that firms need to be quite robust to meet the demands of a demanding environment.

This study investigated emerging market firms' innovation capabilities, sources of information and strategies and how they were impacted on depending on the level of consumer sophistication. The firms were divided into three independent groups, namely a) those firms who sell to more developed markets in addition to the domestic market; b) those firms who sell to the less developed markets in

addition to the domestic market; and c) those firms who sell only to the domestic market.

6.1 Innovation Capabilities

In the literature review it was established that firms who have high innovative capabilities tend to be more successful. Innovation capabilities are deemed fundamental in assisting firms to enhance or develop new product / service innovations and turn ideas into sustainable business opportunities.

Four variables under this construct “innovation capabilities’ were investigated in this study to determine if the sophistication of consumer demand impacted on these variables, namely, research and development, collaboration, patents, and size of the firm (number of employees).

Research and development has been found to be positively related to innovation success in the literature review. As research and development is about creating ‘new’ ideas and turning those ideas into sustainable innovations, it is assumed to be of more relevance to more developed markets with sophisticated consumers compared to less developed markets. In this study

40% of the firms did not have a research department compared to 60% who did. In the software development industry, firms who are unable to innovate do not survive. The software industry is characterised by a swift rate of process / product innovations, rapidly accelerating product life cycles and significant experience in adoption of innovative practices. It is therefore surprising that the percentage of software firms without R&D departments is so high. This may be attributed to the fact that most of the firms in this study were small in nature (1-49 employees) and therefore are likely to innovate informally rather than in a structured unit. R&D departments are an expensive resource and small firms are not always in the position to carry these costs. Strategic partnerships therefore become extremely valuable for small firms, especially when competing in foreign markets. Leveraging off the advantages of various sources of information for innovative ideas is another mechanism that small firms can utilise in the absence of a R&D department.

The more developed and less developed market firms had a marginally higher percentage of R&D departments when compared to the domestic market firms. It can therefore be argued that as a result of these firms competing in foreign markets R&D becomes slightly more important. The findings across the three groups however were not significantly different. It appears that regardless of the market environment, whether local or foreign, research and development is an important variable and becomes even more vital when competing in unfamiliar territory.

In the literature study it was established that in order for firms to improve their ability to innovate firms should cooperate and collaborate with other organisations specifically relating to innovation activities. It is believed that few firms are capable of innovating in isolation. It can be further deduced that collaboration becomes progressively more essential as firms move into foreign markets, in order to benefit from the existing experience and knowledge of organisations already operating in those foreign markets.

The results of the study is therefore surprising in that firms, regardless of the market they were in, focused primarily on internal collaboration within the firm and to a lesser extent with other companies outside of the firm. The pattern between the three groups was consistent and no significant difference was observed. The firms did not consider universities or research centres as possible collaborative partners. Although collaboration with other organisations does occur it is not as significant as found to be in the literature study. Domestic market firms tend to compete similarly on the collaboration variable as the other two groups.

Literature has shown opposing views of the role of patents in stimulating innovation. Prior research conducted found that software patents play a positive

role in promoting innovation on the one hand yet a counterargument was found that patents are a deterrent to software innovation. Patents tend to be associated with increased costs, specifically in terms of entering a market, resources required to patent as well as defending the rights against larger organisations. It can be argued that patents would play an increasingly vital role for firms entering the more developed markets where consumers are more sophisticated and value variety and uniqueness.

The study explored whether patents have an impact upon an emerging market firm's innovation capabilities in terms of its consumers' sophistication and the result found no statistical significance between the three groups. It was established that regardless of market environment patents did not play a role when sourcing customers. It was also found that only 38 of the 72 firms registered patents. It is assumed that due to the high costs and resources required to register patents, firms in an emerging market do not necessarily focus on patent registration as a primary innovation activity. Firms in an emerging market may focus more on less costly alternatives to assist in the generation of new product and service innovations. Such alternatives could include partnerships as well as reliance on various sources of information e.g. clients, competitors, suppliers and employees.

