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U N I V E R S I T Y



Strategic directions, innovation capacity and entrepreneurial  
firm performance in high-tech SMEs, UK

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A thesis submitted to Bangor University in fulfilment of the  
requirements for the Degree of Doctor of Philosophy

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## **Dedication**

*I would like to dedicate my thesis to my life's heroes, mum and dad for their unconditional support.*

*You are the love of my life*

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## Abstract

With increased technological changes, global competition and a changing business environment, innovation and entrepreneurship are becoming vital issues in technology-based Small and Medium-sized Enterprises (SMEs). On the other hand, technology based SMEs are playing a key role in the business environments in all developed and emerging economies. However, the failure rates of such small businesses in almost all economies are very high. Recently, the role of innovation capacity in developing new products and services for SMEs operating in the high-tech sector became of interest to academics and practitioners. Also developing new products and services became one of the critical success factors for SMEs, which in turn increases entrepreneurial firm performance. The main objective of this research is to investigate the moderating role of innovation capacity on the relationship between product and market development strategy and entrepreneurial firm performance in high-tech sector SMEs in the UK.

The conceptual framework of this study has been developed based on synthesizing the existing literature in the subject field. It links the product and market development strategy perused by technology based firms in the biotechnology, pharmaceutical and software development industries with firms' innovation capacity and entrepreneurial performance. This research benefits from quantitative methodology. A quantitative study using a survey was the chosen method of research and was felt justified due to the number of SMEs and their widespread geographical distribution across the UK. The primary data have been collected via questionnaires. To analyze the questionnaires, a five point Likert-type scale was used to evaluate respondent opinion. The main conceptual framework developed and tested empirically in this research proposes that small and medium enterprises could improve and enhance their entrepreneurial performance if they pursue product development rather than market development strategy. The changing nature of the high-tech industry requires innovative and strategic thinking approaches in firms when it comes to making strategic decisions. Innovation is a core element in technology-based SMEs success. It is concluded that high performance firms act aggressively in developing new products in preference to entering into new markets. It has also been found that successful firms enhance innovation capacity to create the foundation for new product design and development.

**Keywords:** Product development, Market development, Innovation Capacity, Entrepreneurship, Performance, High-tech, SMEs, UK

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# Chapter one

## Introduction

## 1.1.Introduction

Recently, product/market development topics have become attractive to academics as well as practitioners in the field of strategic management. This research focuses mainly on product and market development strategy in small and medium-sized enterprises (SMEs). It provides a theoretical discussion, as well as empirical results, of the factors associated with product/market development strategy. This chapter introduces the research topic and the areas it covers in management and business. It outlines the research background and rationale of the study and covers a broad range of literature on strategic direction, innovation capacity and firm' entrepreneurial performance theories and concepts. The objective of the study and the research questions are also stated with some suggestions on how these might cover the gap in the literature reviewed and previous studies, enabling the research questions to be answered. This chapter reviews the methodology and the research design, and briefly describes the outline of the survey. Finally, the chapter ends by explaining the structure of the research.

## 1.2. Research background

### 1.2.1. Strategic direction

Ansoff (1995), cited in Johnson et al., (2011, p.232), proposes a model which supports the notion of strategic directions at the corporate level. Strategic direction is defined as: market penetration/consolidation, market development, product development, and diversification.

Based on Ansoff's matrix, the firm has a choice among these four states according to its

situation in terms of market and products, while indicating a growth preference. Borch et al., (1999) asserted that product/market strategies are more effective for SMEs since they allow identification and application of new strategies according to existing resources. There are significant differences between large organizations and SMEs in terms of structure, policies and management (Ghobadian and Gallear, 1997; Ledwith, 2000; Gray and Mabey, 2005; Nicholas et al., 2011).

SMEs have the advantage of being able to innovate and develop new products because of their flexibility and innovation capacity in globalized markets (Raymond and Croteau, 2006; Razeghi, 2008; Nicholas et al., 2011). SMEs are under pressure, in facing strong competitors, to provide for their customers' needs and demands, and to keep their market share (Hendry et al., 2000; March-Chorda et al., 2002; Nicholas et al., 2011; Yan and Makinde, 2011). Therefore, SMEs have to develop new products strategically in order to continue operating in turbulent and complex business environments (Mugler, 2002; Raymond and Croteau, 2006).

Tidd et al., (2005) hold that SMEs offer significant advantages in the development of new products. The rationale behind this is that small and medium-sized enterprises have short decision-making processes due to a flat and flexible structure with few layers of management, rapid response to environmental change with high functional integration and low resistance to change, as well as being innovative and more creative (Ghobadian and Gallear, 1997; Bartlett and Bukvi, 2001; Kaufmann and Todtling, 2002). SMEs are sometimes unsuccessful in developing new products due to limited access to human and financial resources, and where



they have a lack of contacts with external networks (Voss et al., 1998; Hadjimanolis, 1999; Bartlett and Bukvi, 2001; Kaufmann and Todtling, 2002; Tidd et al., 2005).

Therefore, selecting and employing appropriate strategies are vital elements for SMEs that enable them to compete with other companies and gain competitive advantages (Nicholas et al., 2011). On the other hand, some scholars such as Ledwith (2000), Gray and Mabey (2005), and Nicholas et al., (2011), have indicated that large companies which have a high market share and good financial resources tend to have product diversification, but this is a risky undertaking for SMEs because of their limited access to human and financial resources and their very low market share. The literature review below suggests that product development is the best option for SMEs.

### **1.2.2. Innovation capacity**

Innovation is observed from different perspectives in the literature (Von Hippel, 2005; Flowers and Henwood, 2010). Innovation research differs in focus, primary concepts, strategy considerations, methodology and models, measurement, and analysis (Souitaris, 2002). Recently, the literature has focused on emphasizing those characteristics in firms which lead them to be innovative (Hwang et al., 2004; Lemon and Sahota, 2004). Research into innovation capacity is also limited, particularly in SMEs. This may be because there is difficulty in producing reliable data due to ambiguities in the concept of the innovation process in SMEs.

The theoretical association between entrepreneurship and innovation has been discussed in the literature for several years. Scholars such as Stoneman (1995), Grupp (2001) and Arora and Athreye (2002) have paid more attention to entrepreneurship and innovation in their studies. From the viewpoint of Schumpeter (1942), Drucker (1994), Sundbo (1998), innovation allows for the exploiting of opportunities which increase an organisation's performance and competitive advantage. Also, innovation is recognized as a key factor in achieving sustainable competitive advantage (Romijn and Albaladejo, 2002; Prajogo and Ahmed, 2006; Silva et al., 2008).

Innovation capacity allows for the creation of new features for improving existing technologies and stimulating competition in organizations. Innovation research has also led to the development of new conceptual models (Isaksen 2001; Romijn and Albaladejo, 2002; Lai and Shyu, 2005; Uchida and Cook, 2007).

Koc and Ceylan (2007, p.105) defined innovation capacity as “relating to the firm's capacity to engage in innovation, that is, the introduction of new processes, products, or ideas in the organization”. The innovative capacity of entrepreneurial firms can be improved by combining knowledge of relevant internal and external resources which positively affect the enhancement of innovation (Rothwell and Dodgson, 1994; Morel and Boly, 2006; Silva et al., 2008).

Romijn and Albaladejo (2002) examined determinants of innovation capability in small technological firms, using the following indicators: education, work experience of engineers

and scientists, research and development (R&D), and the interaction of the organization with networks and other firms. The results of their study showed that there is a positive relationship between internal and external factors as regards enhancing innovation capacity.

### 1.2.3. Entrepreneurial firm performance

Many researchers have been interested in the factors associated with entrepreneurial performance (e.g. Baum et al., 2000; Davidson et al., 2002; Ozcan and Eisenhardt, 2009). The main issue in the measurement of entrepreneurship outcomes is choosing the appropriate measures of performance. When considering firm performance, firm growth has been identified as a main part of entrepreneurial performance (Gartner, 2007). In recent years, a growing body of opinion has supported the role of growth in a firm's competitive advantages and profitability, and therefore growth rate is widely used to measure a firm's performance (Markman et al., 2005).

According to MacMillan and Day (1988), rapid firm growth increases profitability, because entering new markets leads to more profit. On the other hand, Carland et al., (1992) stated that high growth may have a negative effect on firm profitability. Firms' growth is multidimensional and all aspects of it should be considered carefully (Lumpkin and Dess, 1996). In terms of SMEs, both financial performance and growth are important aspects of firm performance, and should be studied separately (Wiklund, 1999). Firms grow in different ways related to their size, age and industry sector (Delmar et al., 2003).

Different performance factors could be used to measure the growth of firms, but the most important one for indicating the performance of a firm is sales figures (Delmar et al., 2003). Sales rates are accessible in all firms and demonstrate the firm's long or short-term changes during a certain period. Also, some arguments suggest that sales figures are the main indicator of interest that entrepreneurs widely use, and in addition increased sales express the high demand for firms' products, both goods and services (Barkham et al., 1996). On the other hand, based on the ideas of Delmar et al., (2003), sales figures do not measure growth all the time, considering that high-tech firms with high-level technologies may not show any significant sales increase even with high growth in human resources and assets. Therefore, two other aspects of performance measurement could also be employment rate and assets (Fitzsimmons et al., 2005).

Another significant measure of SMEs' entrepreneurial performance is profitability. This can include net profit margins or return on assets (Fitzsimmons et al., 2005). Delmar et al., (2003) suggested that as there is no single worldwide measure of firm performance, a multiple measure may cover firm performance, based on different theoretical models. They also stated that firm growth should study the development of firms over time and compare it in two time periods. In entrepreneurially orientated firms, the strategy direction covers different methods and decision-making practices (Lumpkin and Dess, 1996).

The existing literature shows that researchers examine performance by analysing the entrepreneurial activities within firms and their relationship with firm performance (Zahra and

Garvis, 2000; Lumpkin and Dess, 2001; Wiklund and Shepherd, 2003, 2005). Entrepreneurially oriented firms, especially small firms or new ventures, can have a better position in comparison with their competitors in the market place, and can increase their performance more effectively (Zahra and Garvis, 2000; Lumpkin and Dess, 2001; Ireland et al., 2003; Wiklund and Shepherd, 2005). Accordingly, in a study about entrepreneurial performance, multiple measures of performance should be included. Considering the complex nature of growth, it is necessary to consider the relationship between variable performance measures over time.

Hunger and Wheelen (1996) observed that the action of entrepreneurs usually involves strategic managers in small firms, because they apply and take all strategic and operational decisions. Also, they use strategic management tools and techniques for analyzing markets, and the firm's resource allocation, financial plan and developing business (Sahlman et al., 1999).

Sathe (1988) and Zahra (1993) noted that three variables which motivate enterprises to be entrepreneurial are opportunity recognition, organisational flexibility, and a firm's ability to measure, encourage, and reward innovative and risk-taking behaviour; a view corroborated by other researchers (e.g, Miller and Friesen, 1983; Murray, 1984; Stevenson and Gumpert, 1985; Stevenson and Jarrillo-Mossi, 1986; Sathe, 1988; Zahra, 1993; Naman and Slevin, 1993).

Murray (1984) considers that a firm's capability to raise its entrepreneurial activities is mainly distinguished through the compatibility of its management practices and entrepreneurial drivers. According to Hitt and Ireland (2000), there are six domains where the connection between entrepreneurship and strategic management occurs. These are: innovations, networks, internationalization, organizational learning, top management teams, and governance and growth.

Although many researchers have tended to focus on organisational characteristics and entrepreneurs' characteristics in organisations, rather less attention has been paid to the link between the firm's strategic management practices and entrepreneurial performance. Based on the studies of Stevenson and Jarillo-Mossi (1986) and Dess et al., (2003), a connection can be made between entrepreneurship and strategic management. A study released by Schendel and Hofer (1979) asserted that entrepreneurial activities are at the heart of strategic concepts. The opinion of Hitt et al., (2001) and Ireland et al., (2003) is that identification and use of opportunities by organizations in their external environment leads to the creation of value for firms and increases their competitive advantages.

### **1.3. Rationale of study**

With increasing global competition and changes in global environments, entrepreneurship and innovation are becoming a vital issue for business enterprises (Johnson, 2001; Marris et al., 2008; Szirmai et al., 2011). In recent years, there has been a growing body of opinion acknowledging the role of corporate entrepreneurship and innovation in helping firms to have

improved performance, and to gain competitive advantages (Ireland and Webb, 2007; Bowonder et al., 2010; Salunke et al., 2011).

Hitt et al. (2001), assert that enterprises, especially startup firms, need to use entrepreneurial strategies in order to compete, and need to identify opportunities and advance entrepreneurial strategies within the organization to gain competitive advantage. Kraus and Kauranen (2009) believe that there is a point where strategic management and entrepreneurship are seen to overlap.

In recent years, a number of scholars, namely, Brown and Eisenhardt (1998), Shane and Venkataraman (2000), Zahra and Dess (2001), Venkataraman and Sarasvathy (2001), and Kuratko et al. (2005), have focused their research on the integration of strategic management and entrepreneurship. The integration of these two research fields is still being debated and is a developing area of interest. These scholars argue that, when a company faces uncertain conditions and threats, it must use its own resources and identify and explore opportunities in a way described by researchers as the essence of entrepreneurship and competitive advantage seeking. Therefore, given the ever-changing global environment and an increasingly competitive environment, there is a need to carry out further research in the area of strategic management and entrepreneurship.

According to Ireland et al., (2003), the main aim of any organization should be the creation of value for customers. In this regard, entrepreneurial strategies and strategic management can

contribute to achieving this purpose. At the present time, a common focus of scholastic research seeks to explicate the differences in organizations in the way they create value in relation to entrepreneurial performance.

It is worth noting that besides the “classical” variables which are more commonly investigated in entrepreneurship studies, such as entrepreneurial characteristics and motivations, many scholars have regarded organisational and strategic variables as important and as key factors for firms’ survival and high performance. These findings are similar to those by Miller and Friesen (1983), Sathe (1988), Woo et al., (1989), Guth and Ginsberg (1990), Covin and Slevin (1991), Zahra (1993). Later works by Zahra (1993), Lumpkin and Dess (1996), Entrialgo et al., (2000) returned similar findings.

Zahra and Dess (2001) found that entrepreneurial approaches and activities are essential for organisations of all sizes to succeed and to grow in competitive environments. Indeed, authors such as Meyer and Heppard (2000), and Barney and Arikan (2001), describe the relationship between entrepreneurship and strategic management as two sides of the same coin, so that without one of them, the other cannot be understood.

Researchers assert that, when a company faces uncertain conditions and threats, it must use its own resources and should identify and explore opportunities, thus seeking further competitive advantage. Given ever-increasing competitive environments and globalization, there is a need



to explore product and market development strategies in entrepreneurial firms, and investigate the moderating role of innovation capacity in relation to firm growth.

#### **1.4. Research objective and questions**

The research questions have evolved from the literature review, which highlights the fact that most prior research undertaken in the area of product development strategy has focused on one dimension of product development strategy, but has not investigated which strategy might be the best option for high tech SMEs. Also, in the area of innovation capacity and entrepreneurship, it is well documented by researchers that innovation and entrepreneurship are vital factors for SMEs to survive and to gain competitive advantages. However, the literature on the study of product/market development strategy, enhanced innovation capacity and firm entrepreneurial performance is very limited.

In addition, there is a lack of comprehensive studies which investigate the relationship between product/market development strategy and firms' entrepreneurial performance or innovation capacity in high-tech SMEs. Hence, the aim of this research is to cover this gap in the literature and to investigate the relationships between product and market development strategy, entrepreneurial firms' performance, and the moderating role of innovation capacity in high-tech SMEs. Hence, the research questions aim is to enhance the body of knowledge through empirical investigation. The research questions are discussed below.

*Research Question One: What is the relationship between product and market development strategy and entrepreneurial firms' performance?*

The interest of this study is to identify whether or not product and market development strategy enhances entrepreneurial firms' performance. Although some prior researchers have argued that new product development has a positive and significant effect on firm performance in SMEs (Ghobadian and Gallear, 1997; Bartlett and Bukvič, 2001; Kaufmann and Tödting, 2002; Acur et al., 2012), other authors believe that SMEs are sometimes unsuccessful in developing new products due to limited access to human and financial resources, or where they have a lack of contacts with external networks (Hadjimanolis, 1999, Bartlett and Bukvič, 2001; Kaufmann and Tödting, 2002; Voss et al., 2002; Tidd et al., 2005). This research is an attempt to investigate the impact of developing new product strategies and market development strategies on the selected high-tech SMEs' entrepreneurial performance.

*Research Question Two: What is the moderating role of innovation capacity in enhancing the relationship between product and market development strategy and entrepreneurial firms performance in high-tech SMEs?*

The second main research question considers innovation capacity and its role in moderating the relationship between product and market development strategy and entrepreneurial firms' performance. It can be observed from the background to the study that innovation is a key factor for organizations to have sustainable competitive advantage. Innovation capacity is

known to be one of the main features of organizations which leads to competitive advantage (Romijn and Albaladejo, 2002; Silva et al., 2008).

There has been a good deal of discussion on innovation capacity as an important factor for innovation, initiative and entrepreneurship, the creation of new features, and improvement in existing technologies and stimulation of competition in organizations (Prajogo and Ahmed, 2006). To answer the second research question, the importance of innovation capacity in high-tech SMEs and its moderating role in the relationship between new product development strategy and market development strategy and entrepreneurial firm performance will be investigated.

### **1.5. Methodology**

This research benefits from quantitative methodology. A quantitative study using a survey was the chosen method of research and was felt justified due to the large number of SMEs and their widespread geographical location across the UK. The sample was framed using SIC<sup>1</sup> codes to identify high tech firms operating in the biotechnology, pharmaceutical and software development industries. Primary data was collected using questionnaires from the selected firms.

In order to increase the response rate, a personalized cover letter that explained the purpose of the study and provided assurance regarding the confidentiality of collected data accompanied

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<sup>1</sup>Standard Industrial Classification

each questionnaire. The SMEs' management teams were urged to participate in this survey. In order to minimize response bias, the participants were also provided with pre-addressed envelopes to enable them to return the completed questionnaires directly to the researchers. The study employed a research process based on hypothetic-deductive principles.

To analyze the questionnaires, a five point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree) was used to evaluate respondent opinion. To test the hypotheses and estimate direct relationships between variables, Structural Equations Modelling (SEM) was developed and tested by Lisrel 9.1 software. Path analysis was employed for the analysis of the data, where the data was measured in interval levels, and a between subjects experimental design applied. In order to investigate the association between variables, correlation analysis and the Pearson correlation, for data measured in ratio level, were used. For investigation of the relationship between variables, SEM techniques and Path analysis were applied.

### **1.6. Structure of thesis**

Chapter one introduces the objective and scope of the study. It also demonstrates the main works in the areas of new product development and entrepreneurial firm performance. Then it discusses the research objectives and questions and briefly the methodological perspective.

Chapter two discusses strategic management in the context of small and medium sized enterprises. It covers the theories and definitions of strategy and strategic management, product development and market development and new product development strategies in SMEs. This

chapter also reviews the concepts of innovation and entrepreneurship. It discusses the innovation model, innovation capacity and entrepreneurial firm performance.

Chapter three begins with outlining the research objectives and questions. It also discusses the synthesis of literature regarding product and market development strategy, innovation capacity and entrepreneurial firm performance. It introduces the research variables measured in detail and the research conceptual framework has been developed.

Chapter four reviews research design and methodology. It introduces the research philosophy, approach and design of the research. Then it provides the research's proposed conceptual model and hypotheses about the relationship between new product/market development and entrepreneurial performance in SMEs. It ends with a data analysis plan of the study.

Chapter five begins with descriptive analysis and provided a wide picture regarding the research data. It continues with statistical data analysis and bivariate and multiple regression analysis through SEM and path analysis.

Chapter six presents the findings of data analysis and reviews product/market development strategy, innovation capacity and entrepreneurial firm performance in small and medium sized enterprises. Furthermore, it reviews the importance of innovation capacity for firm product development and performance. It also connects the findings with incumbent literature and prior researches.

Chapter seven is the final chapter and is concerned with the findings of the research. It explains the theoretical contribution of research and covers the policy and managerial implications. And finally it discusses the limitations of the study and gives some suggestions of future studies

# Chapter two

## Literature review

## 2.1. Introduction

This chapter covers theories, frameworks and models to conceptualize product development strategy, market development strategy, innovation capacity and entrepreneurial firms' performance concepts in the context of small and medium-sized enterprises. The first part of this chapter outlines the historical and contemporary issues regarding strategic management and directions, innovation capacity and entrepreneurial firm performance. The second part reports on prior studies which have investigated the link between product/market development strategy and innovation capacity, innovation capacity and entrepreneurial firm performance, and strategic directions and entrepreneurial firm performance, and also shows how the research hypothesis developed. The chapter ends with a summary.

## 2.2. Strategic management

### 2.2.1. Origin of the term “strategy”

Before reviewing the background to strategic management and outlining the concept, it is necessary to define strategy. The term “strategy” is derived indirectly from ancient Greek “στρατηγία: strategos,” which means “general”. The Greek equivalent for the modern word “strategy” would have been “strategike episteme” (a military general’s knowledge) or “strategon sophia” (a general’s wisdom). Furthermore, one of the most famous Latin works in the area of military strategy was written by Frontinus and has the Greek title of *Strategemata*. *Strategemata* describes a compilation of strategema, or “strategems”, which are literally “tricks of war”.



(Horwath, 2006) stated that “the unique combination of wisdom, science and craft have made strategy creation”.

### **2.2.2. The concept of strategic management**

It is thought by some theorists, for example (Andrew, 1976; Analoui and Karami, 2003; Porter, 1980, 2008a, 2011) that the main paradigm in strategic management is characterised by two principle functions: strategy formulation and implementation. David (2007) believes that strategic management is an art and a science which deals with formulating, implementing and evaluating an organization’s objectives.

According to Thompson (2001), strategic management is basically concerned with setting and planning the aims and goals of an organization in order to achieve them. Strategic management is “management’s game plan for strengthening the organization’s position, pleasing customers, and achieving performance targets”(Thompson and Strickland, 2003). Stacey (2007) and Karami (2012) assert that strategic management is defined as including two main processes: formulation and implementation of strategy.

The opinion of Bowman and Ambrosini (2000) is that strategy formulation is about how an enterprise chooses to define and implement its strategy by strategic management. According to Analoui and Karami (2002), the style of management will be clarified by a strategy formulation approach. On the other hand, the nature of strategy formulation is affected by managerial style and the efficiency of top managers in organizations.

Thompson (2001), states that before selecting and implementing a suitable strategy for a firm, strategic management practice handles the development of a strategy and analysis of the organization's environment. Most studies, such as Thompson (2001), have emphasised that strategic management is the processes and decisions involved in determining the organizational goals, and its long-term structure and activities.

One of the main arguments against these theories, is that strategic management is not solely a management process, because a manager is often required to cope additionally with functional and operational problems. For effective implementation of strategy, these tasks are essential, whereas they are not the same as strategic management.

On the other hand, it can be said that, instead of managers being preoccupied with analysis of the firm, its environment and the formulation of strategies, that implementation and evaluation are the first priorities as critical components of the organization's success. These are the action and assessment facets of the strategic management process.

Overall, as these definitions and theories imply, strategic management emphasizes that, to achieve organizational aims and successes, the integration of managerial abilities, techniques and skills is essential.

### **2.2.3. Definitions of strategy in management**

The concept of strategy has been widely defined, and used in various ways. Bracker (1980) asserted that after World War II, and with a changing business environment from stable to

competitive environment, the need for a concept of strategy became highlighted. Ansoff (1969, p.7) has attributed this change in environment to two significant factors:

1) “The marked acceleration in the rate of change within firms”;and, 2) “the accelerated application of science and technology to the process of management”.

Von Neumann and Morgenstern (2007) were two authors who discussed the concept of strategy in business. They introduced the theory of games within the concept of strategy. According to their view, “strategy is a series of actions by a firm that are decided on according to the particular situation” (P.80).

Drucker (1954, p.17) stated that “strategy is analysing the present situation and changing it if necessary. Incorporated in this is finding out what one’s resources are or what they should be.”

Another definition was provided by Chandler (1962, p.15). According to his definition, strategy is “the determination of the basic long-term goals and objectives of an enterprise and the adoption of courses of action and the allocation of resources necessary for carrying out those goals”.

Ansoff (1965, pp.118-121) explained that “strategy is a rule for making decisions determined by product/market scope, growth vector, competitive advantage and synergy.” According to

Schendel and Hatten (1972, p.4), strategy is defined as “the basic goals and objectives of the organization, the major programs of action chosen to reach these goals and objectives and the major pattern of resource allocation used to relate the organization to its environment.”

Uyterhoeven et al., (1973, p.9-10) described the stages of strategy. They explained the concept of strategy as follows: “strategy provides both direction and cohesion to the enterprise and is composed of several steps: strategic profile, strategic forecast, resource audit, strategic alternatives explored, tests for consistency and finally strategy choice.” McNichols (1972, p.9) believed that “strategy is embedded in policy formulation: it comprises a series of decisions reflecting the determination of basic business objectives and utilization of skills and resources to attain these goals.”

Another definition of strategy, provided by Steiner et al. (1977, p.518), is that “strategy is the forging of company missions, setting objectives for the organization in light of external and internal forces, formulating specific policies and strategies to achieve objectives and ensuring their proper implementation so that the basic purposes and objectives of organization will be achieved”. Mintzberg (1979, p.519) mentioned that “strategy is a mediation force between the organization and its environment: consistent patterns in streams of organizational decisions to deal with the environment.”

The definition of strategy has been developed during the last 30 years and new concepts have been added, such as product life cycle (PLC), the experience curve, the strategic business unit (SBU), and business process re-engineering. In recent years concepts of strategy have shifted more towards competition and renewal, such as the five-force model by Porter (2008a), generic strategies (Porter, 2008b), and the value chain (Porter and Kramer, 2011).

Many strategic management researchers (e.g. Mintzberg, 2003; Mintzberg et al., 2005; Stacey, 2007; Ansoff, 2009; De Wit and Meyer, 2010; McGee et al., 2010; Johnson et al., 2011) have defined and developed the concept of strategy in business, in different ways and approaches. As an overall general definition, Karami (2012) stated that “strategy is the main essence of management, pulling together all of the strands required to run any organization in response to competition in the operative environment.”

#### 2.2.4. Strategic management process

According to Furrer et al., (2008) strategic management was first discussed in the academic literature in the 1960s. The primary publications in this field were the Strategy and Structure theory of Chandler (1962) and the theory of Corporate Strategy by Ansoff (1969).

Wicklham, (2006, p.349) defined strategy as the actions firms take to achieve their business goals. Ireland et al., (2003) and Thompson et al., (2008) believed that strategy is a pathway or roadmap that helps firms understand how to transfer an idea to actual implementation in a competitive situation. Also, Drucker (2007) asserted that the main role of strategy is to help the organization to research and find opportunities and achieve preferred results in spite of environmental instability. Karami (2012) pointed out that strategic management is fundamentally about setting the underpinning aims of an organizations, choosing the most appropriate goals towards those aims and fulfilling both over time. It is argued that in a turbulent

business environment, strategy is a fundamental factor for a firm's success (White, 1996; Carpenter, 2002; Baker and Sinkula, 2005).

Goldsmith (1996) mentioned that “the area had its genesis in the finding from the study of business case studies in the 1950s and 1960s, that companies in the same industry could succeed following different approaches, while other companies that followed approaches similar to each other were not equally successful.”

Karami (2012) argued that “several companies might do well in on- line trade by employing strategies of purchasing different market niches. Other companies however might fail with similar strategies because their strategies did not match the unique assets and talents these other firms brought to bear.”

Andrews (1997) has illustrated that “corporate strategy is the pattern of major objectives, purposes or goals, and essential policies and plans for achieving these goals, stated in such a way as to define what business the company is in or to be”. Therefore, if strategy is very important, and a vital factor for organizations to succeed and have a better performance, top managers should use organization strategy regarding planning, forecasting, analysing internal and external environment to reach their goals and aims.

Ansoff (1969) pointed out that managers have an important role in implementing strategy in organizations; planning is just a small part of strategic management, while the role and involvement of managers in corporate strategy is very important. Karami (2012) argued that

“managing strategy is not just a matter of plotting actions in advance, as the strategic planners soon learnt. It was realized that the long term course of an organization could hardly be left to a planning unit alone. Strategic management gave one answer to the problem.”

Stacey (2007) remarked that a main distinction in strategic management is between strategy (content) and implementation (process). According to Thompson et al., (2008) and Analoui and Karami (2003) three levels of strategy (content) are corporate strategy, business strategy and functional strategy. Corporate strategy is concerned with the firm’s activities and where an enterprise competes, whereas business strategy is focused on how it does so. The third level of strategy is functional, which is essential for each firm to achieve the objectives of corporate and business units by maximizing resources efficiency, for instance, marketing strategy, human resources strategy or R&D strategies.

Goldsmith (1996) stated that implementing and evaluation of organizational strategy are the two critical factors for an organization’s success, rather than formulating strategy, or analyzing the internal and external environment of an organization. He also argued that “strategic management, to sum up, is a broad activity that encompasses mapping out strategy, putting strategy into action, and modifying strategy or its implementation to ensure that the desired outcomes are reached.”

### 2.2.5. Strategic management in small and medium-sized enterprises

In the early 1960s, strategic management had only explored strategic matters in large organizations (Analoui and Karami, 2003). But in recent years, research into strategic management in small and medium-sized enterprises (SMEs) has become a key focus in the academic and industry areas (Hitt, 2000)

O'Regan and Ghobadian, (2002) believe that the process of strategy making and the effectiveness of strategic planning has not been paid enough attention in small and medium enterprises. Due to the organizational structure of SMEs and lack of capability, these firms are unable to determine, control and overcome the obstacles. Therefore, they often face implementation problems in strategic planning. Zimmer et al., (2005) stated that successful small firms have a great tendency to use strategic planning. Sahlman et al., (1999) considered strategic orientation as a driver of strategy formulation, and believed that strategically oriented entrepreneurs should review and thus control the potential opportunities inherent in their resources.

Skrt and Antoncic (2004) asserted that small firms put more emphasis on strategic formulation and particularly have a tendency to plan informally rather than on a formal and regular basis. They also mentioned that strategic planning is a beneficial tool for improving the performance of small firms. Strategic planning impels entrepreneurs to pay attention to the questions of open business and seek solutions to their problems. Hence, it leads to an improvement in the entrepreneur's learning and progress.



Although some researchers have concluded that small enterprises do not practice strategic management (Gable and Topol, 1987), there are several studies which show that there is a positive and significant relationship between strategic planning and performance in small firms. In previous studies such as Miller and Cardinal (1994), it has been found that there is a positive relationship between strategic planning and growth in small firms. Robinson and Pearce (1984) mentioned that small firms that apply strategic planning and employ strategic consultants perform better.

The literature regarding strategic management suggests that supporting the different operational and functional areas of firms is complex; therefore, strategic management should develop from the first stage of planning through to the final part of forecast-based planning (Foster,1993; Beal, 2000; Apfelthaler, 2000).

### **2.3. Strategic directions**

One of the essential management information resources for strategic thinkers and managers is the concept of strategic direction. The main alternative directions for strategy development are given in Ansoff's product/market growth matrix. Ansoff's strategy options are illustrated in figure 2.1. Ansoff (1995), cited in (Johnson et al., 2011, p. 232), proposes a model which supports the notion of strategic direction.

**Figure 2.1:** Ansoff's strategy options

Strategy	Products	Markets
<b>Consolidation Strategy</b>	Existing	Existing
<b>Market Development Strategy</b>	Existing	New
<b>Product Development Strategy</b>	New	Existing
<b>Diversification Strategy</b>	New	New

**Source:** Adapted from Johnson et al., (2011, p.232)

This matrix model consists of four options, namely, market penetration consolidation, product development, market development and diversification. Based on the model, firms have a choice among these four states according to their situation in the market and their products. Ansoff's matrix is a planning technique used for making judgment about firms' growth preferences, and decision making about strategies for expansion (Pleshko and Heiens, 2008; Hussain et al., 2013).

The Ansoff's Strategy Options deliberate growth preference (Pleshko and Heiens, 2008)

### 2.3.1. Consolidation strategy

The first option in developing strategy is consolidation strategy. As can be seen in Figure 2.1, the first strategy is consolidation strategy. In this strategy, the firm offers existing products to the existing market. As Johnson et al., (2011) explained, based on this matrix, once an organization enhances its share in an existing market with existing products, it would be faced with one aspect of strategic direction. This is based on the firms' existing strategy capabilities and does not need to take risks into unknown territory. Also, the scope of the firm is exactly the same.

The main purpose of pursuing consolidation strategy is to increase market share. When the organization is in the consolidation state, it means that it is active in current market with current products. Consolidation has two forms: defending market share, and downsizing or diversifying.

### **2.3.2. Product development strategy**

Another direction, known as product development strategy, is to offer new products to the existing market. Product development is the introduction of new products or services into an organization's existing market. When the organization wants to move from market penetration to product development, it needs a high degree of innovation and creativity. On the other hand, developing new products (goods or services) would be expensive and high risk, because of new strategic capabilities and project management.

### **2.3.3. Market development strategy**

The other strategic direction in Ansoff's viewpoint is market development. When product development is expensive and risky, market development can be a substitute strategy for organizations. In this case, the organization can enter new markets with current products but the organizational scope is the same as for product development. Market development can be in three different ways: new segments, new users, and new geographies.

### 2.3.4. Diversification strategy

This kind of strategic direction is the opposite to consolidation strategy. The organization enters a new market with new products (goods or services) and the scope for the organization to expand is vast. Johnson et al., (2011, p.262) argued that “none the less, Ansoff’s matrix does make clear that the further the organization moves from its starting point of existing products and existing markets, the more the organization has to learn to do it. Diversification is just one direction for developing the organisation, and needs to be considered alongside its alternatives.” The reasons for selecting diversification can be gaining efficiency by applying current resources to new markets and new products, stretching corporate parenting capabilities into new markets and new products, increasing market power, and responding to market decline. Ledwith, (2000); Gray and Mabey, (2005); Nicholas et al, (2011) indicated that large companies which have high market share, good financial resources tend to have product diversification. This is a risky undertaking for SMEs because of limited access to human and financial resources and very low market share.

## 2.4. Product and market development strategy in SMEs

Product development strategy in terms of innovation and performance has contributed significantly to firms’ competitiveness. A great deal of literature deals with product development strategy in large industries, but there are limited empirical studies to identify the important role of new product development strategy in improving entrepreneurial performance

in small and medium-sized enterprises. Lai and Shyu (2005) stated that with advances in technology and science, and also rapid change in the market, a product's life cycle is shorter than before.

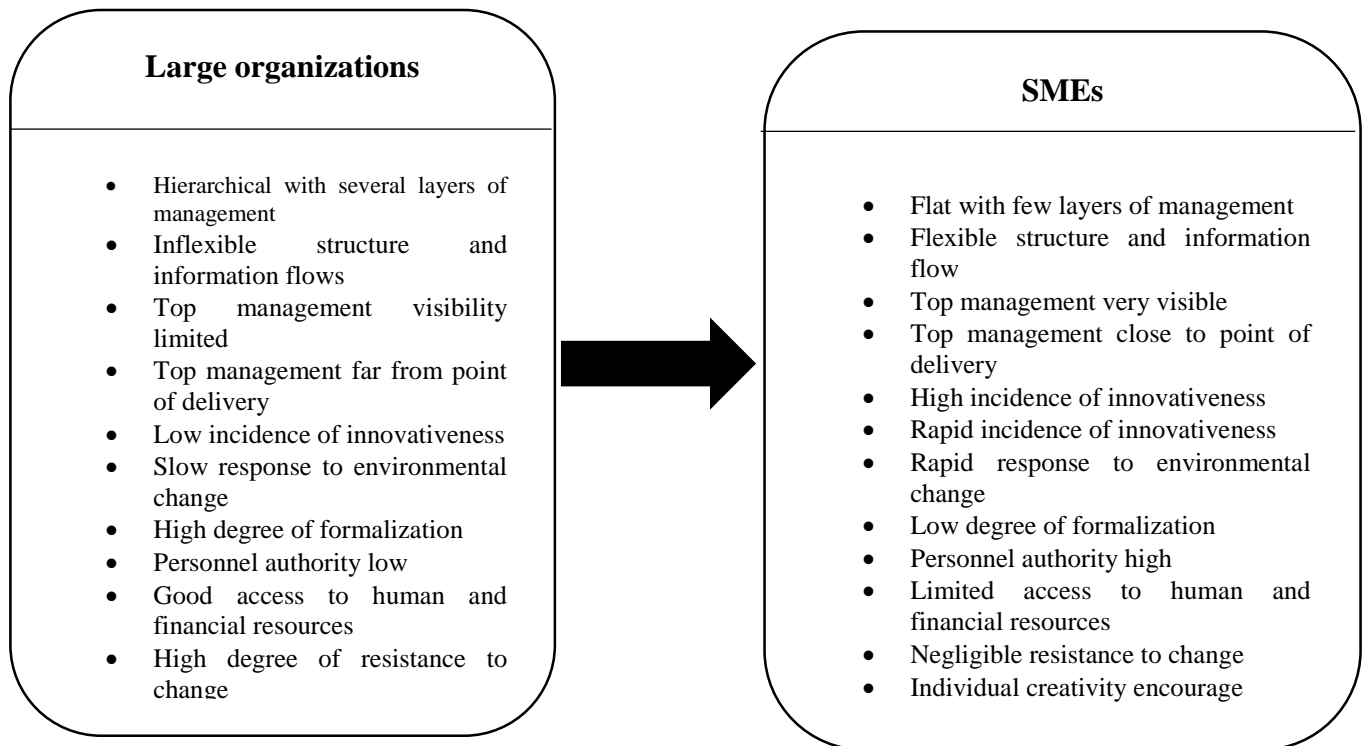
Therefore, firms have to innovate continually and carry out research on new products to develop appropriate products with new technology, so that they both meet customers' needs and deal with the threat of competition. Also, they pointed out that new product development strategy is a significant and major activity, helping firms to improve their products constantly, and survive. Borch et al (1999) has suggested that product/market strategies are very effective for SMEs, since they can be useful instruments that help managers to identify and apply new strategies according to existing resources.

There is a significant difference between large organizations and SMEs, due to structure, policies and management (Ghobadian and Gallear, 1997; Ledwith, 2000; Gray and Mabey, 2005; Ledwith and O'Dwyer, 2008; Nicholas et al., 2011). Small and medium-sized enterprises have the ability and advantages to innovate and develop new products, with their flexibility and innovation capacity in the globalization and international markets and new economy (Nicholas et al., 2011; Raymond and Croteau, 2006; Razeghi, 2008). On the other hand, SMEs are under pressure in facing strong competition to meet customers' needs and demands and keep market share (March-Chorda et al., 2002; Hendry et al., 2000; Nicholas et al., 2011; Yan and Makinde, 2011). Therefore, SMEs have to develop new products strategically to remain competitive in a

turbulent and complex business environment (Mugler, 2002; Raymond and Croteau, 2006; Singh et al., 2010)

Tidd and Bessant (2011) assert that SMEs have significant advantages in comparison with large companies in developing new products, since they have a short decision making process due to having a flat and flexible structure with few layers of management, rapid response to environmental change with high functional integration and low resistance to change, more creativity and a more innovative environment (Ghobadian and Gallear, 1997; Bartlett and Bukvič, 2001; Kaufmann and Tödting, 2002) see Table 2.1.

**Table 2.1:** the comparison of SMEs and large organizations



**Source:** Adapted from Nicholas et al., (2011, p. 229)

In contrast, SMEs sometimes cannot act successfully in developing new products, due to limited access to human and financial resources and a lack of contacts with external networks (Yap and Souder, 1994; Bartlett and Bukvic, 2003; Krasniqi, 2007; Tidd and Bessant, 2011;). As a consequence, SMEs can compete with competitors and gain competitive advantages by selecting and employing appropriate strategies in developing new products associated with large companies (Nicholas et al., 2011) .

Borch et al., (1999) have suggested that product/market strategy is more efficient for SMEs, since it can be a useful instrument for managers, in that they can identify and apply new strategies according to existing resources. Entrialgo et al., (2000) found that there is a significant relationship between the flexibility of SMEs and their entrepreneurship, and also with strategic management which supports them in having a high level of confidence in comparison with large companies to make change. Gibbons and O'Connor (2005) observed that most entrepreneurial SMEs use formalized methods for analyzing their own environment and capabilities, and this kind of strategic planning helps them to react and respond to environmental change efficiently.

In the recent literature we can find several models that emphasise some elements which are common in product development best practice. Cooper (2011) argued that within new product development there are four elements: “Orientating the enterprise to a new product,” “market characteristics adopted by the new product,” “The enterprise’s technological orientation and commitment,” “Technological characteristic adopted by the new product.”

Slater and Narver (1993) investigated product-market strategy with Miles and Snow's strategy typology. They argued that according to Miles and Snow's strategy typology, pioneering new markets needs high quality, service, and technology. They rely on differentiation based on low cost in facing competitors. Analysts can take an innovative approach to enter new markets, or develop new products. According to Miles and Snow (1978) cited in Slater and Narver (1993) analysts have to rely on differentiation to gain competitive advantages. Defenders rely on market penetration and put less emphasis on new product development compared with pioneers and analysts. They focus on how to produce and distribute products efficiently. This can be a lower-cost strategy.

Barczak et al., (2007) explained the strategy of new product development according to Ansoff and Stewart's classification: "first to market", "fast follower", and "delayed entrant". Veryzer (1998) proposed a new model with two major elements: technological capability and product capability (See Figure 2.2). He argued that technology must be used for creating a new product, In this case, it is called a real new product; also product capability means that product development is based on customers' needs.



**Figure 2.2:** Types of product innovation

Type of product innovation	Product capability	Technological capability
Continuous	Same	Same
Technologically discontinuous	Same	Advanced
Commercially discontinuous	Enhanced	same
Technologically and commercially discontinuous	Enhanced	Advanced

**Source:** Adapted from Veryzer (1998, p.307)

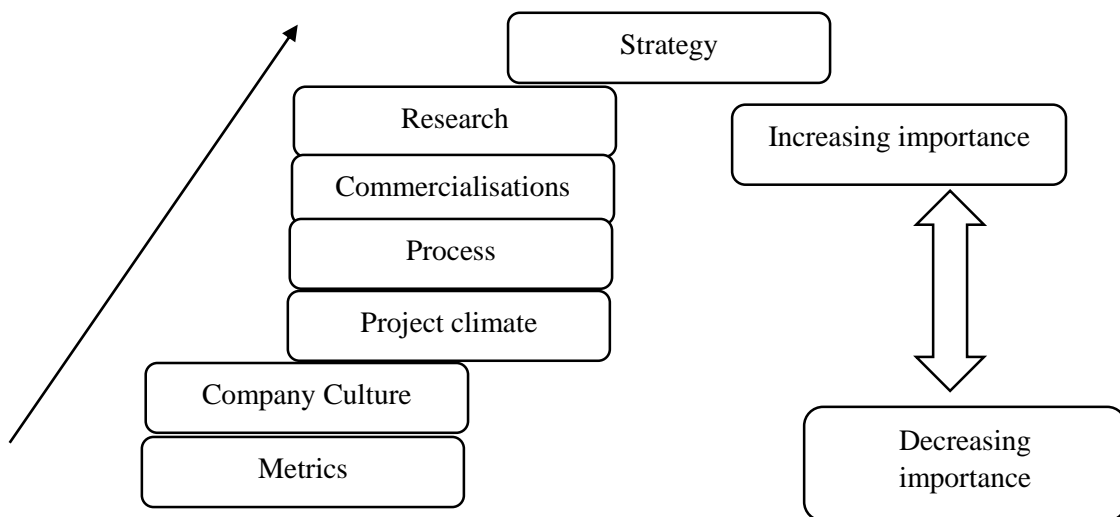
Dooley et al., (2002) believed that in implementing new product processes, four factors are needed, namely: encompassing project selection; goals, product strategy, and customer involvement.