The literature review established that the size of the firm impacts on its ability to innovate and therefore impacts on the firm's innovation capability. Smaller firms are nimbler, agile, and more flexible / responsive to change and therefore tend to be more innovative than larger firms. However, larger firms have the required resources to implement solutions. Small high tech firms need to be innovative to survive in a highly competitive market, specifically in developing countries.

The size of emerging market firms conducting business in domestic, developing and developed nations was investigated to determine if this variable is significantly impacted by the level of consumer sophistication. The results conclude that size does matter. Sorting the firms into two categories, namely, small (one to 249 employees) and large (250 to 2500+ employees) a statistical significance was obtained between the three groups. A p-value of 0.0069 was obtained.

Less developed market firms had a larger percentage of firms who were classified as large compared to the other two groups. Less developed markets tend to be more volatile and turbulent with fewer infrastructures in place and it therefore makes sense that larger firms tend to compete into these markets. Larger firms generally have more resources to combat the impact of a more dynamic and unstable environment. All the firms in the more developed markets were classified as small. In order to compete in these highly developed

competitive markets firms need to be agile and flexible and therefore need the ability to innovate quickly. Small firms allow for quicker decision making and flexible approaches to adapt swiftly to the market demands.

Hypothesis 1 can therefore not be accepted in its entirety. The following conclusion is therefore made:

Hypothesis 1: The firm-specific innovation capabilities of software development firms in an emerging market that sell to consumers in a more developed market will vary significantly with those of less developed and domestic markets in terms of innovation behaviour, namely:

1a) Research and Development – Rejected

1b) Collaboration – Rejected

1c) Patents – Rejected

1d) Size – Accepted

6.2 Sources of information

In the literature review employees, suppliers, clients and competitors have all been found to be important sources of innovation knowledge and ideas. These sources of information are more than likely to have a different impact when

considering more versus less sophisticated customers. The more developed markets tend to have the more sophisticated consumers who focus on quality, specialisation and variety. In comparison, the less developed markets have less sophisticated consumers who focus mainly on low cost. Firms can benefit from strong competitors, aggressive suppliers, knowledgeable employees and a demanding customer base.

This study found that the emerging market firms' local employees are a valuable source of innovation knowledge and ideas for all three groups, regardless of the level of consumer sophistication. Domestic market firms made extensive use of local competitors and less developed markets accounted for 64% and more developed markets only 40% of local competitor knowledge. However, more developed market firms made considerable use of international competitors (60%) as would be expected, whereas domestic firms accounted for only 30% of international competitors as a source of information. More developed market firms have to keep abreast of the international product and service innovations and therefore international competitors becomes an important source of such information. The results were not statistically significant between the three groups.

In addition to the above this study found that suppliers and clients as a source of innovation information are significantly impacted on by the level of consumer sophistication.

Domestic firms made the most use of existing suppliers as a source of information locally and the least use internationally when compared to the other two groups. It can be argued that domestic firms would have a higher percentage locally than internationally due to the fact that domestic firms compete locally and that firms who have moved into foreign markets would have a higher percentage internationally than domestic firms. Marginal statistical significance was obtained at a 10% level of significance across the three groups with a p-value of 0.0877.

Clients as an information source showed statistical significance between the three groups with a p-value of 0.0285. The more developed market firms' data pattern differed significantly from the other two groups'. The more developed market firms' international clients contributed to the firms' innovations almost triple the amount when compared to the less developed market firms. International, sophisticated consumers who demand variety and uniqueness in products and services are therefore a vital source of information for more developed market firms as opposed to domestic firms who focus on local clients. This makes sense as domestic market firms have not moved into

international markets and are not reliant on international consumers to compete domestically. More developed market firms who are able to meet the challenge of identifying consumer needs are in a stronger position to enhance their innovation capabilities to better serve their market.

Less developed market firms' consumers who are less sophisticated do not rely on international clients as a source of information as was to be expected as the focus is more on low cost. These firms make use of local clients for ideas.

Hypothesis 2 can therefore not be accepted in its entirety. The following conclusion is therefore made:

Hypothesis 2: The firm-specific sources of information of software development firms in an emerging market that sell to consumers in a more developed market will vary significantly with those of less developed and domestic markets, namely:

2a) Employees – Rejected

2b) Suppliers – Accepted

2c) Clients – Accepted

2d) Competitors – Rejected

6.3 Strategy

The literature review has shown that firms in an emerging market generally compete internationally based on price / cost strategies. Due to the highly competitive nature of mature, more developed markets, emerging market firms have a tendency to enter less competitive emerging markets or enter developed markets either through partnerships or by offering low cost products and services.

The investigation of various strategies such as quality, cost, new products / services, strategic partnerships and resource allocation in an emerging market such as South Africa was conducted to determine how emerging market firms can successfully penetrate mature markets as well as developing markets.

Quality as a strategy was essentially the most important variable for all three groups, followed by new product / services and strategic partnerships when accessing the domestic market. No statistical significance was obtained between the three groups for all four strategies namely, quality, cost, new product / services and strategic partnerships. Initially it may seem surprising that the domestic market firms and less developed market firms focus on quality

when accessing the local market as quality is normally associated with more sophisticated consumers. It was thought that a cost strategy would have been the most important variable for less developed market firms and domestic firms when accessing the local market. However it can be argued that the quality of a software product or service is critical regardless of context due to the very nature of the product itself – software either works or it does not.

Different strategies were considered important for the groups when accessing more developed markets. Firms who sell mainly to less developed markets focused again on quality whereas firms who sell mainly to the developed markets focused on strategic partnerships. In order to enter a more mature developed market, strategic partnerships are essential to strengthen, support and sustain the firm in such a highly competitive environment. Collaboration is critical for the survival of such firms. It was also identified that most of the more developed market firms were small in size and therefore strategic partnerships become extra important due to the constraints associated with small firms.

A similar pattern was found for the groups when accessing less developed markets. Firms who sell mainly to less developed markets focused again on quality whereas firms who sell mainly to the developed markets focused again on strategic partnerships. It appears that firms establish a strategy that works

for them in their given international market and then use this same strategy regardless of the international context or level of consumer sophistication.

The resource strategy obtained statistical significant results with a p-value of 0.0234. The majority of domestic market firms (53%) categorised their resources (machinery and equipment) as 'ahead' of the industry in South Africa. A large percentage (42%) of less developed market firms categorised themselves as 'average' and almost half (47%) of more developed markets firms did not know how to categorise themselves. This was an interesting result. Domestic market firms may be overstating themselves as they have not been exposed to international markets and hence perceive themselves to be ahead of the SA industry based on their narrow world view.

Less developed market firms have had exposure to international markets and therefore are able to realistically rate themselves as average as they have a benchmark to which to compare themselves against. The interesting phenomenon though is that the more developed market firms do not know what their resource position is. This may be due to these firms being small in size and reliant on strategic partnerships to establish themselves. It may also be a result of the firms not knowing how to compare or evaluate themselves against other firms in a mature niche environment.

The degree of novelty will have varying levels of value depending on the level of consumer sophistication. More sophisticated consumers are willing to pay for unique products and services whereas less sophisticated consumers are not. It is probable that firms operating in more developed markets will display a higher degree of novelty than those of less developed market firms in order to satisfy the more sophisticated consumers. In contrast, standardised products tend to satisfy consumers with a low degree of sophistication. It can therefore be argued that when firms serve low-income markets, process innovations that serve to lower prices will dominate. In contrast, firms that serve higher-income, more developed markets may focus on process innovations that serve quality and variety. However in this study, this was not found to be so.