Cormican and O’Sullivan (2004) used six critical elements in the process of product development (see Figure 2.3). These dimensions are:

- strategy
- leadership
- culture and climate
- planning and selection
- structure and performance,
- communication and collaboration

Kahn et al. (2006) portrayed new product development best practice across six dimensions: 1) strategy 2) portfolio management 3) process 4) market research 5) people, and 6) performance evaluation. Nicholas et al., (2011) used seven dimensions in investigating new product development best practice in SMEs and large organization. These elements are: strategy, process, research, project climate, company culture, commercialization, and metrics and performance (see Figure 2.4). Their research shows that the action of SMEs in developing new product best practice in the dimensions of strategy and commercialization is limited; while large companies are unable to find and recognize best practice in new product development in the dimension of metrics and performance evaluation.

**Figure 2.3:** Structure of new product development NPD Success



**Source:** Adapted from Nicholas et al., (2011, p. 239)

Yan and Makinde (2011) designed a conceptual model and used six variables to measure new product development in SMEs in South Africa. These variables are continuous improvement, management support, company resources, people involvement, new product development process, and new product development strategy. The result of their study indicates that among these variables continuous improvement has a positive and significant effect on new product development in SMEs.

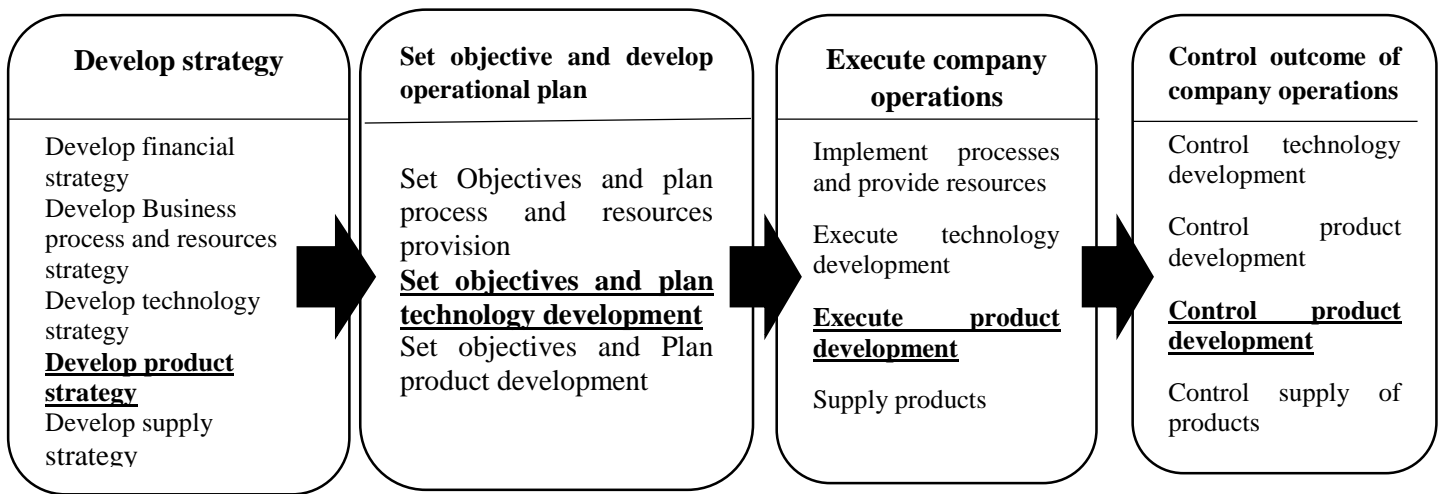
### **2.5. Product development and business strategy**

Business strategy is defined as a long-term plan for a company which helps it achieve its goals (Zahra and Covin, 1993). The goal of business is to achieve their long-term objectives by using strategic management. To do this, it is necessary to formulate strategies for the business's various elements in a coherent way so that they are consistent and integrated (Murthy et al., 2008). After this stage, procedures to implement the plans need to be followed and all resulting actions should be monitored effectively.

New product development strategy is one of the business goals that meets two types of main goals: product goals such as improving performance; and costs and quality and business goals that relate to the contribution of product development to business goals [such as improving marketing performance, revenue and profitability]. Therefore, the role of new product development contributes to achieving the business's goals (Murthy et al., 2008).

According to Fairlie-Clarke and Muller (2003), new product development rests on key strategies and consists of three stages: set objectives and plan product development; execute product development; and control product development. New product development is part of the business process (see Figure 2.4).

Figure 2.4 New product development as a part of business processes



Source: Adapted from to Fairlie-Clarke and Muller (2003)

As Wheelwright and Clark (1992) discussed, successful firms are those able to introduce and enter new products into the market very quickly in the face of a turbulent business environment and global and dynamic competition. These products should meet customers’ needs and satisfy their expectations. Wheelwright and Clark (1992) described the characteristics of those firms as follows:

(1) Approaching new product development in a structured manner, which is more successful than using an ad-hoc approach.

(2) Emphasizing the early stages, which has a higher chance of success than not so doing.

With global competition, companies have to react fast to respond environmental turbulence. In determining market success, technology has as a pivotal role (Zahra and Covin, 1993; Dutta et al., 1999; Cooper, 2000). Therefore, companies have to maximise their adoption of advanced technologies to introduce new technological products. These changes have alerted companies to the need for developing a new products strategy that is consistent with or fits the business strategy (Zahra and Covin, 1993; Kotabe and Scott Swan, 1995; BurgeSmani and Wheelwright, 2004). This fit ensures that technological resources and capabilities are sufficient to attain business goals.

New product development activities are vitally important for the growth and performance of firms (Frambach et al., 2003). Although there is considerable research that focuses on the factors leading to successful new product development, little attention has been devoted to the importance of business strategy on new product development, and how business strategy can influence new product development that is undertaken within the firms (Zahra and Covin, 1993; Manu and Sriram, 1996; Henard and Szymanski, 2001). For example, Porter (1997) asserted that a firm that follows a strategy of product differentiation tends to be more involved in developing new products than a firm which follows a strategy of cost leadership. According to

Miles and Snow (1978), prospector firms that have an entrepreneurial attitude and peruse new market opportunities are more involved in new product activity and focus more on product innovation than firms that have other types of strategy.

The study of Frambach et al. (2003) claims that business strategy influences new product development, directly and indirectly, through market orientation. Also, firms that emphasize a differentiation strategy or a cost leadership strategy tend to be more customer or competitor-oriented. Further, being customer oriented leads directly to enhanced new product activity. While greater competitor orientation has a negative influence on enhancing new product activities directly, it has a positive effect on new product development indirectly. Their study also shows that business strategy with differentiation strategy enhances the level of new product activities in firms.

## **2.6 New product development process and models**

According to Whitney (1990), “product development is the process of converting needs into a technical and commercial solution and each product development process is unique but the processes share common features or elements.” He mentioned that understanding those common principles in the process helps to guide the management of future product development processes.

A different model of new product development processes has been proposed. All models attempt to get better insight into NPD processes and management. According to Smith and Morrow

(1999), there are different goals for process modelling which cover two main purposes: learning about the process, and suggesting ways for controlling processes.

As product development is complex in nature, there are various process models that help to improve managerial decision making. The different advantages of each modelling approach have been explored by reviewing the product development modelling literature. Brady et al. (1997) highlighted the significant interactions between the models' theoretical power and their practical values. Each model is applied in firms to fulfil their needs and attempt to improve the new product development process.

Smith and Morrow (1999) pointed out modelling criteria in the product development process, and believe that any model of the product development process should take several criteria into consideration. These criteria lead to a useful predictive value in the modelling of the product development process.

Major features of product development models that meet the requirements of management are ones that:

- address the significant managerial issues of firms
- provide available and reliable information
- have reasonable assumptions and simplification
- computationally tractable. (Smith and Morrow, 1999)

**Table 2.2:** The different models and phases of new product development

Models	Researchers	Phases
Model 1	Andreasen and Hein (1987)	Recognition of need, investigation of need, product principle, product design, product preparation, execution
Model 2	Pugh (1990)	Market, specification, concept design, detail design, manufacture
Model3	Fox (1993)	Pre-concept, concept, design, demonstration, production
Model4	Roozenburg and Eekels (1995)	Analysis , concept , materialization
Model5	Pahl and Beitz (1996)	Clarification of task, conceptual design, embodiment design, detail design
Model 6	Blanchard (2004)	Conceptual design, preliminary system design, detailed design and development, construction, production
Model 7	Cooper (2005)	Scoping, build business case, development, testing and validation, launch
Model 8	International Electrotechnical Commission (1991)	Concept and definition, design and development, manufacturing and installation

**Source:** Adapted from Murthy et al., (2008, p. 28)

New product development processes start with an idea to create a new product that meets the specific needs of customers and/or manufacture and ends by launching the product on the market (Murthy et al., 2008). Many researchers suggested a variety of phases, which are different from model to model. Examples of models and phases are given in Table 2.2



In diverse models, there are a variety of phases and different terminology, while the same terms can be interpreted differently. Each model and phase in table 4.1 has a different explanation and each model illustrates a different context, such as:

- type of product ( mechanical or electrical)
- degree of innovation ( redesign versus routine design)
- product complexity
- production process (manual, highly automated or existing production facilities)
- type and number of suppliers/original equipment manufacturers (OEMs)
- technologies involved
- availability of resources
- temporal and budget constraints.
- availability of resources
- temporal and budget constraints. Query – this bullet point repeats the one above?

There are different models for having a successful product development process. Wilson et al. (1996) introduced a model for firms where market success depends on timely products. Bobrow (1997) developed a list of different success factors for firms' new products such as “clear strategic direction,” “corporate culture aligned behind new products,” “sensible allocation

policy of resources and people” and “a cross-functional team” allocated to the new product development.

The notion of the product development process has developed from strategic planning and concept generation, pre-technical evaluation, technical development and commercialization.

Seven critical factors for success in the product development process have been introduced by

Bowen et al. (1994):

- (a) recognizing and developing the core capabilities of the firm
- (b) all cross-functional team members sharing a guiding vision.
- (c) effective project management and leadership
- (d) raising of the spirit of commitment and proprietorship

There are different models for having a successful product development process. Wilson et al., (1996) introduced a model of market success for firms which depends on timely products. Also, Bobrow (1997) developed a list of different elements of success factors for e firms’ new products such as a “clear strategic direction”; “corporate culture aligned behind new products”; “sensible allocation policy of resources and people”; and “a cross-functional team” allocated to the new product development.

The product development process has developed from strategic planning and concept generation, pre-technical evaluation, technical development, and commercialization. The other

seven critical factors for the success of the product development process have been introduced by Bowen et al., (1994, 1995) including:

- a) Recognizing and developing the core capabilities of firms
- b) Sharing of a guiding vision by all the cross-functional team members
- c) Project management and leadership
- d) Raising the spirit of commitment and proprietorship
- e) Being able to enhance the firm's performance
- f) Having a systematic approach to the new product development project
- g) Organizational learning and being able to reduce faults and misunderstanding.

Rosenau and Moran (1993) stated that success in new product development projects depends on quality management, multifunctional teamwork and marketing abilities. Likewise, Himmelfarb's study (1992) indicated that parallel marketing, R&D and a functional team (manufacturing, engineering and finance) are the main tools for firms to gain successful product development. In a study by Patrick (1997), it was highlighted that having a complete comprehension of new product development projects from forecasting and developing stages to launching is important.

An empirical study by Bruce and Biemans (1995) analyzed the difference between marketing, networks and the failure and success of launch strategies in regard to developing new products.

Another analysis of new product development projects in 200 companies was undertaken by

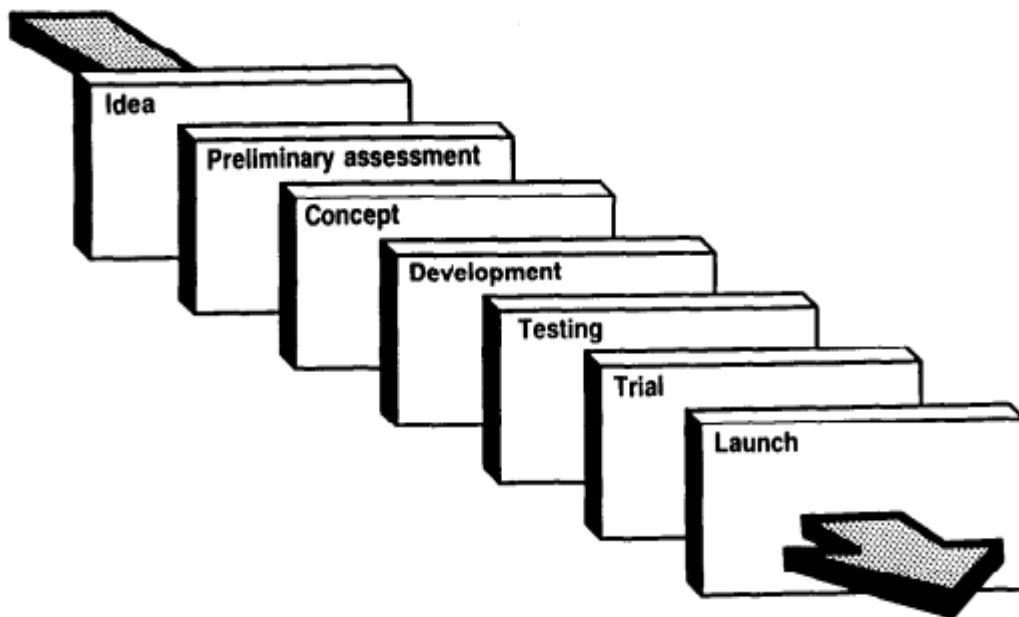
Kuczarski (1992). The purpose of this study was to develop a recipe of factors showing how other companies had been successful. The product development process is evaluated and managed continuously in various phases, through “strategic planning,” “pre-technical evaluation,” “technical development” and “commercialization.” Although several models for product development have been developed, the basic activities in the product development process are similar (Veryzer, 1998). The product development process evolved based on market opportunity and customer needs; other issues such as refining the concept, examining the technical feasibility and the initial design phase also need to be taken into consideration.

“Generic” product development processes have been proposed for use with discontinuous high-tech products, with little modification. Firms with such products try to start with a new technology and then find a proper market, even though more work is needed to adapt technology to market opportunities. Following this stage, new product development processes should be carried out in the normal way. Although the adaption of a firm’s technology to their market opportunities is an extra stage in the developing of products that are manufactured continuously, the process is presumably different when it includes important new technologies, and manufactures products that are “new to the world.” Firms need to make more effort to identify new opportunities for products and create new technologies (Veryzer, 1998).

In the last decade, many structured approaches have been developed for the new product development process. For instance, Cooper (1988) has suggested a new product development process model with seven stages which starts from the idea of a new product to launch (Hugs

and Chafin, 1996). These stages are illustrated in Figure 2.5. In the first stage, new ideas for generating the product are shaped. Critical activities are undertaken in this stage, and an initial evaluation and screening of ideas is done, because poor ideas and weak screening lead to high-cost problems in subsequent stages. The second stage is a preliminary assessment.

**Figure 2.5:** the Cooper's seven stage new product development

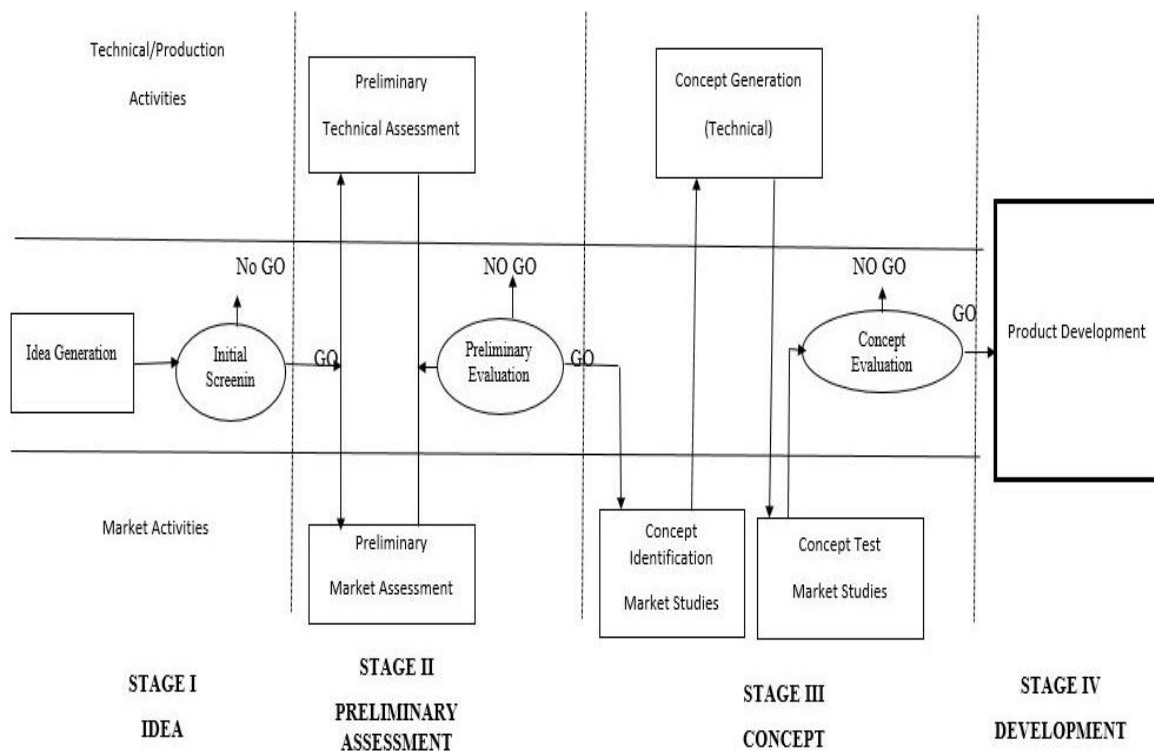


**Source:** Cooper (1988, p.242)

The second step after idea generation for further investigation is an informal stage in the new product process which is called screening. According to Cooper (1988), this stage should be considered as a formal step in the new product development process. In this stage, initial decisions will be made about preliminary resources for the project, to assess its viability and potential. During the screening stage, the new product ideas are studied and some “must-have criteria” questions are considered as a significant part of the project. “Must-have criteria”

include characteristics which every project must meet in order to receive further consideration. Such questions pertain to strategic alignment, feasibility, project size and other company-specific criteria. After passing the “must-have criteria,” the next set of criteria are “should criteria,” which deal with project success, economy of scale, marketing and sales potential, and the product’s fit with the firm’s resources. Preliminary assessment is the second stage. After the screening step, the most effective and important stage investigating resources and feasibility for the project has been carried out in this second stage (see Figure 2.6). The exact expenses for the project, including technical assessment and market assessment, should be completed in this stage.

**Figure 2.6:** The up-front or predevelopment steps in the NPD



Source: Cooper (1988, p.243)

Preliminary market assessment is a non-scientific market evaluation with a limited time and budget. It includes figuring out marketing aspects of the projects such as size, segments, growth and competitors. During this stage the firms could find out about the ideas of a few customers, their interest and expectations. Also, in order to get an insight into products and a primary market evaluation, they can have meetings with dealers, distributors, industry and knowledgeable experts as well as statistical materials reports, and so on.

Primarily, technical assessment refers to evaluation of the products technical aspects by a firm's technical department. This stage involves considering the cost of production, technical solutions, product development, and manufacturing of the proposed product.

The second stage provides more precise information than the initial screening step. Therefore, qualitative and financial analysis shows whether the decision for the proposed product is GO or not. If not, the project will be stopped, but if GO, it moves to the next stage.

Stage three in product development process is concept definition. This stage, which is very important, time consuming and costly is the final stage. The final decision, including GO/KILL before product development will be made, and the product concept and strategy, such as the exact design requirements, will be finalized. This stage should define the product's competitive advantages, superior values and benefits to the customer (see figure 2.6). Customers could benefit through the product's design, attributes and features. Customer value is the most important process of the concept definition stage.

In the concept definition stage, the product protocol will also be developed. The protocol refers to agreements about the products, target market, benefits, features, attributes, design, and objectives of R&D efforts. Furthermore, the concept definition stage involves two main activities – technological activities and market-oriented efforts – in order to conceive the final winning products.

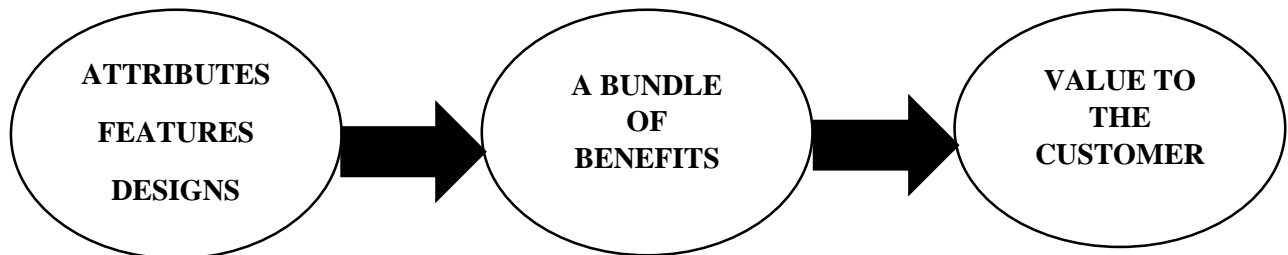
Market-oriented activity involves studying the “best products” on the market. This step is called concept identification. The main purpose of this stage is finding out the “ideal product” according to the customers’ “wish list.” What attracts the customers? Can new products be a good replacement for the products the customer is using now? Why? Also, prospective customers, their criteria and choices, customer satisfaction levels and competitive products are investigated. Figure 2.7 illustrates the link between product design and value to the customers.