The results for the three groups with regard to the various types of innovations, namely product and process as well as the degree of novelty, namely, new to the world, new to domestic market and new to the firm were not significant. All three firms displayed similar patterns. All three groups mainly innovated with new products and services in the domestic market and internally (new to the firm) with only a few product / service innovations in the 'new to world' category. However, with regard to process innovations, all three groups focused mainly within the firm. It appears the 'new to the world' innovations are severely limited for emerging market firms and that most innovations are new to the domestic market or firm. This may be due to the high tech nature of the

software development process and product. Emerging market firms tend to be playing catch up with the more mature markets and perhaps mimicking international players locally. The focus is definitely on new product / service innovations as opposed to process innovations which may be due to the maturity level of emerging market firms.

Only a small part of Hypothesis 3 can therefore be accepted. The following conclusion is therefore made:

Hypothesis 3: The firm-specific strategies of software development firms in an emerging market that sell to consumers in a more developed market will vary significantly with those of less developed and domestic markets in terms of:

2a) Strategy:

Quality – Rejected

Cost – Rejected

New products / services – Rejected

Strategic partnerships – Rejected

Resources - Accepted

2b) Type of innovation and degree of novelty – Rejected

7. Chapter 7 Conclusion

This study addressed the question, “How do emerging market firms innovate to compete both locally and globally?” The research study sought to establish if emerging market firms’ innovation capabilities, sources of information and strategies were impacted on depending on the level of consumer sophistication. This study thereby provided some insight into how these firms conduct business in domestic, more developed and less developed markets.

The results produced findings that were not always aligned with the literature review. However, certain variables contained within each main proposition were found to be statistically significant. The following variables were investigated:

Innovation capabilities: research and development, collaboration, patents, size

Sources of information: employees, suppliers, clients, competitors

Strategies: quality, cost, new products / services, strategic partnerships, resources

Type of innovation: product innovation, process innovation

Novelty of innovation: new to the world, new to the domestic market, new to firm

Size does matter. It was found that the size of the firm, as determined by the number of employees, was significantly different for the three groups, namely, more developed markets, less developed markets and the domestic market.

Almost a third of the firms who sell to the less developed markets were classified as large. Less developed markets tend to be more unpredictable in nature and are inundated by infrastructure constraints when compared to more developed markets. It therefore makes sense that larger firms tend to move into and compete in these markets. Larger firms generally have less resource constraints and are better positioned to combat the negative impact of a more dynamic and unstable environment.

On the other hand all the firms in the more developed markets were classified as small. It seems that in order to compete in these mature, competitive environments firms need to be highly responsive, flexible and need the ability to innovate quickly. Small firms allow for quicker decision making and adaptable approaches to adjust swiftly to the ever changing market demands.

In addition to the above this study found that suppliers and clients as a source of innovation information, knowledge and ideas were significantly different for different levels of consumer sophistication.

Domestic firms made the most significant use of local suppliers as a source of information and the least use of international suppliers when compared to the other two groups. It was argued that domestic firms would have a higher percentage locally than internationally due to the fact that domestic firms compete locally. The results also found that both more developed market firms and less developed market firms were equally distributed across local and international suppliers as a source of ideas. It was argued that firms who have moved into foreign markets would have a higher percentage internationally than domestic firms and this was confirmed.

The more developed market firms' data pattern differed significantly from the other two groups'. The more developed market firms' international clients contributed to the firms' innovations almost triple the amount when compared to the less developed market firms. International, sophisticated consumers who demand variety and uniqueness in products and services are therefore a vital source of information for more developed market firms as opposed to domestic firms who focus on local clients. It was argued that domestic market firms have not moved into international markets and are not reliant on international

consumers to compete domestically. More developed market firms that are able to meet the challenge of identifying consumer needs are in a stronger position to enhance their innovation capabilities to better serve their market. Less developed market firms' clients who are less sophisticated do not rely on international clients as a source of information as was to be expected as the focus is more on low cost. However, these firms make use of domestic clients for innovation ideas.