All acquired information helps the firms to identify the ideal product for customers. Access to this information can be by various methods, such as face-to-face interaction with potential customers, surveys, interviews, observations and investigating competitors’ products.



**Figure 2.7:** The link between product design and value to the customer

We want a product with “value “to customer



“Value” is in the eye of the customer.

We must study the customer to determine.

- what is “value”?
- what is a benefit?
- what is a better product?

**Source:** Cooper (1988, p.245)

Analyzing the other competitors’ products, and considering their weak and strong aspects, price marketing strategy, design and features, provides the necessary inputs to identifying the ideal product. Concept development refers to finalizing the feasibility of the products from two main viewpoints: technical feasibility and economic feasibility. Technical problem-solving activities are undertaken with marketing and technical individuals.

The next stage involves a final test, called a concept test. In this stage, firms ascertain whether the final product meets the customer’s needs and if it is better than competing products or not.

This stage is the final step before moving to the product development stage. The concept test also tests the level of acceptance of products in markets. It includes the study of potential customers ,which is different from prospecting concepts, since it measures the customer’s reaction to potential products. The aim of this stage is to determine whether the product is

heading in the right direction or not, and it should be borne in mind that the product has not entered the development stage yet.

The final stage before entering full-scale product development is called concept evaluation. In this stage the critical decision to GO or KILL is made. Both qualitative and financial studies enter into the final GO/KILL decision. In this stage, agreement between marketing and technical people is finalized and a protocol is established to guide the development stage. Using this clear protocol, the designing of the product can be started.

The process of innovation is divided into predestined stages and each stage includes prescribing, and relating, and sometimes parallel activities. This system is a “stage-gate” system, of which Cooper’s seven-stage system is an example . The “gate” function acts as quality control for product development projects, and needs to satisfy some specific demands before the product development process is permitted to run (Potter et al., 1991). Although the number of stages and gates differs in stage-gate systems between different firms, each pursues risk management and enhancing efficiency by cohering structurally to the product development process (Veryzer, 1998).

There are a number of product development models that have been developed for managing new product development, and other processes have been applied with the aim, of improving the outcomes of product development: for instance, “phase-review processes” entailing consecutive phases with distinct input and output; “stage-gate processes” such as “product and cycle-time

excellence,” a system that acts as a facilitator for implementation; “quality function deployment,” which helps incrementally to improve and develop structure; and the “value proposition process” which deals with improving continuous learning and cycling (Millson et al., 1992; Wheelwright and Clark, 1992; Griffin, 1996 et al., Griffin, 1997; Hughes and Chafin, 1996; Veryzer, 1998).

To sum up, although these models and methods of product development are different according to the mechanisms of procedures and processes, the basic stages of each model are similar, and include the generation of ideas, preliminary market and technical evaluation, doing market research and a detailed investigation of the market, an analysis of the business, and determination of market strategies (Hughes and Chafin, 1996; Cooper, 1988; Veryzer, 1998).

## 2.6. New product development and success factors

In recent decades, new product development has been an area of interest for scholars (e.g. Leonard-Barton, 1992; Muffato, 1998; Kleinschmidt et al., 2007; Afonso et al., 2008; Gmelin and Seuring, 2014). It also attracts researchers in different areas such as the technical, engineering and service sectors (Perrone et al., 2010; Rauniar and Rawski, 2012). New product development emphasizes trapping market opportunities and producing a product for supplying into market with a short development cycle (Krishnan and Ulrich, 2001; Atuahene-Gima and Murray, 2007; Hu and Bidanda, 2009; Gmelin and Seuring, 2014).

One of the crucial issue for firms is to develop and introduce new products regularly (Bevilacqua et al., 2007; Zhang and Dhaliwal, 2009; Hult and Tomas, 2010; Gmelin and Seuring, 2014).

Given that new product development is important for firms, developing new products is very prominent in the literature. Many empirical studies have investigated the success factors rfor new product development. Research on new product development has led to the identification of the success factors that impact on improving the product development process (Montoya-Weiss and Calantone, 1994; Griffin, 1997; Cooper, 2001; Marion et al., 2012).

Thorough empirical studies during this time have developed, modified and justified these factors, such as “top management support” (Tang, 1999), “cross-functional work and cooperation” (Cooper, 1996; Song and Parry, 1997), “allocated resources” (Nystrom et al., 2002), “marker orientation” (Hult et al., 2004), “market planning” (Esslinger, 2011; Hult, 2011) and “formalized processes” (Singhal and Singhal, 2002; Grieves and Tanniru, 2008; Bergsjø et al., 2008).

According to Cooper (2001), these success factors cover the two fundamental aspects of successful product development: first, doing the project right, and second, doing the right project. As Marion et al. (2012) mention, “cross-functional work” and “formalized processes” focus on the first aspect, doing the project right, and “top management support” and “market planning” focus on the second aspect, doing the right project. The most relevant success factors that have been examined and tested by several researchers are summarized and described in

Table 2.3.

Gmelin and Seuring (2014) investigated the effect of the product life-cycle management on facilitating the integration of new product development and sustainability. The result of their study indicated that a sustainable new product development depends on cost awareness, quality, flexibility and environmental and social issues. They argued that the integration of sustainability in the new product development process is a challenging and long term activity for firms.

**Table 2.3:** New Product development success factors (NPD)

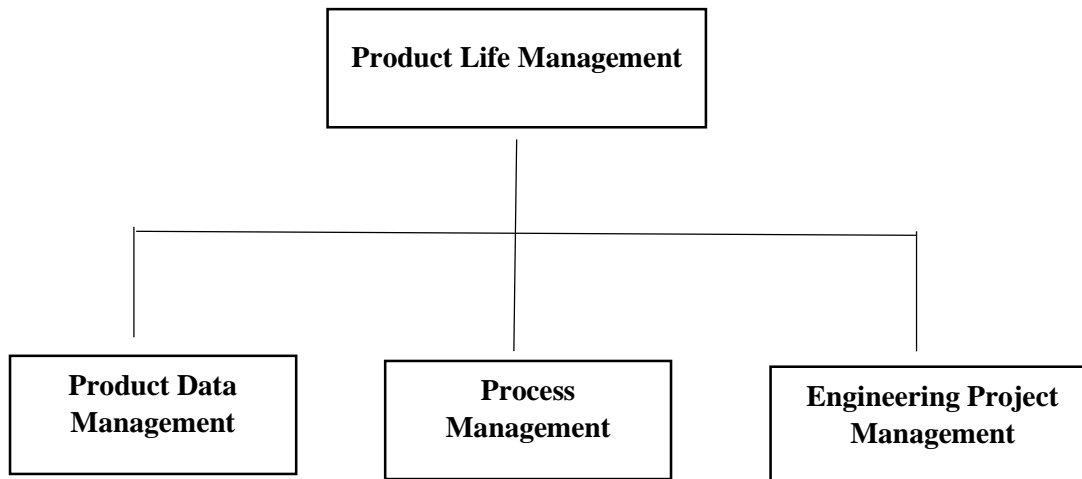
Success factors	Description	References
Cross-functional work	People from different functional areas work jointly toward a new product	Pagell and Wu (2009), Wang et al. (2009), Rauniar and Rawski (2012)
Top management support	Sponsorship by company's senior staff to enable NPD activities	Sarin and McDermott (2003), Salomo et al. (2010), Slotegraaf and AtuaheneGima (2011)
Market planning	Evaluation of the current market needs with the company's capabilities to fulfill these needs	Lambert et al., (1998), Hult and Tomas (2010), Esslinger (2011)
Formalized processes	Well defined routines toward a dedicated output being agreed by all development partners	Singhal and Singhal (2002), Grieves and Tanniru (2008), Bergsjo et al. (2008)

**Source:** Adapted from Gmelin and Seuring (2014, p.168)

Development success factors have an interconnection with each product life cycle management pillar (see Figure 2.8). Product life cycle management introduces three product life cycle management approaches: product data management, process management, and engineering

project management (Saaksvuori, 2004; Stark, 2005; Chiang and Trappey, 2007; Grieves and Tanniru, 2008).

**Figure 2.8:** Three pillar of product life management



**Source:** Adapted from Gmelin, and Seuring, (2014, p.169)

A large body of literature regarding new product development has typically focused on marketing perspective (Hines et al., 2006) while there has been relatively little research on the relevance of sustainable new product development and product life cycle management (Bras, 2009).

Young et al., (2007) noted that firms that are dominantly product oriented identify that managing the product life cycle is an appropriate approach to product complexity management. Grieves (2006) defined product development management as “Product Life Management (PLM). It is an integrated, information driven approach comprising of people, processes/practices, and

technology [...] relevant to all aspects of a product's life, [...];by trading product information for wasted time, energy, and material across the entire organization and in the supply chain.”

Liker and Morgan (2006) argued that trading information is one of important issues in developing new products that has been unnoticed in this regard. Nowadays, with the day to day emergence of new technology, the demands of market have been propelled into new products. On the other hand, firms are under pressure to keep market share, satisfy their shareholders, adapt to globalization and provide up to date products to the market. Consequently, a short life cycle development for new products is crucial (Hu and Bidanda, 2009; Rao and Holt, 2005; Gmelin and Seuring, 2014). Cooper (2011) stated that firms should consider product success more critically.

### **2.7. New product development and resource management**

Successful new product development relies on a firm's capabilities (Iansiti and Clark, 1994). Leveraging the firm's capabilities is part of the action to be accomplished during the new product development process in any firm. Having organizational members, for example team leaders, with managerial skills, can be considered as a capability with great influence for enhancing product concept effectiveness. A firm's strategic vision as a unique capability could also have an effect on the outcome of the product development process (Verona, 1999). The presence of variables, such as special agents and organizational capabilities, will also have an influence.

This distinction, the contribution of agents and capabilities and its effect on new product development process, has been driven from a resource-based view (RBV). This view emphasizes recognizing the firm's capabilities that have an effect on performance (Wernerfelt, 1984; Barney, 1991). RBV was developed by Penrose (1995), who stressed that unique resources and capabilities in firms lead to competitive advantages. In the light of this theory, capabilities and resources which are rare, valuable and inimitable are the basis for a sustainable competitive advantage (Barney, 1991). It has been argued that intangible resources such as knowledge, managerial skills, technical capabilities and skilled workers play a significant role in competitive advantage (Kogut and Zander, 1992; Petraff, 1993).

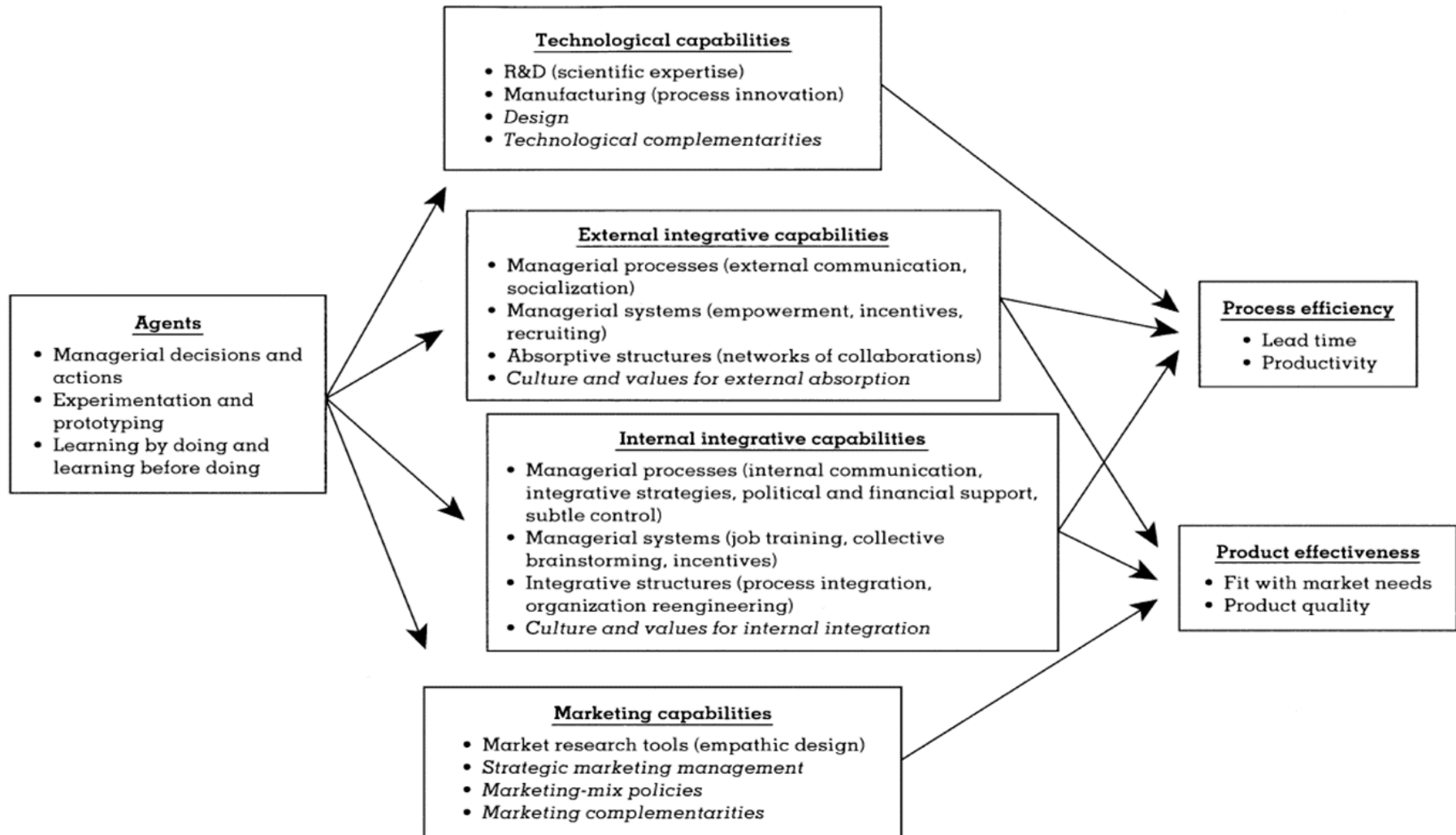
Considering the resource-based theory, and previous studies which emphasize the role of agents as product development drivers, makes it possible to reach analytical explanations. The existence of variable links between agents, organizational capabilities and performance contributes to a better understanding of product innovation management.

Figure 2.9 demonstrates the correlation of firm capabilities which are driven from agents' activities with "process efficiency" and "product effectiveness". Brown and Eisenhardt, (1995) focused on process efficiency and product effectiveness for measuring product development. In a study by Verona (1999), process efficiency was measured in terms of lead time and productivity; and product effectiveness in terms of fit with market needs and product quality. In this model, the four main drivers of product development outcome are technological capabilities (Helfat, 1994; Camuffo and Volpato, 1996; Hayes et al., 1996), external integrative capabilities



(Nonaka, 1990), internal integrative capabilities (Brown and Eisenhardt, 1995; Griffin and Hauser, 1996) ,and marketing capability (Montgomery and Hariharan, 1991; Tripsas, 1997).

Figure 2.9 A resource based model of product development



Source: Verona (1999, P. 135)

## 2.8. Market development strategy

Growth of SMEs is recognized as vital to the development of a nation's economic and future welfare. The need for successful market development is predominantly important for smaller firms pursuing niche strategies for enhancing the firm's growth (Coviello and Munro, 1995). Ostgaard and Birley, (1994) defined market development strategy as 'the strategic importance of market creation or expansion'.

Market development strategy is one of Ansoff's matrices option for firms. Once product development is expensive and risky, market development can be a substitute strategy for organizations. In this case, the organization can enter new markets with current products but the organizational scope is the same as product development, and limited (Johnson et al., 2011, p. 232).

According to Ostgaard and Birley (1994, p. 289), market development strategy reveals the scope of the geographic markets that firms peruse through new distribution channels. Gundry and Welsch (1997) and Lohmann (1998) asserted that firms with high growth are more willing to enter new markets in comparison with low growth firms. On the other hand, Ardishvili and Cardozo, (1994), believed that "younger firms are also more likely to expand geographically, using their product lines to serve new regional and international markets, while older firms are more likely to grow locally, developing specialized products for small, established demographic niches".

Placing more emphasis on market development strategy provides firms with an insight to better analyses for understanding their position in market and incorporating ideas into existing processes (Zahra and George, 2002; Branzei and Vertinsky, 2006); as well as suggesting new way and solutions that lead to enhanced and improved technological capabilities firms (Barkema and Vermeulen, 1998, p. 8). Firms tend to regularly update their processes of production and attain higher levels of technological proficiency (Helfat, 1994) and “operational effectiveness” (Spender, 1992; Lane et al., 2001).

Some research indicates that SMEs have advantages compared to large companies in designing and implementing product or market development strategy (Raymond and Croteau, 2006; Nicholas et al., 2011; Tajvidi and Karami, 2015). The structure, policies and management of these firms enables them to be more successful in developing new product and market (Ghobadian and Gallear, 1997; Ledwith and O’Dwyer, 2008). As SMEs have limited resources and compete with strong competitors then developing innovative products and identifying market niches are critical issues. Therefore, product and market strategies can be effective strategies for SMEs (Borch et al., 1999).

The literature on the market development strategy and the assessment of entrepreneurial firms in SMEs is quite limited. Much prior researches emphasises issues relating to large firms or international market development in smaller firms (Miesnbock, 1988; Beamish and Munaro, 1987; Coviello and Munro, 1995). This study is an attempt to cover this gap in the literature

and investigates market development strategy in SMEs and also the relationship between market development strategy and entrepreneurial firm performance.

## 2.9. Innovation

Based on the early definition of the concept of innovation by Schumpeter (1911), cited in Hagedoorn, (1996), innovation can be in the form of new products, new products processes, new market or new forms of organizations. As Johnson et al., (2008, P.325) argued, innovation leads to major strategic management problems for strategists. They stated that innovation can be more complex than just invention. Invention is the process of the transformation of new knowledge into a new product, process or service; while innovation adds the extra stage so that the new product, process or services is useful. Typically, this process is diverse in different sectors. In the private sector, it occurs through the marketplace, while in the public sector it is via service delivery.

Also, Johnson et al., (2008) asserted that the strategic dilemmas are a more complex process.

Decisions of strategists ought to be based on three fundamental issues:

- “How far to follow technological opportunity as against market demand”
- “How much to invest in product innovation rather than process innovation”
- “Whether to focus on technological innovation rather than extending innovation to their whole business model”

They also pointed out that managers have to achieve a balance between technological push and market pull. Hence, they put more emphasis on product or process innovation. Generally, innovation is supposed to be driven by technology. In the push view of technology, technologists or scientists undertake their researches in their laboratories to create new knowledge. This new knowledge is considered as a base for new products, processes or services. Subsequently, it is handed over to the rest of the organisation to make, market and distribute.

### **2.9.1. Innovation capacity**

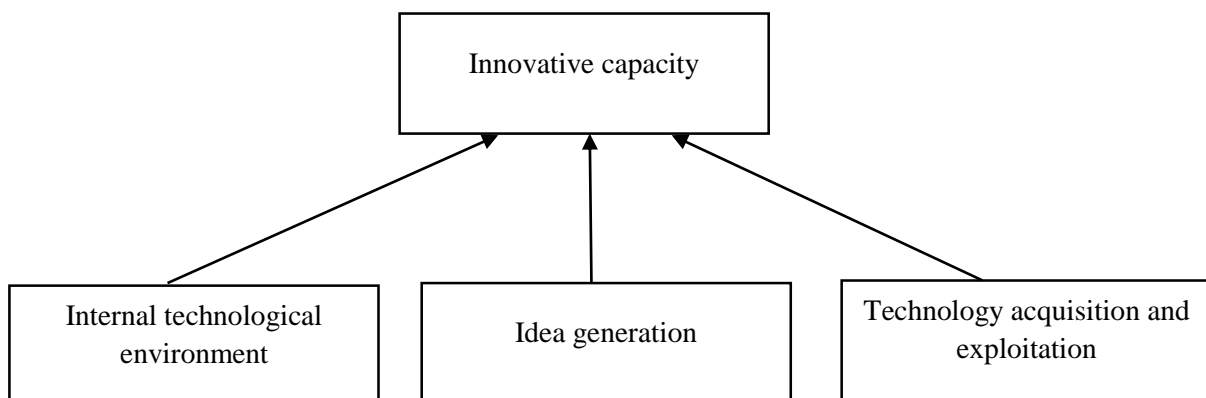
Nowadays, innovation is a key factor for organizations to have sustainable competitive advantage and innovation capacity, and is known to be one of the main features of organizations that will lead to competitive advantage (Romijn and Albaladejo, 2002; Silva et al, 2008; Prajogo and Ahmed, 2006). Innovation capacity is an important factor for innovation, initiative and entrepreneurship, to create new features, improve existing technologies, and stimulate competition in organizations.

In recent years, studies on this topic has led to the development of conceptual models (Isaksen 2001; Romijn and Albaladejo, 2002; Lai and Shyu, 2005; Uchida and Cook, 2007). This subject is observed from different views in the literature. These perspectives differ in focus, primary concepts, strategy considerations, methodology and models, measurement and analysis (Souitaris, 2002). Recently, the literature has focused on the characteristics of firms and other

characteristics of firms that lead them to be innovative (Hwang et al, 2004; Lemon and Sahota, 2004).