As regards their resource strategy, just over half of the domestic market firms categorised their resources (machinery and equipment) as 'ahead' of the industry in South Africa. A large percentage (42%) of less developed market firms categorised themselves as 'average' and almost half of more developed markets firms did not know how to categorise themselves. Domestic market firms may be overstating themselves as they have not been exposed to international markets and hence perceive themselves to be ahead of the SA industry based on their narrow world view. Domestic market firms should engage more with international players and benchmark to ensure they are not exaggerating their position.

Less developed market firms with exposure to international markets seemed to be more realistic when they rated themselves as average as they have a benchmark to which to compare themselves against. The interesting finding

was that the more developed market firms do not know what their resource position is. This may be due to these firms being small in size and reliant on strategic partnerships to establish themselves. It may also be a result of the firms not knowing how to compare or evaluate themselves against other firms in a mature niche environment.

Disruptive environments have become routine and the nature of competition keeps changing. Sustaining success during these times has become challenging and therefore identifying competencies and understanding the environment in which you operate becomes critical. Based on the literature study and research findings the following recommendations to enhance emerging market firms' innovation activities based on the level of consumer sophistication are presented below:

1) Due to the high costs usually associated with patent registration and the establishment of R&D departments, especially for small firms, it is vital that emerging market firms investigate alternative mechanisms to generate and enhance innovation activities and ideas. One such mechanism is to leverage off the various sources of information. It is recommended that firms competing in foreign markets should make extensive use of international clients, competitors and suppliers as sources of innovation ideas and knowledge. Domestic market firms should also tap into international sources of innovation (suppliers and competitors) in order to enrich their innovation process. A larger variety

of sources of information should be utilised to ensure a more comprehensive and richer innovation outcome.

2) In this study almost a third of the firms who sell to the less developed markets were classified as large. Presumably the unpredictable nature of such an environment requires more resources. However this may not necessarily be the case. The disadvantages and advantages of small emerging market firms moving into less developed markets were highlighted in the literature review. It was found that small emerging market firms have developed the capabilities to deal with poorer regulatory quality, difficult governance conditions and underdeveloped institutions as they suffer with these difficulties in home countries. It is therefore recommended that small firms be encouraged to expand into markets with similar home conditions in order to apply their home grown capabilities which may turn out to be a competitive advantage in the foreign market.

3) Collaboration between companies regardless of consumer sophistication needs to be fully exploited. The literature review has shown the importance of collaboration between companies in order to stimulate innovation. It is recommended that emerging market firms should collaborate more actively and engage with other organisations more often. Collaboration with suppliers, clients and research institutions have shown to have a positive impact on innovation novelty.

4) Strategic partnerships have shown to be of great importance to firms entering foreign markets. Firms entering both the developed and less developed markets should engage in strategic partnerships to ensure sustainable operations. These partnerships provide valuable sources of information, experience, expertise and market knowledge that will facilitate emerging market firms overcome their limited resource constraints such as a lack of internal R&D departments and small size.

5) In this study it is evident that emerging market firms have not effectively adjusted their strategy to accommodate for the sophistication of consumers. It is vital that firms alter their strategies depending on the market they are to enter. Consumer sophistication has a direct impact on a firms' success in a given market and emerging market firms need to ensure that they are aware of their consumers' demands and needs before entering into that market. Strategies such as cost, quality, new innovations and partnerships should be seriously considered and amended depending on the context in which the firm chooses to compete in.

6) Domestic market firms may be amplifying their resource strategy as they have not had exposure to international markets and hence perceive themselves to be ahead of the SA industry based on their narrow perspective. It is recommended that domestic market firms should engage more with international players and benchmark to ensure they have a more realistic picture of their position. The interesting finding was that the more developed market firms do not know what their resource

position is. This may be a result of the firms not knowing how to compare or evaluate themselves against other firms in a mature niche environment. It is recommended that these firms actively seek out ways to identify a pragmatic picture compared to their competitors in mature markets. Lack of information in such a competitive environment could be immensely costly.