Koc and Ceylan (2007) defined innovative capacity as that which “relates to the firm’s capacity to engage in innovation, that is, the introduction of new processes, product or ideas in the organization.” They believe that product and process innovation are key factors for firms, especially industrial companies. Hence, they investigated the influence of three factors, namely internal technological environment, idea generation, technology acquisition and exploitation, rather than other factors, has a strong and positive effect on innovation capacity.

**Figure 2.10:** Conceptual model of innovation capacity



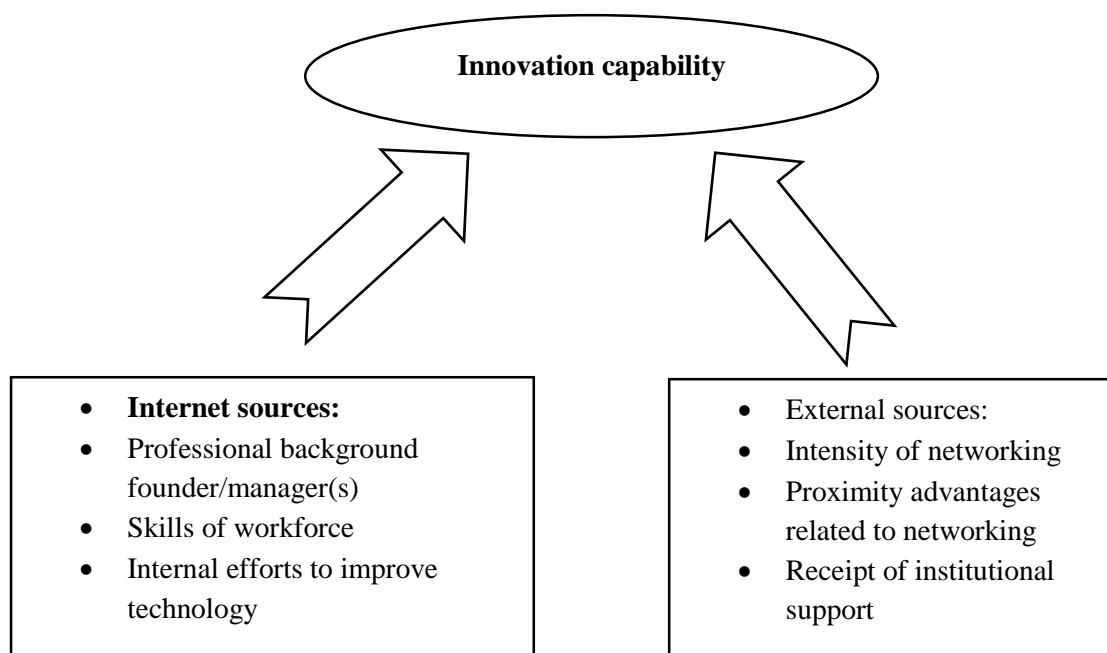
**Source:** Adapted from Koc and Ceylan (2007, p.107)

The research of Suarez-Villa and Hasnath (1993), which investigates the effect of public infrastructures on innovation capacity in USA organization from 1920-1989 shows that there is a significant relationship between educational infrastructure and innovation capacity in

organizations, so that the organization which invested more on improving infrastructures had better performance and more innovation.

Romijn and Albaladejo (2002) examined the determinants of innovation capability in small electronics and software firms in Southeast England, using indicators of innovation such as potential internal and external resources, such as education, work experience of engineers and scientists, R&D, the interaction of organization with networks and other firms. The result of their survey showed that there is positive and significant relationship between internal and external factors on enhancing innovation capacity (see figure 2.11).

**Figure 2.11: Innovation Capability**



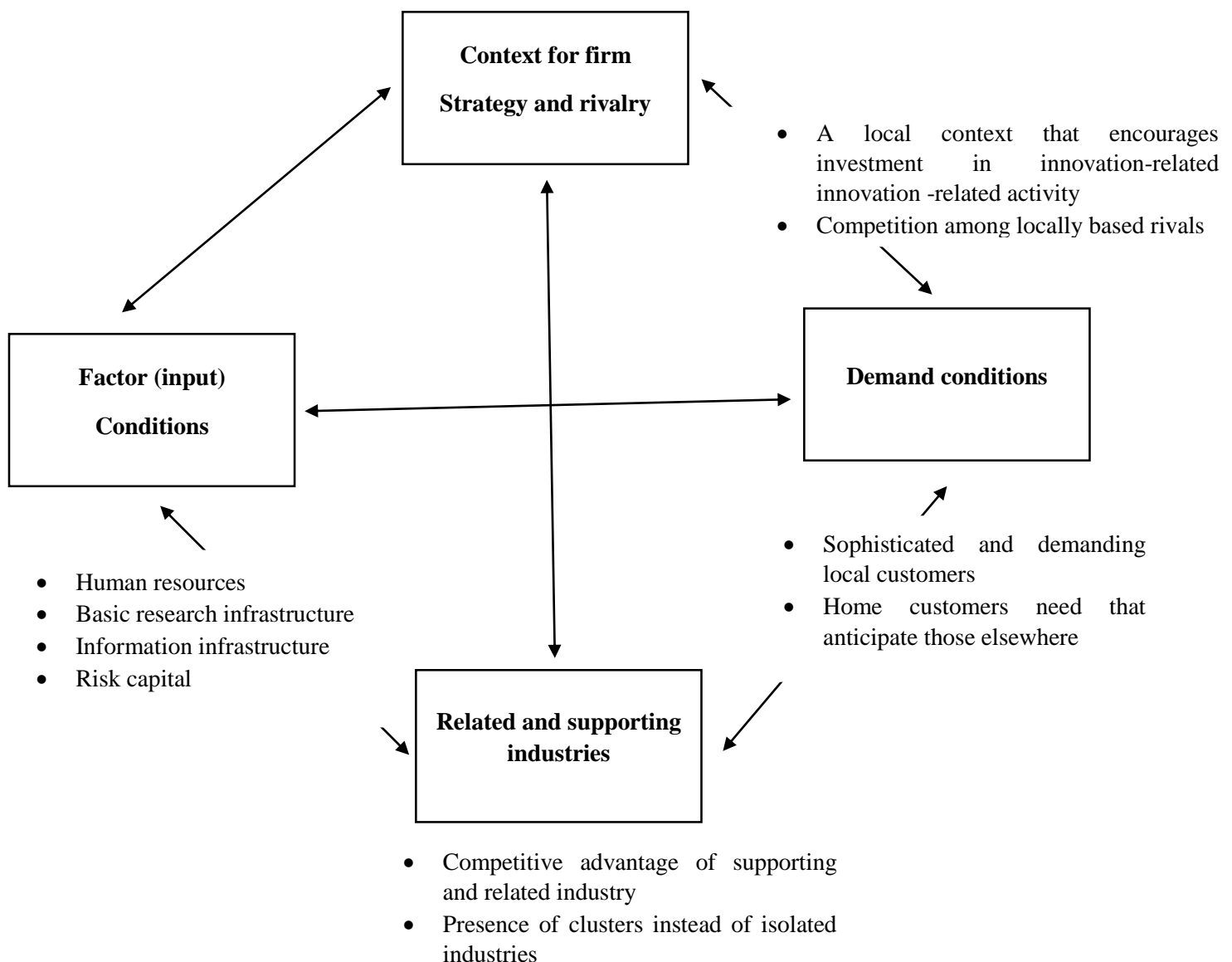
**Source:** Adapted from Romijn and Albaladejo (2002, p.1056)

Lai and Shyu (2005) compared differences in innovation capacity between science parks in China and Taiwan. They studied the innovation orientation of national industry clusters in both



countries (see figure 2.12). Their research shows that research infrastructure, and the amount and type of customer demand and industry cluster, made a difference to innovative practices. Technology strategies in organizations define the type of innovation they seek, and how to achieve it.

**Figure 2.12: The innovation orientation of national industry cluster**



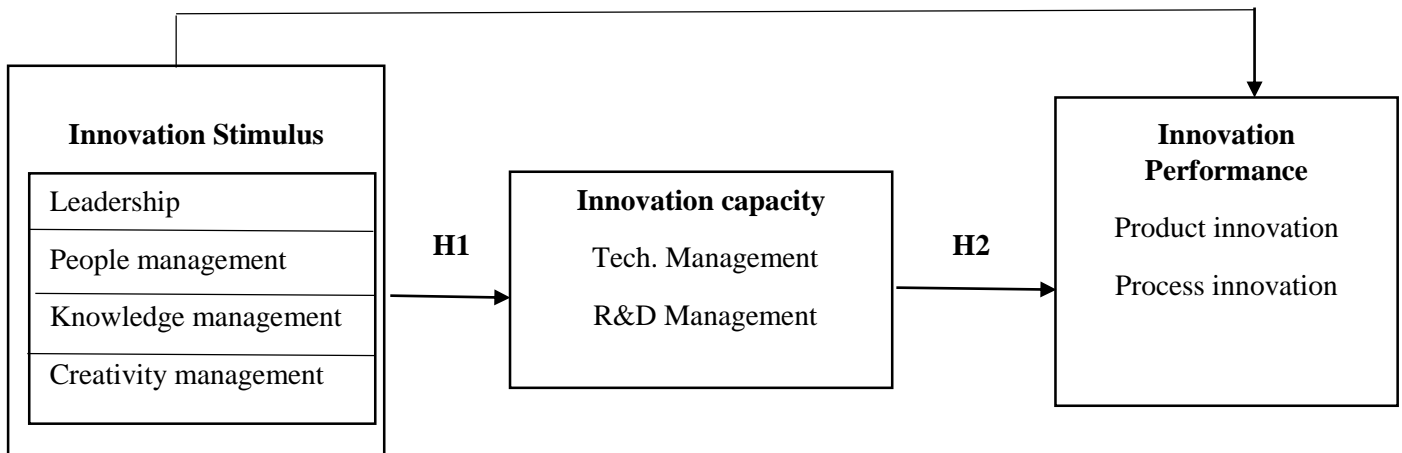
**Source:** Adapted from Lai and Shyu (2005, p.808)

Roberts and Berry (1985) describe how there are various strategic options for introducing innovation into the market. To create those strategic decisions, new product and process development efforts should apply a wide corporate perspective. This perspective should include customer needs as an important factor of the external network. Supporting this view, Cooper (2011) identifies the importance of identifying customer needs and matching them with technological capabilities.

Prajogo and Ahmed (2006) argued that organizations need to develop innovation stimulus such as leadership, HRM, knowledge management, creativity and innovation management in organizations to achieve high performance in innovation and this leads to enhancing innovative capacity in research and development and technology. They hypothesised that innovation stimulus results in innovation capacity and innovation capacity in turns results in higher innovation performance. The conceptual framework on their study is illustrated in figure 2.13.

Figure 2.13: Integrated model of innovation management

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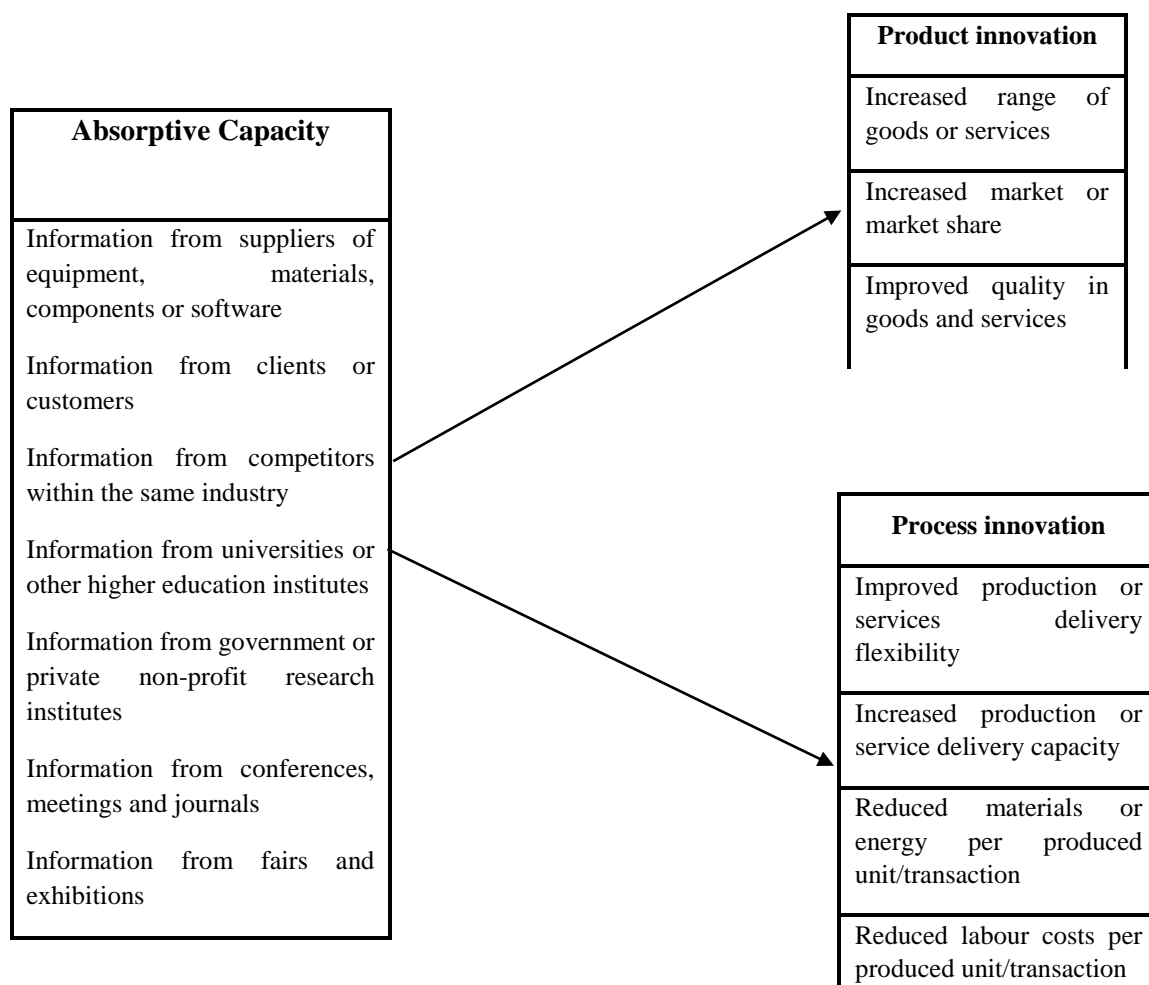
**Source:** Adapted from Prajogo and Ahmed (2006, p. 504)

Suarez-Villa (2003) considered that “measuring the level of invention and innovation capacity over time can provide an important indicator of the capacity or potential for innovation and the introduction of new technologies and also important insights on the dynamics of invention in any economic activity, nation or geographical area”. Therefore, the measuring of innovation capacity is valuable for policy makers, top management of firms and decision makers in industry, or academic researchers who are responsible for promoting innovative and technological activities.

Murovec and Prodan (2008) investigated the influence of organizational absorptive capacity on product and process innovation among 2564 Slovenian organizations which have 10 employers and more. They asserted that one of the crucial concepts in the organizational research area is absorptive capacity over the last decades.

Based on their definition of absorptive capacity, it is considered as “the set of organizational routines and processes through which an organization identifies and values new external information, and then acquires it, assimilates it and applies it to commercial ends” They showed that innovation capacity has a strong, positive and significant effect on product and process innovation in Slovenian organizations and a bigger effect on product innovation.

**Figure 2.14: The model of absorptive capacity**



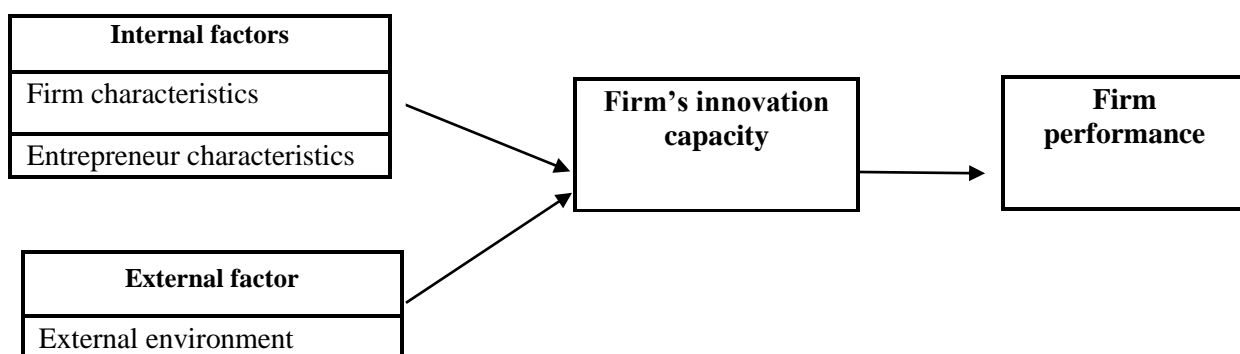
**Source:** Adapted from Moreover and Prodan, (2008, p.47)

In another study in Portugal, Marque and Ferreira (2009) identified the factors which enhance innovation capacity and how much they contribute to improvements in the firm's performance.

They classified factors into two groups: internal factors such as size, age, level of training, sector of activity, life cycle, and entrepreneurial activities; and external factors such as cooperation with other partners and networks, openness to external and the firm's business environment.

To investigate the relationships among these variables of internal and external factors, innovation capacity and firm performance, the study was based on the results of a questionnaire completed by a sample of firms drawn from the manufacturing industry in the Beira interior region of Portugal. Their research showed that age of firm, life cycle, entrepreneurial activities, cooperation with other partners and networks had the highest and most positive effect on enhancing innovation capacity and improving firm performance (see Figure 2.15).

**Figure 2.15:** The influence of internal and external factors on innovation capacity and firm performance



**Source:** Adapted from Marque and Ferreira (2009, p.57)

To sum up, reviewing the literature shows that a wide range of conceptual frameworks and models considered innovation capacity as a dependent variable which is influenced by independent variables such as absorptive capacity, internal organizational factors, and external environmental factors.

### **2.9.2. Innovation capacity in SMEs**

Innovation capacity has been defined as continually improving the capabilities and resources of firms for discovering opportunities in order to engage in new product development (Szeto, 2000). Meanwhile, firms pay a lot of attention to customers' needs in developing new products. Amit and Schoemaker (1993) separate the definitions of resources from capabilities: resources are factors owned controlled or available to firms, and capabilities are the capacity of firms to deploy and use the resources effectively for innovation.

It has been proposed that innovation usually starts with creating a new idea, and idea generation is considered as a significant factor for a firm's innovation capacity. Idea generation involves organizations gathering, exchanging, sharing and exploiting knowledge (Koc and Ceylan, 2007). Therefore, it has been claimed by a number of researchers that technological information flow leads to idea generation and eventually influences the innovation capacity of firms (Cohen and Levinthal, 1990; Macdonald and Williams, 1994).

As discussed in the literature, innovation capacity refers to firms' R&D efforts and innovative new products (Kirner et al., 2009). R&D activities and technological knowledge are also

considered to be a base for technological innovation in firms. But regarding small and medium-sized enterprises, the literature proposes that formal R&D efforts do not lead to innovation, but rather to informal day-to-day business development and customer relationships (Hirsch-Kreinsen, 2008; Forsman and Temel, 2011). Marsili and Salter (2006) also noted that the majority of SMEs don't have any formal written innovation plan, and less than half of those enterprises set a budget for innovation in the firm.

Moreover, Santamaria et al. (2009) argued that innovation in small enterprises is the result of investigation, learning, assessment and adaptation of technologies. Since, in small firms development activities are integrated in daily business efforts, it is very difficult to differentiate daily business development from innovation (Forsman, 2008). In SMEs, not only is the innovation process "hidden" from external individuals observing the firm's activities, but even the internal firm members do not find out about innovation development strategy even when they are dealing with it themselves (Hansen and Serin, 2010).

The capabilities of firms have been considered as transformers of firms' resources into innovation objectives (Dutta et al., 2005). A great body of literature states that firms can increase their innovation capacity by accumulating their existing knowledge (Cohen and Levinthal, 1990; Forsman and Temel, 2011). Where a firm's existing knowledge is low, it is not able to access, explore and deploy the external knowledge. In this context, the absorptive capacity refers to the firm's ability to understand external knowledge in order to absorb and exploit it for commercial means (Zahra and George, 2002). In another definition, by Branzei

and Vertinsky (2006), absorptive capacity has been considered to be a fundamental factor in increasing a firm's dynamic capabilities to produce innovative products in SMEs. It has been discussed that "dynamic capabilities" refers to recognizing new opportunities and organizing the tangible and intangible assets of a firm for achieving competitive advantages (Teece, 2007).

Furthermore, the literature proposes other capabilities, or even a mix of capabilities, which are essential for developing new innovative products. Hernández-Espallardo and Delgado-Ballester (2009) found that having a market-oriented approach and taking customer knowledge into account are key factors in developing new products. Another study, by Danneels (2002), highlighted that a proactive approach is significant for understanding and identifying customers' needs in developing new products. In addition, the two main factors for increasing innovation in firms are "transformation capabilities" and "risk-propensity" (Herrmann et al., 2007). Interaction-oriented capabilities have also been identified as an essential catalyst for the success of innovation development projects (Gruenberg-Bochard and Kreis-Hoyer, 2009).

A number of researchers have found that collaborative business networks have a great impact on increasing the radical or incremental innovation capacity of enterprises (Caniels and Romijn, 2003). However, it has been highlighted that it is significant for firms which are involved in different product chains to gain advantage from networking (Forsman, 2008; Todtling et al., 2009).



A number of researchers have found that the collaborative business networks have a great impact on increasing the radical or incremental innovation capacity of enterprises (Caniels and Romijn, 2003). However, it has been highlighted that it is difficult for firms which are involved in different product chains to get more advantage from networking (Forsman, 2008; Todtling et al., 2009).

Enterprises can gain benefits in their innovative product development by networking. For example, access to new markets, low production cost, (Glaister and Buckley, 1998; Karaev et al., 2007), increasing market share, achieving sustainable competitive advantages (Simon et al., 2003), knowledge creation, knowledge transfer and learning in SMEs (Smedlund, 2006) are some examples of networking benefits for firms in terms of developing new innovative products.

Hence, it has been supported by researchers that participating in organizational groups and having close communication with other members contributes to exchanging and sharing the information through different organizational channels which finally leads to idea generation and innovation (Crowston, 1997; Walz, 2007; Koc, 2011).

### **2.9.3. Innovation typology**

Several scholars have introduced different types of innovation. It includes product/service versus process innovation (Damanpour and Gopalakrishnan, 2001), technological innovation

and incremental or radical innovation (Dewar and Dutton, 1986), and sustaining or disruptive innovation (Anderson and Tushman, 1990; Christensen, 2003). The common typology which has been studied in regard to innovative product development distinguishes between, product, process and technological innovation. Another classification by OManual (2005) introduced four types of innovation as product, process, organizational and marketing innovations.

**Technological innovation** consists of two main types as product and process innovations, but non-technological innovation involves marketing and organizational innovations (OECD, 2005). In addition, a number of studies have focused on human factors in innovative practices (Battisti & Stoneman, 2010), while some scholars just consider technological innovation and R&D (Damanpour, Walker, & Avellaneda, 2009).

In addition, Oslo Manual's has defined organizational innovation as: “the implementation of a new organizational method in the firm's business practices, workplace organization or external relations” (OECD, 2005:51).

**Product innovation** represents the production of new products with innovative changes (Dibrell et al., 2008), it also refers to entering and generating new markets (Simonetti et al., 1995). There is no clear definition for product or service innovation. The enterprises offering services are similar to the firms which produce the products (MacAdam et al., 2004).

**Process innovation** refers to the innovative methods or ways that the firm is using to produce the products, or deliver products and services (Dibrell et al., 2008). In addition process

innovation deals with decreasing the cost of production by using flexible production methods and processes.

### 2.9.3.1. Technological innovation

It is suggested that Technology has been considered as an impartible part of innovation in enterprises. When firms are struggling to gain and maintain superior competitive advantages in a fast growing business environment, technological innovation is very critical for them (Cardinal., 2001). Technology not only has a significant influence on developing new products and processes, but it also plays a key role in changing firms' strategies for achieving competitive advantage (Prajogo and et al., 2004).

These changes may create new markets and put an end to existing markets (Tushman and Anderson, 1986). Since technology includes design and production of products, the term "technological innovation" has been discussed widely in literature (Berry and Taggart, 1994; Claver et al., 2007; Battisti & Stoneman, 2010; Prajogo, 2006).

The literature emphasizes the relationship between technology and innovation and technology's role in exploiting opportunities and changing firms' innovation strategies; such as changing "technology push" to offer innovative products, or "market pull" in considering existing market needs (Prajogo and et al., 2006). Enterprises may find it difficult to strike a balance between their strategies and innovative efforts (Rothwell's, 1994; Battisti & Iona,

2009). It has been discussed that the main purpose of technological innovation is enhancing the firm's effectiveness and efficiency (Hollen et al., 2013).

Technological process innovation affects the processes of production in enterprises. It may accomplish this by investment in new processing machines, robots or IT facilities (Edquist et al., 2001). On the other hand, technological product innovation results in improving a product or stimulating the access to a new market, instead of gaining interfirm success or efficiency which are the main effects of organizational innovations (Boer & Duing, 2001).

De Borja Trujillo-Ruiz et al., (2015) demonstrated that technological innovation capabilities enhance and improve the innovation performance of enterprises, and also developing innovative technological processes causes a superior innovation capability.

### **2.9.3.2. Research and development (R&D)**

Research and Development (R&D), known as the technological "gate keeper", significantly affects innovation in enterprises (Jankowski, 1998). Many researches show that technology and R&D are strongly linked to each other (Betz, 1987; Erickson et al., 1990). Also a number of studies have focused on the relationship between innovation and R&D investment in firms. For instance, outstanding R&D activities in firms results in the development of innovative products and services (Capon et al., 1992; Baldwin and Johnson, 1996; Koen and Kohli, 1998).

Innovative companies are usually managing excellent R&D activities, which determine a

successful innovation performance (Chiaromonte, 2002). Moreover, R&D has the ability to change the strategic path of enterprises by attacking the competitors, enhancing market share, and creating new markets; all of these have a strong relationship with firm innovation (Low, 1995).

### **2.10. Innovation capacity and entrepreneurship**

Innovation is recognizing the opportunities and reacting to those opportunities by thinking of new ideas and implementing them by developing value. Developing value may result in growth such as social growth, business growth and environmental changes (Bessant and Tidd, 2007). If the enterprises fail to grow and cannot offer new changes they will face problems in the business world. Being innovative is very important for enterprises, but it does not happen automatically. It is driven by entrepreneurship, which is a combination of synergy, vision, insight, enthusiasm and hard work; which in turn converts plain ideas to innovative products (Baumol, 2002). The power for changing depends on individuals in organizations who transfer ideas to reality. According to Peter Drucker, innovation is a specific tool of entrepreneurs, the means by which they exploit change as an opportunity for a different business or services. It is capable of being presented as a discipline, capable of being learned, capable of being practiced (Drucker, 2007).

It is easy to build a structure in an organization and allocate resources and responsibilities, but this alone won't accomplish actual changes (Trott, 2008). It needs the spirit of entrepreneurship and mixing the organizational structure and tools with vision and passion and taking risk with judgment. The importance of firm innovation capacity for survival and growth is very clear. But the success or failure of innovative projects is a matter for most organizations. They need to manage the process actively. Innovation includes four key factors, as follows (Bessant and Tidd, 2007):

- recognising the opportunities
- finding the resources
- developing the venture
- and creating value.

**Recognizing the opportunities:** Organizations can come up with innovative ideas in different ways. For example, from inspiration, listening to customer's needs, conducting research, transferring ideas or combining ideas in a new context (Miles, 2005). To consider all potentials and alternatives in offering something new needs skills and abilities. This ability to find opportunities refers to the skills and expertise of successful entrepreneurs (Baumol, 2002).

**Finding the resources:** in order to develop opportunities and transfer ideas to reality a large amount of time, investment, knowledge, skills and equipment are needed (Baumol, 2002). But

the significant factor which should have been considered is making a plan before starting (Baumol, 2002). The plan should cover what we need and when, and also what opportunities we are going to develop Why we have chosen this opportunity among different possibilities, and how it should be done? Thinking about innovation considering the firm's limited resources is very challenging, especially in small and medium sized enterprises (Bessant and Tidd, 2007). If the project is not successful, the firm may end up out of the game. In this context, it is very crucial for firms to know how to get support, time, energy and skills. This stage deals with strategic choices. About fitting the new idea with the firm's strategy, does it have the skills needed to support the idea? And then take the innovation forward?

**Developing the venture:** How we are going to change our idea into a product or service and offer it to customers? It needs to balance resources with time and budget. In the early stages, there is uncertainty but, by investing time, money and research on the market and competitors, R&D, etc. firms should have a clearer idea about customer needs and the position of competitors (Trott, 2008). Then it leads to developing a business plan, which is an important factor in innovation success. In addition, entrepreneurs should think ahead about the customer's reactions and perceptions about the new product before launching it (Baumol, 2002).

**Creating value:** there is no guarantee that after a company has invested hard work, and allocated resources into developing a venture, that they will succeed (Audretsch and Keilbach, 2011). There is a need to carefully manage the process and to protect financial returns. In this stage, enterprises should consider the value of creating something new, should understand

about social gains, consumers requirements, copyright and IP (Miles, 2005). And also consider the value of investment of time and money, learning acquired, and the chance of success and failure. Throughout this stage, it is essential for enterprises to acquire valuable learning about developing innovation capability (Bessant and Tidd, 2007).

In the light of managing innovation successfully, the consideration of four main factors is essential, the factors include;

- Making it clear *what* is going to be managed, if the entrepreneurs have fully understood the innovation process they will be able to create successful structures for the innovation process (Trott, 2008).
- Understanding the main messages about the successful ways of managing an innovation process and *how* it is possible to provide these conditions to make it happen (Bessant and Tidd, 2007).
- Completely being aware of what, how and when, the purpose and direction of the innovation process, which can include strategy development (Audretsch and Keilbach, 2011)
- Considering the innovation process as a "moving target and "developing dynamic capability (Baumol, 2002)



If organizations don't pay enough attention to the above mentioned factors, the novel innovative ideas will be destroyed and it becomes impossible to change ideas to technical reality. Successful managers are very strategic in managing innovation processes as no enterprises possess infinite resources and innovative projects consume a large amount of resources (Audretsch and Keilbach, 2011).

If enterprises are going to achieve capability in innovation management and be successful in all innovative projects they need to answer a number of questions such as (Baumol, 2002):

- Do we have an effective enabling mechanism for the core process?
- Do we have strategic direction and commitment for innovation?
- Do we have an innovative organization?
- Do we build rich pro-active links?
- Do we learn, and develop our innovation capability?

## **2.11. Entrepreneurship**

### **2.11.1. The concept of Entrepreneurship**

The word entrepreneur originates from a French word, entrepreneur, which means, to undertake. The meaning of it in the business dictionary is commencing a new business. On the contrary, there is no common accepted definition for entrepreneurship. The reason there is not

a single definition of entrepreneurship is due to the multidimensionality of the concept. The main definition, which is used to study or classify entrepreneurial activities, reflects a particular perspective or emphasis. For example, definitions of entrepreneurship are completely different between the economic and managerial viewpoints. Therefore, in the literature of business, many definitions of entrepreneurship can be found.

The primary definition of entrepreneurship which dates back to the Eighteenth Century, is an economic term describing the process of bearing the risk of buying and selling at uncertain prices (Won et al, 2005). Since then, many definitions of entrepreneurship have been developed and innovation was added to entrepreneurship descriptions. Schumpeter (1911) cited in Wong et al., (2005) emphasised innovation in defining entrepreneurship. He remarked that innovation can be as new products, new products process, new market or new forms of organizations.

The definition of Kirchoff (1944) was that entrepreneurs are creators of new enterprises aimed at doing business. In the late 1950s and with the advent of Solow's Neoclassical Growth (1956), labour and capital were considered as the most important factors in determining the economic growth of countries. In studies of growth theory, a neoclassical production function was used, which contains only the two above factors: labour and capital. In the 1980s, Solo's Growth model faced many criticisms, including the lack ability of this model to explain long-term economic growth.

In late 1980, Romer (1986) and Lucas (1988) resolved this problem by adding the knowledge variable to the Neo-classical production function. Unlike the variables of labour and capital, this variable is determined as endogenous, and provides the possibility of long-term growth. Many researchers believe that, in addition to the knowledge variable, another variable like entrepreneurship has an effect on growth and should be considered along with other inputs in the production function. William J. Baumol (2002) showed that the main part of economic growth is involved with entrepreneurship.

According to Johnson's definition (2001), "entrepreneurship, in its narrowest sense, involves capturing ideas, converting them into products and, or services and then building a venture to take the product to market". The opinion of Miller (1983) was that the significant features of entrepreneurship contain risk taking, pro-activity, and innovation. Conversely, some authors, for instance, Slevin and Covin (1997), have mentioned that these three factors are not adequate to make sure an organisation succeeds or not. They asserted that not only entrepreneurial behaviours are important for organizational success, but also a strong corporate culture is necessary to support this purpose.

### **2.11.2. Entrepreneurial firm performance**

With increasing global competition and changing of the world environment, and considering the complex nature of growth, firms' growth and profitability are main issues for SMEs to survive. Many researchers have been interested in the factors associated with entrepreneurial

performance (Davidsson et al, 2002). The main issues in the measurement of performance outcomes of entrepreneurship are to agree on choosing appropriate measures of performance.

Considering firm performance, firm growth has been considered as a main part of entrepreneurship (Gartner, 1997). In recent years, a growing body of opinion supports the role of growth in a firm's competitive advantages and profitability, therefore growth rate is widely used to measure performance (Markman and Gartner, 2002).

According to MacMillan and Day (1988), rapid firm growth increases profitability, due to entering new markets, so it makes more profit. But on the other hand, Hoy et al., (1992) stated that high growth may have a negative effect on firms' profitability. Firm growth is multidimensional and all aspects of it should be considered carefully (Lumpkin and Dess, 1996). In terms of SMEs both financial performance and growth are important aspects of firm performance which should be studied separately (Wiklund, 1999). Firms grow in different ways related to size, age and industry sector (Delmar et al, 2003).

Different performance factors could be used to measure the growth of firms, but the important one which best indicates the performance of the firm is sales figures (Delmar et al, 2003). Sales rates are accessible in all firms and demonstrate the firm's long or short term change over time.

Also some arguments suggest that sales figures are the main indicator used by entrepreneurs, increased sales express e high demand for a firm's products, both goods and services ( Barkham et al, 2012). On the other hand, based on Delmar et al (2003) ideas, sales figure don't measure

growth all the time, considering high- tech firms with high level technologies may not show any significant sales rate, even with high growth in human resources and assets. Therefore, two further aspects of performance measures could be employment and assets (Fitzsimmons et al, 2005).

Another significant measure of entrepreneurial performance is profitability. It can include net profit margins or return on assets (Fitzsimmons et al, 2005). Success in economy of scale requires high performance in a firm, but when, economic success and profitability are performance indicators, the relationship between size and age of firms should also be considered as well (Delmar et al, 2003; Fitzsimmons et al, 2005).

Delmar et al (2003) suggested that as there is no worldwide measure of a firm's growth, a multiple measure may cover firm performance, based on different theoretical models. They also stated that firm growth and development should be studied over different time periods.

In entrepreneurial orientated firms strategy direction covers different methods and decision making practices (Lumpkin and Dess, 1996). The existing literature shows that researchers examine the performances via analysing the entrepreneurial activities within firms and its relation with firm performances (Lumpkin and Dess, 2001; Wiklund and Shepherd, 2003, 2005 ;Zahra and Covin, 1995; Zahra, S. A., & Garvis, 2000).

Entrepreneurial oriented firms, especially small firms or new ventures, might have a better position and outperform their competitors in the market place. (Ireland, Hitt, and Sirmon,

2003; Lumpkin and Dess, 2001; Wiklund and Shepherd, 2005; Zahra and Garvis, 2000).

Accordingly, studies on entrepreneurial performance should include multiple measures of performance. Considering the complex nature of growth, it is necessary to consider the relationship between variable performance measures over time.

### **2.11.3. Entrepreneurship in SMEs**

It is stated that 98% of the total businesses' population consists of small and medium enterprises (Trzcielińska, 2014). According to the report of Eurostat (2011, P.11-12), there were 21 million enterprises in the EU in 2008 and there were nearly 4.9 million businesses in the UK which employed 24.3 million people, and had a combined turnover of £3,300 billion. SMEs accounted for 99.9 per cent of all private sector businesses in the UK, 59.3 per cent of private sector employment and 48.1 per cent of private sector turnover.

SMEs have a dynamic existence because of the factors that have an effect on them. One of the crucial factors is the business environment, which includes both macro and industry environments. Considering the importance of SMEs in the economics of countries, the extension of their life cycle is a main research question of scholars. One problem is about SMEs ability in receiving and using the opportunities of the market. There is a systematic approach that includes three stages as follows: 1) the environment's segmentation; 2) the events and changes' analysis; and 3) to transform the segments' changes and events to opportunities and the preferred situation.

Various methods support those stages. For instance, regarding first stage, PESTLE and the sector's structural analysis might be used. The other strategic analysis such as "trends extrapolation", "strategic groups mapping", "sectors attractiveness analysis", and the sector's structural analysis can be employed for the second stage. Also, the cross impact method could be applied for the last stage. These strategic methods are widely used in large and medium size enterprises as well (Trzcielińska, 2014).

The reason for applying such strategic analysis in firms is that organizational structures in each unit are emphasised on specific segments of the environment. For instance, research and development analysis used for change in technological segments' or financial analysis applies to changes in the segment of economics.

Since most of small and medium enterprises (SMEs) have a simple and flat structure, few layers of management and low degree of formalization, it was conjectured that SMEs cannot cope with change in micro and industrial environment segments, and don't seek to find opportunities there. A great deal of research has shown that the entrepreneurship abilities of the SMEs enable them to seek opportunities and deal with environment changes. Among other definitions of entrepreneurship that focus on the effects that entrepreneurship may cause, Stam et al., (2011, P.429) discussed that entrepreneurship is a way of seeking niches in new markets aimed at existing or adopted products.

Among the many definition of entrepreneurship, Bjerke (2007) defined entrepreneurship as “the same kind of creative process, as grabbing at opportunities or exploiting a possibility”. Stevenson (1983) stated that “entrepreneurship is the pursuit of opportunity beyond resources controlled”. According to this definition, entrepreneurship is the process of opportunities' identification, commitment to opportunities, control and managing resources.

Accoridng to Acs (2011, P.238) cited in Trzcielińska (2014), entrepreneurship is a reaction to new opportunities that occurred through investing in new knowledge. Also, Bjerke (2007, P.184) noted that entrepreneurship is considered as an opportunity that should be identified, recognised, and explored though sometimes it could fail. Low and Marriott (2006, P.243) mentioned “opportunity entrepreneurship” as a type of entrepreneurship which deals with exploiting perceived opportunities.

Although there has been relatively little definition regarding opportunity as a significant and defending factor of entrepreneurship, Barringer and Ireland,, (2012) defined opportunity as a set of circumstances that generates a new product, service, or venture. Also, the other definition of opportunity is by Trzielinska and Trzielinska (2011, p.12) that stated that “an opportunity is as a situation appearing in the environment of the enterprise that favours the achievement of the enterprise’s intended goal or desirable effects”.

The focus of Barringer and Ireland’s definition is on the external needs of stakeholders while the domains of opportunities are extended in Trzcielinska’ definition and he pointed out the



enterprise's needs as well. For instance, access to cheaper supplier, more competent labor forces, and more attractive loans. As opportunists are essential for firms to attain goals, they should increase their capabilities in perceiving opportunities. As Barringer and Ireland, (2012) asserted, without identifying an opportunity, it could not be pursued.

Along similar lines, Bjerck (2007, P. 92-95) has provided some recommendations regarding enhancing the enterprises' ability in recognizing the opportunities as follows:

- Build a broad and rich knowledge base
- Organize the knowledge and access to information
- Create relevance between the achieved knowledge
- Generate practical intelligence

Barringer and Ireland, (2012); and Bjerck (2007) stated that entrepreneurial SMEs have a strong impact on the stability and power of the economy by thorough innovation and the creation of jobs. Also, research that has been carried out by Safin (2008) indicates that entrepreneurial SMEs impacts on the macro economy and the transformation of the economy, capital's mobilization and stability as well. Karami (2012, P.17) asserted that entrepreneurial firms emphasized more on opportunities not resources.

The predominant focus of the literature on the features of entrepreneurship, characteristics of successful entrepreneurs, and traits: Bridge et al., (2009) categorized entrepreneurs' features as follows:

- Risk taking tendency
- Achievement motivation
- Locus of control
- Need for autonomy
- Determination
- Initiative
- Creativity
- Self confidence
- Trust

According to Bjerke (2007), the traits of entrepreneurial firms are as follows:

- Responsibility
- Opportunity obsession
- Desire for immediate feedback
- Future orientation
- Tolerance of ambiguity
- Over optimism
- High commitment and leadership

Zimmer and Scarborough (2002) considered successful entrepreneurs as strategists that are proactive leaders and asserted that they are well motivated people with high flexibility that use strategic planning in the process of decision making. Also, they are successful managers who are skilled managers that have sufficient experience in the business. Furthermore, they are self-confident individuals that rely on their own motivation, and begin their own business. Also, they are self-financed as well. Along similar lines, Burns (2007) argued that entrepreneurs are

proactive people that can recognize opportunities and make decisions with high energy. They often take a greater risk in their decision-making and tend to live with high uncertainty to achieve their goals.

Analoui and Karami (2003) mentioned the following characteristics of successful entrepreneurs. According to them, successful entrepreneurs are hard-working people that have a personal financial resource and have enough motivation for starting a business. Moreover, they are strong planners and skilled organizers that have a technical knowledge background and sufficient experience.

Bjerke (2007, P.83) argued that “entrepreneurs see opportunity where other people only see problems if anything at all”. Also, Braunerhjelm (2011, p.165) believes that “the entrepreneur is innovative and perceives and creates new opportunities”. Many researchers have been interested in the factors associated with entrepreneurial performance (Zahra, 1996; Davidsson et al, 2002; Ozcan and Eisenhardt 2009).

The main issue in the measurement of entrepreneurship’s outcomes is choosing the appropriate measures of performance. Considering firm performance, firm growth has been considered as a main part of entrepreneurial performance (Gartner, 1997). In recent years, a growing body of opinion supports the role of growth in a firm's competitive advantages and profitability, therefore growth rate is widely used to measure the firm’s performance (Markman and Gartner, 2002).

According to MacMillan and Day (1988) rapid firm growth increases profitability caused by entering new markets and thereby increasing profit. Also, Velnampy and Nimalathan (2008) mentioned that firm growth has a significant effect on all ratios of profitability but on the other hand, Hoy et al., (1992) stated that high growth may have negative effect on firm profitability. Firms' growth is multidimensional and all aspects of it should be considered carefully (Lumpkin and Dess, 1996).