This research study investigated emerging market firms' innovation capabilities, sources of information and strategies and whether the level of consumer sophistication impacts the way these firms operate in domestic, more developed and less developed markets. It argued that a firm's level of innovation will vary depending on the market it chooses to operate in. Firms who do business in a more developed market will innovate differently compared to firms who do business in local and less developed markets due to the varying level of consumer sophistication. The size of the firm, suppliers and clients as information sources as well the firms' resource strategy were found to be significantly different for the three groups. Recommendations to enhance emerging market firms' innovation activities based on the level of consumer sophistication were also presented.

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Appendix A



Insert logo of partner institution here

QUESTIONNAIRE FOR FIRMS
"INNOVATION-BASED STRATEGIES FOR GLOBALIZATION"
Questionnaire for "SOFTWARE"
(SOUTH AFRICA)

Person that makes the interview _____

Date of the interview _____

NOTE: Please answer all questions in relation to the status and activities of your unit in 2007



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I. COMPANY BACKGROUND

1. Company name

2. Is this unit...

- A single plant firm
 Part of an enterprise group¹. If part of an enterprise group, this unit is
 The head office A subsidiary

In which country is the head office of your group located? _____

If your unit is part of an enterprise group, please answer all subsequent questions in relation to this plant in SOUTH AFRICA only.

Do not include results from parent or other enterprises outside of SOUTH AFRICA

3. Year of establishment in South Africa

4. Location city of this unit

5. Web site

6. Ownership

- Percentage of domestic capital _____ %
 Percentage of foreign capital _____ %

7. Number of employees (average full-time equivalent for 2007)

- 1-9 50-99 250-499 1000-2499
 10-49 100-249 500-999 More than 2500

8. Please indicate the total sales (in 2007)

Estimation of total sales in RAND _____

Or, alternatively²:

- Less than 2 million US\$ Between 10-50 million US\$ More than 100 million US\$
 Between 2-10 million US\$ Between 50-100 million US\$

9. Please indicate the estimated percentage of your company's sales according to the following categories:

	% sales
Products manufactured by your unit according to design specifications provided by external buyers (<i>Original Equipment Manufacturing – OEM</i>)	
Products developed and designed by your unit according to performance requirements of buyers (<i>Original Design Manufacturing – ODM</i>)	
Products developed and designed by your unit and sold under your own brand (<i>Original Brand Manufacturing – OBM</i>)	
Others (please describe)	



10. a Please indicate the destinations of your sales in 2007 (estimated percentage on total sales)

Destination	% sales
Domestic market	
North America (US and Canada)	
Western Europe ³	
Africa (except domestic)	
Other, please specify	
	100%

10. b Click here if you estimate that more than 50% of your domestic sales are further exported to international markets

11. Please indicate the origin of suppliers in 2007 (estimated percentage on total purchases)

Origin	% purchases
Domestic market	
North America (US and Canada)	
Western Europe ⁴	
Africa (except domestic)	
Other, please specify	
	100%

12. Please indicate in which segments and for which markets of the software industry you operate.

a) By sub-industry (Segment)

- Packaged software
- Software services
- Embedded software
- Application software
- Other, specify _____

b) By the market the unit serves

- Solutions to industry
- Entertainment and games
- Film animation
- Other, specify _____
- Other, specify _____

13. Please describe the highest value product, process or service of your unit (2007)⁵

14. In the software industry, which of these activities in the value chain did your unit perform in 2007? (Tick each box in the graph where your unit was involved)

<input type="checkbox"/> Requirement analysis with final customer (for software services)
<input type="checkbox"/> High level design (complex)
<input type="checkbox"/> Low level design (standard)
<input type="checkbox"/> Integrated services or solutions
<input type="checkbox"/> Coding
<input type="checkbox"/> Testing
<input type="checkbox"/> Post Production support

II. STRATEGY TO ACCESS LOCAL AND FOREIGN MARKETS

15. Please indicate which strategy is mainly being used to access each of the markets: (mark with a X all that apply)

	Quality ⁶	Cost ⁷	New products or services	Strategic partnership
Access domestic market	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Access markets in other developing countries ⁸	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Access other markets in industrialized countries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

III. RESOURCES

16. a. Is your machinery and equipment behind or ahead the average of the industry in South Africa?