It is argued that in terms of SMEs both financial performance and growth are two important aspects of firm performance which should be studied separately (Wiklund, 2006). Firms are growing in different ways related to size, age and industry sector (Delmar et al, 2003).

Different performance factors could measure the growth of firms, but the important one which can indicate the performance of firm is sales figures (Delmar et al, 2003). Sales rates are accessible in all firms and demonstrate the firm's long or short term changes over time. Also some arguments suggest that sales figures are the main indicator that entrepreneurs widely use, besides increased sales express the high demand for a firm's products, both goods and services (Barkham, 1996).

On the other hand, based on Delmar et al (2003) idea, sales figure don't measure the growth all the time, considering high tech firms with high level technologies don't always show any significant sales rate, even with high growth in human resources and assets. Therefore, two aspects of performance measure could be employment-rate and assets (Fitzsimmons et al,

2005). Another significant measure of SMEs performance that entrepreneurs are using is profitability. It can include net profit margins or return on assets (Fitzsimmons et al, et al, 2005).

Delmar et al (2003) suggested that as there is no worldwide measure of a firm's growth, a multiple measure may cover firm performance based on different theatrical models. They also stated that firm growth should be studied with the development of firms over time , and compare it in two time periods. In entrepreneurial orientated firms strategy direction covers different methods and decision making practices (Lumpkin & Dess, 1996).

The existing literature shows that researcher's examine the performances via analyzing entrepreneurial activities within firms and its relation with firm performances (Zahra &Covin, 1995; Zahra and Garvis, 2000; Lumpkin & Dess, 2001; Wiklund & Shepherd, 2003, 2005). Entrepreneurial oriented firms, especially small firms or new ventures, could have a better position in comparison to their competitors in the market place and can increase their performance better (Ireland, et al.,2003; Lumpkin & Dess, 2001; Wiklund & Shepherd, 2005; Zahra & Garvis, 2000). Accordingly, during the study about entrepreneurial performance, multiple measures of performance should be included. Considering the complex nature of growth, it is necessary to consider the relationship between variable performance measures over time.

#### 2.11. 4. Innovation and entrepreneurship

One of the key factors that has been widely used in the literature to distinguish and identify the entrepreneurial performance is firm innovativeness. Innovation refers to creating new products or process (Cumming, 1998); enhancing product quality or value (Knox, 2002); generating new ideas or knowledge (Chaharbaghi and Newman, 1996; McAdam et al., 1998; Urabe et al., 1998). Thus, there are different definitions about innovation in the literature.

According Damanpour (1991) innovative enterprises are able to adapt new ideas or behaviours which effect all organizational activities, such as product processes, technology, structure and administrative systems and even organizational plans. Innovative organizations are focusing mainly on product, process and administrative innovations. Furthermore, due to the significant role of SMEs in technological and economic development of countries, there is much interest in the literature (Ndubisi and Iftikhar, 2012).

Nooteboom (1994) stated that even with considerable resources limitations, SMEs are successful in innovation issues. And because of flexibility and small size, entrepreneurial SMEs are moving faster than r large companies and have a more proactive and risk taking nature (Ndubisi et al., 2005). Innovation enables SMEs to enter niche markets and achieve superior customer value which leads to competitive advantages (Porter, 1980; Lieberman and Montgomery, 1988).

Entrepreneurial SMEs by offering innovative products and attracting niches can develop their performance. Accordingly, the literature on the relationship between entrepreneurship and innovation proposes that entrepreneurial firms by a market-oriented culture are more innovative (Slater, 1997). Moreover in a study by Nasution et al. (2011) it has been noted that entrepreneurial firms with learning and integrated market orientation also are often successful innovative enterprises. The significant values of entrepreneurial firms in regard to innovation can be classified as autonomy, risk taking and pro-activeness (Nasution et al., 2011; Ndubisi and Iftikhar, 2012). In this study also innovation as a significant value effecting the entrepreneurial performance has been studied in detail: the entrepreneurial performance has been measured by firm innovativeness.

#### **2.11.5. Risk taking and entrepreneurship**

The other important factor in measuring firms' entrepreneurial performance is risk taking. Risk taking refers to managers tendency to take risks and showing high tolerance in facing failure (MacMillian et al., 1986; Sathe, 1985:1989; Sykes, 1986; Sykes and Block, 1989; Burgelman, 1984; Quinn, 1985; Kanter, 1986; Ellis and Taylor, 1988; Bird, 1989; Stopford and Baden-Fuller, 1994; and Hornsby et al., 2002). Risk taking sometimes includes risky actions such as entering new markets, or allocating a large amount of resources to developing new products with uncertain outcomes (Lumpkin and Dess, 2001).

There are a number of studies in the literature emphasising the risk taking as a main characteristic of successful entrepreneurs (McClelland, 1961; Timmons, 1978; Welsh and

White, 1981; Morris, 1998). A study by Brockhaus (1980) noted that there are no statistical differences in entrepreneurs risk preference patterns. In the 1980s after reporting this study, risk taking has been considered as a significant entrepreneurial quality. On the other hand, in recent studies risk taking as an entrepreneurial quality has been investigated and measured. The results of the recent studies show that risk taking plays a key role in enhancing firm innovation and technology (Ndubisi et al., 2005; Nasution et al., 2011). Therefore, it has been suggested that risk taking has a significant effect on entrepreneurial performance and the innovation capabilities of enterprises (Ndubisi and Iftikhar, 2012). Furthermore, the finding of Morris (1998) demonstrated that entrepreneurs have a tendency to calculate the risk which involves their efforts, for finding a way to reduce and share the risks. According to (Dess and Lumpkin, 2005) entrepreneurs and managers are taking different kinds of risk such as:

- Business risk (entering to unfamiliar market or adapting unconfirmed technologies),
- Financial risk (a large amount of borrowing or allocating a large part of resources to new projects for the mean of firm growth)
- Personal risk (the undertaken risk of CEOs in entrepreneurial firms in the case of strategic actions)

In the present study due to considering the new product development activity of firms and its relationship to risk taking ability of firms, the effect of risk taking on entrepreneurial performance has been investigated in more detail.



### 2.11.6. Pro-activity and entrepreneurship

The literature assumes entrepreneurship as a combination of innovation, risk taking and proactive behaviours that is essential for creating value in any enterprise (McDougall and Oviatt, 2000). Schumpeter (1968) for the first time introduced pro-activity as an entrepreneurial quality while he was studying the characteristics of entrepreneurs and focussing on “initiative”. Later in another study by Hornaday and Aboud (1971) it has also been pointed pro-ctivity as a characteristic of entrepreneurship. Moreover, pro-activity has been defined as an “opportunity-seeking” and “forward-looking” perspective for developing new products for achieving competitive advantages Lumpkin and Dess (2001).

Pro-activity enables firms to anticipate future market demands and react fast to environmental changes before competitors. The main signs of pro-activity in entrepreneurial enterprises includes ‘creating new ideas, flexibility, developing and implementing new processes, launching new products, effective communication (Morris and Kuratko, 2002; Nasution and Mavondo, 2008).

Entrepreneurs and entrepreneurial firms continually scan the environment; this enables them to be aware and susceptible to new opportunities in business (Ndubisi and Iftikhar, 2012).

In a study by Kickul and Gundry (2002), it has been noted that pro-activity positively affects entrepreneurial activities. Furthermore, Nasution et al. (2011) found that there is a relationship between innovation and pro-activity: being proactive enhances a firm’s ability to be creative in

developing products. In a study by Ndubisi and Iftikhar (2012) it was indicated that pro-activity as a dimension of entrepreneurship significantly affects firm performance. The finding of their study also indicates that innovation has an impact on firm pro-activity and risk taking, which leads to high performance in entrepreneurial firms.

### **2.11.7. Financial performance, turnover/net profit**

In the entrepreneurial literature there is a high attention on firm turnover by both academics and owner/managers. There are different factors that have effect on firm turnover such as organizational tasks, employees, markets and firms strategies and policies. It has been noticed that firm growth is a key factor that affects entrepreneurial performance (Gartner, 1997). Therefore recently there is more emphasis in the literature to measure the firm's growth in order to study firm entrepreneurial performance (Zahra, 1996; Davidsson et al, 2002; Ozcan and Eisenhardt 2009). Moreover growth has been identified as a main element in increasing firm competitive advantages (Markman and Gartner, 2002).

It is also reported that firm rapid growth leads to enhancing profitability, and also encouragement for firms entering new markets (MacMillan and Day,1988). Though, according to Hoy (1992), rapid growth may have a destructive effect on firms' profitability. Firm growth is multidimensional (Lumpkin and Dess, 1996) and considering a firm's age, size and industrial sector, firms may grow in different ways (Delmar et al, 2003). One of the main factors in measuring firm growth is sales rates, which can describe the firm performance (Delmar et al, 2003).

Firms' sales figures are available in all firms and shows the organizational changes over a short and long period of time (Barkham, 1996). Entrepreneurs are very interested in sales turnover: since the figures show high demands for special products, entrepreneurs widely use this indicator to measure the employment rate and assets as two main aspects of performance (Fitzsimmons et al, 2005). The other factor in assessing firm performance is net profit and loss.

Net profit refers to the money which has ended up as profit after reducing all business costs and after taxes. An important measure for entrepreneurial performance in SMEs deals with measuring net profit (Fitzsimmons et al, et al, 2005). According to Delmar et al., (2003) it is better to use different measurement tools for measuring the performance of firms since there is not any universal measure for SMEs performance.

## **2.12. Entrepreneurship and product/market development strategy**

Hunger and Wheelen (2001) mentioned that the action of entrepreneurs usually is as a strategic manager in small firms because they apply and take all strategic and operative decisions. Also, they use strategic management tools and techniques for analysing markets, the firm's resource allocation, financial plan and developing business (Sahlman et al. 1999).

Sathe (1988) and Zahra (1993a:1993b) pointed out that three variables, which motivate enterprises to have an entrepreneurial manner, are regularly stated in the literature of entrepreneurship. These variables are 1) opportunity recognition 2) organizational flexibility 3) a firm's ability to measure, encourage, and reward innovative and risk-taking behaviour

which are thought by some theorists as essential (e.g, Miller, 1983; Murray, 1984; Stevenson and Jarrillo-Mossi, 2007; Stevenson and Gumpert, 1985; Sathe, 1988; Zahra, 1993a:1993b, Naman and Slevin, 1993).

Murray's approach (1984) can be stated that researches in this field are tremendously valuable for enterprises since a firm's capability to raise its entrepreneurial activities is mainly distinguished through the compatibility of its management practices and entrepreneurial drives. According to Covin and Miles (2006) and Hit and Ireland (2000), there are six domains where the connection between entrepreneurship and strategic management occurs, such as innovations, networks, internationalization, organizational learning, top management teams and governance and growth.

Although many researchers have tended to focus on organizational characteristics, entrepreneurs' characterises and manners in organizations, rather less attention has been paid to the link between a firm's strategic management practices and its entrepreneurial performance.

Based on the studies of Stevenson and Jarillo (2007) and Dess and Lumplin(1999), a connection can be made between entrepreneurship and strategic management. A study released by Schendel and Hofer (1979) asserted that entrepreneurial activities are at the heart of strategy's concept. The opinion of Hitt et al (2001) and Ireland et al (2001) is that identification

and using opportunities by organizations in their external environment leads to creating value for firms and increases their competitive advantages.

Most studies, such as Schwenk and Shrader (1993) and Kraus et al (2006) have emphasised that the standard approaches of strategic management are not suitable for all firms such as small and medium enterprises (SMEs) as they have originally been developed for large enterprises.

Cooper (1979) was the first author who investigated the link between entrepreneurs' characteristics, strategic management and performance in newly established and growth-oriented firms. He believed that most of the scholars who are surveying in strategic management would pay more attention to these firms.

Ireland et al., (2003) like Cooper (1979) and Sandberg (1992) agree that small and medium enterprises (SMEs) are skilful at all times in identifying and classifying entrepreneurial opportunities; on the other hand they are less effective in exploiting these opportunities for developing competitive advantages. As said by Borch et al (1999), young SMEs are generally limited in their activities owing to their limited resources. Consequently, for achieving the highest performance, they have to be more cautious in selecting each strategy because it needs to be linked with appropriate resources.

Sanberg (1992) argued that an enterprise should be capable of acquisition, utilization and distribution of its resources. Also, he mentioned Mintzberg's design school in matching organizations' resources to opportunities. Conversely, Wernerfelt (1984:1995) and Barney

(1991) assert that innovation, which has been studied in Schumpeterian theory as a basic factor for new combinations of production, is a basis of many strategic management tools. Likewise, they remarked that if innovation is assumed as an individual process or the way to lead to organizational entrepreneurship, the cognitive, entrepreneurial and learning school of Mintzberg can be applied in enterprises.

One of the most important strategies is the strategy of product/market by Ansoff (1970). This matrix is comprised of four strategies. The first one is the present product in the present market. It presents the organization status in the present time. The second strategy is the present product in a new market. In this strategy, organizations attempt internationalization. The third one is a new product in the old market. It is commonly based on some innovation. The last and fourth strategy of Ansoff is a new product in a new market which is the most risky and costly strategy option. Borch et al (1999) has suggested that product/market strategy is more efficient for SMEs since it can be a useful instrument for managers in that they can identify and apply new strategies according to existing resources.

Reviewing the literature and prior studies regarding the investigating the relationship between strategic directions and entrepreneurial firm's performance, there is no attempt to cover this issue. Just in recent years, some studies have been administered (See Table 2.4).

**Table 2.4:** latest studies regarding strategic directions and entrepreneurial firm performance

Authors	Results of Research
Acur et al., (2012)	New product development has a significant effect on entrepreneurship and firm performance.
Henard and McFadyen (2012)	New product development is strategically effective activities in contributing to firm performance
Cucculelli and Ermini, (2012)	New product development has statically relationship among product innovation and growth.
Cardinal et al., (2011)	Product development influences firm performance in distinct technological environments
Ernest et al., (2011)	New product performance mediates the relationship between CRM and company performance
Sandvik et al., (2011)	NPD proficiency influences positively product advantage. Also, directly and indirectly influences tourism business performance

Given that the importance of product development or market development in high-tech SMEs is significant, there is a gap in the studies. Hence, this study attempts to cover this gap.

Therefore, the first hypothesis of studies is developed.

*H1: Product development strategy has a direct influence on entrepreneurial firms' performance.*

*H2: Market development strategy has a direct influence on entrepreneurial firms' performance.*

### **2.13. Entrepreneurial firm performance and innovation capacity**

In response to a turbulent business environment and high competitions situations, firms are continuously exploring ways to overcome this issue and make more profit. One of the means of overcoming this challenge is generating extra value and dealing with more competition.

Mostly firms use innovation tools in terms of new products, product development (PD) and making innovative and creative product with high value for their customers. In this way, they can enhance competitiveness and survive in competitive business areas and can increase their customers' loyalty.

It has been stressed that using innovation as an instrument is a more complex concept than inventing new products and should be studied from different viewpoints (Garcia and Calantone, 2002; Hauschildt, 2004). Innovation can happen in any item within an organization such as innovation in organizational structure, technology, market, culture, systems, products and services (Cooper, 2001; Griffin, 1997a:1997b).

In order to deal with this complexity and multi-dimensional aspect of innovation, researchers suggest using different policies and disciplines in the fields of engineering, management and IT systems. These disciplines help to develop new products efficiently (Garcia and Calantone, 2002; Barczak, Sultan and Hultink, 2007; Wheelwright and Clark, 1994).

Burns (2007, P.11) asserted that “entrepreneurs use innovation to exploit or create change and opportunity for the purpose of making profit. They do this by shifting economic resources from an area of lower productivity into an area of higher productivity and greater yield, accepting a high degree of risk and uncertainty in doing so”.



Since organizations prefer to be more competitive, managers can use different improvement tools and methods such as CAD<sup>2</sup>, CAE<sup>3</sup>, CAM<sup>4</sup>, QFD<sup>5</sup>, FMEA<sup>6</sup> and new processes such as Stage-gate systems, concurrent engineering, etc. which help organizations to reduce the development time and increase the success in marketing new products. Some of them make use of expensive ways to design new and innovative products, such as using CAD system (Computer Aided Design) which has unwanted effects on organizational resistance, conflict and incompatibility of the used systems (Petrovic et al., 2011).

New product development is the core activity of high tech SMEs (Howells et al., 2008). The leadership and management role in this concept is undeniable, and leadership supports product development team's creativity and innovation activities. It seems that management has crucial importance in leading innovative ideas and exploring opportunities (Trott, 2005). SMEs, due to their high flexibility and freedom and risk taking features, can support and accomplish innovativeness better than other organizations (Benner and Tushman, 2002). But leading a PD team and meeting the difficulties is not easy. Some organizations consider innovation in the early stages of their production stages and separate it from execution stages. But it seems that creativity and innovation should be considered as covering the whole product development stages (Murray and Blackman, 2006; Benner and Tushman, 2002; Martins and Terblanche,

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<sup>2</sup>Computer Aided Design

<sup>3</sup> Computer Aided Engineering

<sup>4</sup> Content Assembly Mechanism

<sup>5</sup>*Global Financial Data*

<sup>6</sup>Failure Mode and Effects Analysis

2003). Owner/managers should support the complex innovation phases via focusing on making them a very formal activity, though according to Mumford (2002 high formality is very harmful for creativity within organizations and PD teams.

Innovation and entrepreneurship are essential initiatives in an economy. Entrepreneurship has a vital role in the economies of countries particularly in developing countries. There are few shared viewpoints about what are mainly entrepreneurial activities. The numbers of definitions of entrepreneurship and innovation are countless. Some scholars, for example, (Casson, 1982; Caird, 1988; Littunen, 2000,) explained entrepreneurship and innovation through various aspects such as personality and psychology or the nature of entrepreneurship and innovation in enterprises.

According to Suarez-Villa (1990), “for any economic activity or industry, innovative capacity can measure its level of invention at any time or between different locations. Providing comparisons with other activities or industries to determine actual or potential technological leadership is one of the many uses of this concept. Very often, for example, declining levels of innovative capacity for any industry or activity can serve as an early warning of future difficulties and decline.” Also he argued that measuring innovation capacity is very important because “for any geographical area, such as a state, province, metropolis, county or city, innovative capacity can provide important indications of how it fares as a source of inventions and new technology. Areas that become important sources of innovative capacity usually

develop faster economically, attract highly skilled populations, and experience rising incomes and trade”.

The theoretical association between entrepreneurship and innovation has been deliberated in the literature for several years. Moreover, in recent years, some scholars as (Stoneman, 1995; Arora et al., 2002; Grupp, 2001) have paid more attention to entrepreneurship, especially innovation, in their studies. From the viewpoint of Schumpeter (1934); Drucker (1994); Sundbo (1998); Kanungo (1999) and Zhao (2005) innovation is the precise instrument of entrepreneurs, in that they can exploit opportunities for increasing organization’s performance and competitive advantages. Consequently, there is significant intersection between entrepreneurship and innovation.

Tajvidi et al., (2010) argued that the entrepreneurship index has a highest, positive and significant effect among other variables on the production growth in SMEs. Encouraging entrepreneurship amongst the manufacturing industry must be considered as a crucial and strategic factor, which in turn will increase firms’ performance. Therefore, entrepreneurship has a key and important role in creating new business, new knowledge, new ideas and products, and productivity in firms and industry.

In recent years, the amount of literature published in the field of innovation capacity, especially in small and medium enterprises (SMEs), has been limited (see Table 2.5).

**Table 2.5** studies regarding innovation capacity, strategic directions, and entrepreneurial firm performance

Authors	Results of Research
Audrtsch & Feldman (1996), Glaeser and et al.(1992)	Increasing the number of entrepreneurs in firms cause more competition among firms for creating new ideas and innovation. For that firm attempt to absorb more entrepreneurs.
Shane and Venkataraman, (2000); Lumpkin and Dess, (1996)	Entrepreneurship, which typically leads to new product introduction or market entry, creates value through association with the discovery and exploitation of profitable business opportunities and cause competition among firms.
Heger(2009)	There is relationship between Entrepreneurship, Innovation and Competition. Young firms need more for Entrepreneurship and creating innovation because they have to compete to big firms and other SMEs. For that they need more investment in R&D.
Acs and et al. (2009)	there is a strongly positive relationship between entrepreneurship, knowledge creation, and knowledge spillovers
parkman et al., (2012)	Innovation capacity mediates the Entrepreneurial Orientation – performance relationship for both individual projects and in terms of achieving competitive advantage
Tran et al., (2012)	Innovation intermediaries need to be carefully selected according to the NPD needs and requirements of the innovating firm
Cucculelli and Ermini, (2012)	New product development has statically relationship with product innovation.
Colombo et al., (2011)	New Product Development (NPD) providers have prominent role in enabling a more widespread use of Innovation strategies.
Bahemia and Squire, (2010)	New Product Development potentially influence the implementation of an open innovation strategy
Chen et al., (2010)	New product development (NPD) speed has become increasingly important for managing innovation.
Maidigue and Zirger (2009)	Success and effective new product development strategy in high-tech industries in US is contingent on good planning and execution of the R&D process and innovation.

The reason for failure of the previous studies on behalf of producing reliable consequences was ambiguities in the concept of innovation capacity in small and medium businesses. Also, considering the existing literature and previous studies there are fewer attempts to investigate the relationship between innovation capacity and strategic direction. It seems there is a gap in this issue. Therefore this study tries to cover the gap; hence the third and fourth hypotheses have been developed.