Ahead Behind Average Not known

b. For how many years (ahead or behind)? ____

17. How many patents per employee did your unit register in 2007? ____

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18. In 2007, what was the estimated proportion of employees in each of the following categories?

a. By position	%	b. By education	%
Shop floor		Technical education/training	
Supporting staff ⁹		University degree	
Managers		Postgraduate studies	

19. Does your unit employ any of the following systems of production organization? (check all that apply)

- Quality control systems
 Just in time
 Continuous improvement
 Quality circles, team work
 Internal manuals
 Other (please specify) _____

20. Does your unit have any quality certification? If so, which one?

- ISO
 Other, please specify _____
 Other, please specify _____

21. Do you have an R&D department?

- No Yes, how many employees in the R&D dept as a percentage of total staff? _____ %

IV. TYPE AND IMPORTANCE OF INNOVATION

Product innovation¹⁰ and Process innovation¹¹

22. During 2007, did your unit introduce any of the following innovations? If you did not, leave the rows blank If you did, please put a cross under one of the three columns indicating the degree of novelty		New to the world ¹²	New to domestic market ¹³	New to the firm ¹⁴
Product	P1. New or significantly improved goods ¹⁵ .			
	P2. New or significantly improved services.			
Process	PR1. New or significantly improved methods of manufacturing ¹⁶			
	PR2. New or significantly improved logistics ¹⁷			
Organizational	O1. New internal management practices ¹⁸			
	O2. New methods of organising external relations ¹⁹			

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23. Which one of the product/process/organizational innovations selected on the previous question 22 had the most significant impact²⁰ on your unit performance during 2007? (Please indicate the code P1, P2.....)

24. For the most important innovation for your unit (as selected on question 23) please indicate who contributed mainly to its development. (Select the most appropriate option)

- Mainly your unit
 Your unit together with other companies
 Your unit together with a university or research center
 Other (please specify) _____

25. Please indicate if this innovation (as selected on question 23) had an impact on your main strategies to access international or domestic markets. (Check all that apply)

- It contributed to increase the quality of our products or services
 It contributed to reduce the costs of manufacturing our products or supplying our services
 It helped improving our delivery time
 As a consequence, we developed new products or services
 Other, please specify _____

26. Look at the following list of innovation activities. Did your company engage in any of those in 2007? If you did not, leave the rows blank. If you did, please indicate with a cross whether the activity was conducted mainly locally, domestically or internationally.	Local	Domestic	International
Intramural R&D ²¹			
Extramural R&D ²²			
Acquisition of machinery and equipment ²³			
Acquisition of other external knowledge ²⁴			
Training ²⁵			

V. LINKAGES AND CHANNELS

Sources of technology and knowledge

27. Were the following sources of technology and knowledge important for your product/process innovation developed in 2007? If not, leave the rows blank. If yes, please indicate with a cross whether the sources were mainly local, domestic or international	Local	Domestic	International
Existing employees (excluding returnees from abroad)			
Existing employees who are returnees from abroad			
Suppliers			
Clients			
Competitors			
Consultancy companies			
Universities			
Government ²⁶			
Other (please specify) _____			



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Content of the collaboration

28. For companies that collaborated with local, domestic or international universities or research centers in 2007, which of these following activities have been important for your unit? (Mark with a X all that apply)	Local	Domestic	International
Training			
Research activities (R&D)			
Other (please specify) _____			

29. For the following transactions with other firms please indicate if in 2007 they took place mainly locally, domestically or internationally. (Please put a cross under one of the three columns)	Local	Domestic	International
Acquisition of inputs			
Acquisition of machinery			
Outsourcing			
Research collaboration			
Other (please specify) _____			

30. For companies that benefited in 2007 from any of the following supporting schemes to foster innovation or technology dissemination, please indicate which of them have been important to support your company's innovation strategies. (Mark with a X all that apply)

	Supporting schemes from		
	From local government	From national government	International funding
Tax incentives			
Funds to develop new products and acquire technology			
Export support ²⁷			
Information on technological opportunities			
Other (please specify) _____			

THANK YOU VERY MUCH FOR YOUR PARTICIPATION. WE ARE VERY GRATEFUL!

Person we should contact if there are any queries regarding the form (please fill the form or attach business card):

Name: _____
 Job title: _____
 Organisation: _____
 Phone: _____
 Fax: _____
 E-mail: _____

¹ A group consists of two or more legally defined enterprises under common ownership. Each enterprise in the group may serve different markets, as with national or regional subsidiaries, or serve different product markets. The head office is also part of an enterprise group.

² Rand should be converted in US dollar on the basis of 31st December 2007 rate.

³ Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Italy, Ireland, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovenia, Slovakia, Switzerland, Turkey, Spain, Sweden and the United Kingdom.

⁴ Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Italy, Ireland, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovenia, Slovakia, Switzerland, Turkey, Spain, Sweden and the United Kingdom.

⁵ By highest value product or process we refer to the most important one in terms of sales, price per unit or volume.

⁶ Better quality than your competitors in that market.

⁷ Lower costs than your competitors in that market.

⁸ Asia, Africa, Latin America etc.

⁹ Accounting, financial, administrative, etc.

¹⁰ A product innovation is the market introduction of a new good or service or a significantly improved good or service with respect to its capabilities, such as improved software, user friendliness, components or sub-systems. The innovation (new or improved) must be new to your enterprise, but it does not need to be new to your sector or market. It does not matter if the innovation was originally developed by your enterprise or by other enterprises.

¹¹ A process innovation is the implementation of a new or significantly improved production process, distribution method, or support activity for your goods or services. The innovation (new or improved) must be new to your enterprise, but it does not need to be new to your sector or market. It does not matter if the innovation was originally developed by your enterprise or by other enterprises. Exclude purely organisational innovations.

¹² Your enterprise introduced a new or significantly improved good or service onto the global market before your competitors.

¹³ Your enterprise introduced a new or significantly improved good or service onto the domestic market before your competitors (it may have already been available in other markets).

¹⁴ Your enterprise introduced a new or significantly improved good or service that was already available from your competitors in your market.

¹⁵ Exclude the simple resale of new goods purchased from other enterprises and changes of a solely aesthetic nature.

¹⁶ Include new methods of producing goods or services.

¹⁷ Include delivery or distribution methods for your inputs, goods or services.

¹⁸ For example new business practices for organizing work or procedures, new knowledge management systems, marketing for innovative products and services, new method of workplace organization.

¹⁹ For example with other firms or public institutions (i.e. first use of alliances, partnerships, outsourcing or sub-contracting, etc.).

²⁰ The most important impact in terms of sales/export etc.

²¹ Creative work undertaken within your enterprise to increase the stock of knowledge and its use to devise new and improved products and processes (including software development).

²² Same activities as above, but performed by other companies (including other enterprises within your group) or by public or private research organisations and purchased by your enterprise.

²³ Acquisition of advanced machinery, equipment and computer hardware or software to produce new or significantly improved products and processes.

²⁴ Purchase or licensing of patents and non-patented inventions, know-how, and other types of knowledge from other enterprises or organisations.

²⁵ Internal or external training for your personnel specifically for the development and/or introduction of new or significantly improved products and processes (that is, training related to new products or processes, not training in general).



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²⁶ For Government we mean local/provincial/national departments.

²⁷ Including attendance to fairs, demonstrations, etc.