*H3: Innovation capacity moderates the relationship between product development strategy and entrepreneurial firm performance.*

*H4: Innovation capacity moderates the relationship between market development strategy and entrepreneurial firm performance.*

#### **2.14. Chapter summary**

This chapter discusses new product development strategy and market development strategy in the firms studied. It began with a theoretical discussion of new product development strategy and covers a wide range of theories and conceptual frameworks in developing new product concepts. The associated theoretical models and new product processes are discussed in detail. The chapter covers the findings of the empirical research on product/market development strategy and firm performance in the firms studied. This chapter also provided a theoretical framework and the results of empirical research on innovation capacity. It discussed the

moderating role of innovation capacity in the relation between product/market development and entrepreneurial firm performance.

This chapter discussed entrepreneurial firm performance in high-tech small and medium enterprises. The chapter deliberated a broad discussion of entrepreneurship in SMEs. There is a detailed discussion on the relationship between innovation and entrepreneurship. Different aspects of entrepreneurship, including risk taking and pro-activity, are discussed. Then the discussion focuses on the relationship between entrepreneurship and product/market development strategy. Finally, the relationship between innovation capacity and entrepreneurial firm performance is discussed.

To sum up, the strategic management literature recognizes innovation capacity as a critical enabler for firms to create and sustain competitive advantage in the turbulent business environment. Research into entrepreneurship has become one of the main foci of academia and industry. Perhaps this is because, of the key role of entrepreneurial firms in generating employment, promoting innovation and creating competition. While the volume of literature on strategic directions, entrepreneurial firm performance, and innovation separately is extensive, the literature and research on the impact of product and market development strategy on entrepreneurial firm performance and enhancing innovation capacity and the moderating role of innovation capacity on the relationship between product development strategy and entrepreneurial firm performance is more limited. Therefore, this research attempts to cover the gap in the literature.

## **Chapter three**

# **Synthesis of literature and development of conceptual framework**

### 3.1. Introduction

This chapter provides the conceptual framework to investigate the research objectives and research propositions in synthesis of the literature review presented in chapter two. This chapter aims to enable chapter four to develop an appropriate methodology for the research. It presents the research questions to identify the research variables chosen. The high tech industry will be introduced with strategic direction and also innovation capacity to produce the research model.

### 3.2. The conceptual framework of the study

The conceptual framework is a theoretical structure of assumptions and ideas that illustrates the relationship between dependent and independent variables and hypotheses. It creates the structures that categorise subjects round which the researcher can organise thinking and construct an action plan (Rowley and Slack, 2004). The terms of the conceptual framework and theoretical framework have been used by researchers to illustrate the same concept, and the literature review is used as an agenda for their studies. As Merriam and Simpson (2000, pp.10) asserted, the purpose of a literature review is to help develop a conceptual framework or to explore a topical area for study.

Rocco and Plakhotnik (2009) mentioned that there are five steps that need to be taken to undertake a literature review to develop a conceptual framework. In this research these five steps are as follows:



1. To lay the foundations of the research, by using previous work to illustrate trends in research findings and provide an overview of previous concepts.
2. Indicates the contribution to knowledge by highlighting the gaps in existing studies and generating and clarifying possible research questions.
3. Conceptualise own ideas by looking at theoretical frameworks.
4. Creates a research and design frame work
5. Provide references to enable discussion and an analysis of findings.

Leshem and Trafford (2007, p.97) stated that in order to fulfil the conceptual framework, two main rules should be considered by researchers. First, providing a theoretical clarification of what the researcher intends to investigate, and, second, enabling readers to be clear what the research tries to find and achieve, and how that will be accomplished.

The conceptual framework is connected to the problem statement and helps identify the research questions and research variables and clarify the relationships between them. 1, and the conceptual framework illustrates what the researcher intends to investigate in the study (Fraenkel and Wallen, 2000).

### 3.3. Components of conceptual framework

Prior to developing the conceptual model, the key themes of the research (discussed in chapter two) were analyzed to clarify the key variables of the research. The importance of SMEs is well

documented but the research has focused on the importance of strategic direction and innovation capacity in large companies rather than SMEs.

Hence, there are limited studies which focus on investigating the relationship between strategic direction and entrepreneurial firms' performance or considering innovation capacity as a moderating role in the relationship between strategic direction and entrepreneurial firms' performance. On the other hand, literature in the area of high-tech industries and specifically in SMEs is equally scarce. Concerning the critical role of strategic direction, entrepreneurial firms' performance, and innovation capacity in SMEs, these roles haven't been researched in prior studies. Thus, the gap in literature review raises some questions to address these shortfalls.

### **3.4. Defining strategic direction variables**

Ansoff (1965), cited in Johnson, Scholes and Whittington, (2011, p. 258) defined strategic direction as market penetration, consolidation, product development, market development and diversification. Based on Ansoff's matrix, the firm has a choice among these four states according to its situation in terms of market and products, while indicating a growth preference.

Borch et al (1999) proposed that product/market strategies are more effective for SMEs since they allow identification and application of new strategies according to existing resources.

- **Product development**

Product development is when the organization introduces a new products or service in current market. In this case, the extension of organizational scope is not large. When the organization wants to move from market penetration to product development, it needs a high degree of

innovation and creativity. On the other hand, developing a new product (goods or services) would be expensive and high risk because of new strategic capabilities and project management.

- **Market Development**

The other strategic directions statute in Ansoff's viewpoint is **market development**. When product development is expensive and risky, market development can be a substitute strategy for organizations. In this case, the organization can enter new markets with current products but the organizational scope is the same as product development and limited. Market development can be in three different ways: new segments, new users, and new geographies.

Borch et al (1999) has suggested that product/market strategies are more effective for SMEs, since it can be a useful instrument for managers, in that they can identify and apply new strategies according to existing resources. On the other hand, SMEs are under pressure in facing strong competitors to provide customers' needs and demands and keep their market share (Hendry et al., 2000; March-Chorda et al., 2002; Nicholas et al, 2011; Yan et al, 2011).

Therefore, SMEs have to develop new products strategically to remain in turbulent and complex business environments (Mugler, 2002; Raymond and Croteau, 2006). In contrast, sometimes SMEs can't act successfully in developing a new product due to limited access to human and financial resources and having a lack of contacts with external networks (Voss et al., 1998; Hadjimanolis, 1999; Bartlett and Bukvi, 2001; Kaufmann and Todtling, 2002; Tidd et al., 2005).

As a consequence, SMEs can compete with competitors and gain competitive advantages

through selecting and employing appropriate strategies in association with large companies. (Nicholas et al, 2011).

### 3.5. Defining innovation capacity variables

Based on Schumpeter's (1911) definition of the concept of innovation innovation can be as new products, new products process, new market or new forms of organization. Innovation is a key factor for organizations to have sustainable competitive advantage and innovation capacity is known as one of the main features of organizations which will lead to competitive advantage (Romijin and Albaladejo, 2002; Silva et al, 2008; Prajogo and ahmed , 2006). Innovation capacity is an important factor for innovation, initiative and entrepreneurship, creating new features, and improving existing technologies and stimulating competition in organizations.

According Suarez-Villa's definition (1990), innovation capacity is:

*“Measures the level of invention and the potential for innovation in any nation, geographical area or economic activity”.*

Invention can be defined as ideas that are patented. The innovative capacity of firms and their capabilities can be improved through combining knowledge of relevant internal and external resources which impact on enhancing innovation during the time (Rothwell and Dodgson, 1994, Hurley and Hult, 1998; Silva and et al., 2008; Morley and Boly, 2006).

According to Koc and Ceylan's (2007) definition, innovative capacity “relates to the firm’s capacity to engage in innovation, that is, the introduction of new processes, products, or ideas in the organization”.

They believed that product and process innovation are key factors for firms, especially industrial companies.

- **Product Innovation**

Product Innovation is creating or improving new goods or services and involves the conversion of new knowledge into a new product or service which develops positive fundamental changes, technical specification, materials or components (Smith, 2003; Parker, 2000; Kodama, 2007).

- **Process Innovation**

Process innovation includes creating, or improvement, in the process of production or delivery methods. It can be changes in technical, equipment or software changes (Hassanian and Al-Saadi, 2005).

### **Research and development (R&D)**

Research and development (R&D) is to develop new products or discover and create new knowledge about scientific and technological topics for the purpose of uncovering and enabling development of valuable new products, processes, and services. Generally, R&D activities are carried out by engineers or industrial scientists (Zedtwitz and Gassmann; 2002; Eng and Shackell, 2001).

Nowadays, new product design and development is a crucial factor for a company's survival. Because change in industries and also the preference of customers particularly in high-tech industries, is so fast, firms must continually revise their design and range of products as effectively as other competitors (Mogollon and Vaquero, 2004; Marques and Monteiro, 2006).

### 3.6. Defining Entrepreneurial firm performance variable

The main issues in the measurement of performance outcomes of entrepreneurship are to agree on choosing appropriate measures of performance. Considering firm performance, in this concept, firm growth has been considered as a main part of entrepreneurship (Gartner, 1997).

Different performance factors could measure the growth of firms, but the important one which can indicate the performance of a firm is sales figures (Delmar et al, 2003). Sales rates are accessible in all firms and demonstrate the firm's long or short term changes over time. Also some arguments suggest that sales figures are the main interest indicator that entrepreneurs widely use, besides increased sales express the high demand for a firm's products, both goods and services ( Barkham, 1996).

Although many researchers have tended to focus on organisational characteristics and entrepreneurs' characteristics in organisations, rather less attention has been paid to the link between the firm's strategic management practices and entrepreneurial performance. Mogollon and Vaquero, (2004); Rauch (2009); Stater et al, (2006); Anderson and Sandmann (2009) deliberated that some factors, such as creativity and innovation, "first moving", risk bearing, sales volume and profit, determine the entrepreneurial firm's performance.

Sathe (1988) and Zahra (1993) noted that three variables, which motivate enterprises to be entrepreneurial: are opportunity recognition, organisational flexibility and a firm's ability to measure, encourage, and reward innovative and risk-taking behaviour; a view corroborated by other researchers

Murray's (1984) considers that a firm's capability to raise its entrepreneurial activities is mainly distinguished through the compatibility of its management practices and entrepreneurial drivers.

According to Covin and Miles (1999) and Hit and Ireland (2000), there are six domains where the connection between Entrepreneurship and Strategic Management occur. These are innovations; networks; internationalization; organizational learning; top management teams; and governance and growth.

### 3.7. Characteristics of SMEs

Small and medium sized enterprises (SMEs) are famous as growth instruments in developed and especially in developing countries (Demick and Reilly, 2000; Tajvidi et al., 2010). Firms are classified as small and medium-sized enterprises (SMEs) by the European Union if the number of their employees does not exceed 250 and their annual turnover may not be beyond 50 million (EU Commission, 2005) (see Table 3.1). Another category, micro-enterprises, is firms smaller than SMEs in size, which includes firms with less than ten employees (Delahaye, 2005).

**Table 3.1** different definitions of SMEs

<b>Firm category</b>	<b>Definitions of SMEs</b>	
	<b>Number of employees</b>	<b>Annual turn over</b>
<b>Micro</b>	Less than 10	Less than €2 million
<b>Small</b>	Less than 50	Less than €10 million
<b>Medium</b>	Less than 250	Less than €50 million

**Source:** European Commission (2005)

All SMEs have a flat structure, are under the impact of the personal characteristics of –their owner/managers, a flexible operation system, limited resources and high innovation capacity (Lu and Beamish, 2001).

The unique features of small and medium sized enterprises are their small market share and less power to impact on market rates (Demick and Reilly, 2000). Since most of SMEs are working as a part of large organizations, they can't penetrate deeply in market. On the other hand, sometimes, the personal beliefs, skills and experiences of SME's managers influence the important and strategic decisions of firms (Zahra et al., 2000).

SMEs in comparison to large organizations are facing limitations because of their nature, such as cash flow constraint, not being able to increase capital, accessing up to date technology, information transfer systems, and providing raw material (Burns, 2007).

Lack of promotional programmes and effective advertisement, due to capital limitation, effects on SMEs performance. Therefore networking and entering business clusters and expanding



relationship with other companies, customers and suppliers is a good way to cover all limitations and the constraints on small and medium sized enterprises. By network based activities SMEs can make use of other complementary resources, sharing knowledge and learning from other companies, joint pricing policies, joint marketplaces and lots of benefits that networking brings for small and medium sized companies (Gronum et al., 2012).

### 3.8. High Tech SMEs

In the SMEs literature, there is no single or fixed definition for High Tech SMEs, HTSMEs are the small and medium sized enterprises which are dealing with, high technology and knowledge capabilities, highly educated and skilful employees and are very fast in reacting to business environmental changes (Crick and Spence, 2005).

The high tech SMEs have been known to react rapidly in facing new opportunities for entering overseas markets; it is very important for the high tech SMEs to be aware of competitive firm's new products and new up to date facilities in dynamic high tech markets (Karia, et al., 2012).

These characteristics make it possible for SMEs to enter international business. It has been suggested that since SMEs may have limitations in time and resources they should follow a "reactive strategy" in facing new opportunities (Sawyer et al., 2003). They should be aware of business opportunities and react to them very quickly, allocating resources and developing new procedures to make the best uses of opportunities (Crick and Spence, 2005). Reactive strategies will lead to them obtaining competitive advantages and enhance firm performance (Eisenhardt and Martin, 2000; Elfring and Hulsink, 2003).

### 3.9. The proposed model and hypothesis

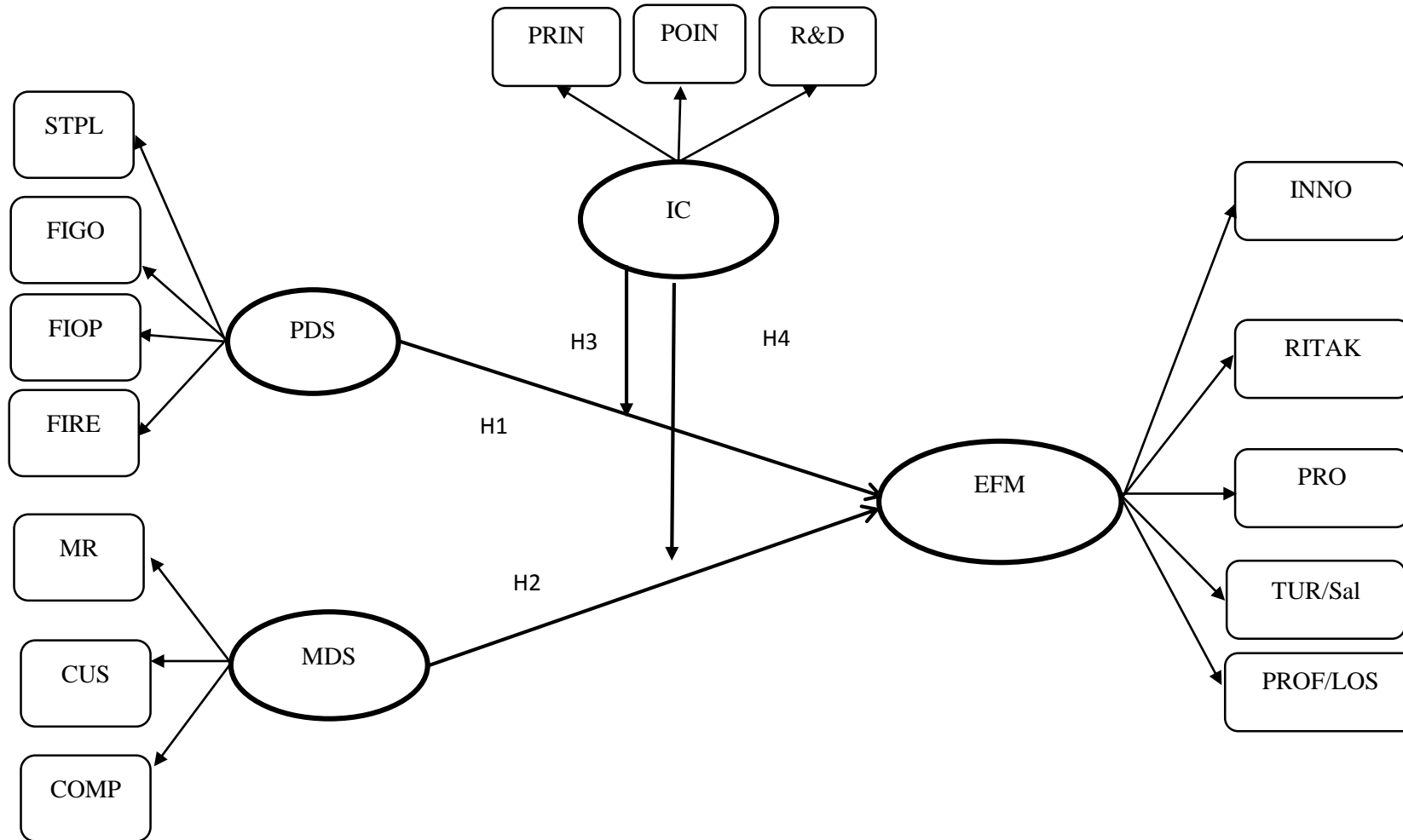
In the literature review a number of models for strategic direction, innovation capacity and entrepreneurial firms have been used by researchers. These models have been applied successfully in large and small firms and researchers attempt to adopt them to fit the purpose.

Using the literature outlined in Chapter Two, and based on these models, in this study a research model (Figure 3.1) has been constructed using the following three dimensions: (1) strategic direction (Ansoff, 1965); (2) the firm's innovation capacity (Rothwell, 1991; Silva et al., 2008); and (3) the entrepreneurial firm's performance (Ferreira, 2003; Acquah, 2007) in Figure 3.1.

The model suggests that choosing the best strategy of strategic direction (NPV or MPD) improves the entrepreneurial firm's performance and also innovation capacity has a moderate role that enhances the relationship between strategic direction and an entrepreneurial firm's performance in high tech SMEs.

**Figure 3.1** Hypothesized Model of the effect of strategic direction on entrepreneurial firm performance with the moderate role of innovation capacity

capacity



**Note:** *Latent Variables:* PDS: Product development strategy; MDS: Market development Strategy; IC: Innovation Capacity, EFM: Entrepreneurial Firm Performance; *Observed variables:* STPL: Strategic plan; FIGO: Firm’ goals; FIOP: Firm’s opportunities; FIRE: Firm’s resources; MR: Market research; CUS: Customers; COMP: Competitors; INNO: Innovation, RITAK: Risk taking; PRO: Proactiveness; TUR/Sal: Turnover/sale; PROF/LOS: Profit/Loss; PRIN: product innovation; POIN: Process innovation; R&D: Investment in R&D

**3.10. Chapter summary**

This chapter has discussed the use of conceptual frameworks to investigate the research objectives and questions and also construct the research model and variables. The key themes of the research have been discussed in chapter two and reviewed to produce the research independent and dependent variables i.e. strategic direction (product development; market development), innovation capacity(product innovation; process innovation; and investment in R&D) and entrepreneurial firms' performance (innovation; risk taking; pro-activeness; turnover/sale; and net profit/loss).

Contemporary researches haven't identified relationships between strategic direction and entrepreneurial firms' performance or considered innovation capacity as a moderating variable directly. Hence, this research attempts to identify and investigate relationships among variables as presented in figure3.1.

Chapter four discusses the research design and methodology of the survey and the variables that have been used to construct the questionnaire. Also, it presents data collection methods and ways of analysing.

# **Chapter four**

## **Research design and methodology**

#### 4.1. Introduction

This chapter sets out the various steps that are necessary in executing this study and thereby satisfying its objectives. It aims to explain in detail all aspects of the research, with particular reference to all of the key theoretical and practical issues involved. This chapter discusses the research design and methodology and the survey. Various research philosophies and approaches asserted in the literature will be discussed with foci on their application to this study. This chapter is composed of seven sections which cover the research objectives and questions, research philosophy, research approaches, research strategies, research choices, research time horizons, and research techniques and procedures. Each sub-section of this chapter covers one of these aspects of the research. The first sub-section addresses the objective and questions of the study. The second sub-section presents the research methods and strategy and includes research philosophy, research approach, research design, data collection process and constructing the questionnaire. The third sub-section addresses the conceptual framework and research variables. The fourth sub-section presents the characteristics of SMEs. The fifth sub-section reveals the proposed model and hypotheses. The sixth sub-section presents the research choice and data analysis. The seventh sub-section presents the chapter summary.

#### 4.2 Revisiting the research objectives and questions

The main objective of this study is to investigate the relationship between product/market development strategy and entrepreneurial firm performance with the moderating role of

innovation capacity in high-tech SMEs. The specific emphasis is the effects of three variables, product development strategy, market development strategy and innovation capacity, on entrepreneurial performance in SMEs. Therefore, the dependent variable is entrepreneurial firm performance and independent variables include product development strategy, market development strategy and innovation capacity. In this regard, the research questions, objectives and hypothesis are as follows with detailed propositions:

**Research question 1:** What is the relationship between product and market development strategy and entrepreneurial firm performance?

Proposition 1: To identify whether or not the product development strategy or market development strategy is a better option for high-tech SMEs to improve their entrepreneurial performance.

*Research Objective 1* :To investigate the relationship between following a new product development strategy and a market development strategy in high-tech SMEs and entrepreneurial firm performance.

*Hypothesis 1:* There is a significant relationship between new product development strategy and entrepreneurial firm performance.

*Hypothesis 2:* There is a significant relationship between market development strategy and entrepreneurial firm performance.

**Research question 2:** What is the moderating role of innovation capacity in enhancing the relationship between product development strategy or market development strategy and entrepreneurial firm performance?

*Proposition 2:* To identify the role of innovation capacity as a moderating variable and its effect on improving the relationship between new product development and market development and entrepreneurial firm performance.

*Hypothesis 3:* Innovation capacity positively moderates the relationship between product development strategy and entrepreneurial firms' performance.

*Hypothesis 4:* Innovation capacity positively moderates the relationship between market development strategy and entrepreneurial firms' performance.

### **4.3. Research Methods and Strategy**

#### **4.3.1. Research philosophy**

A research philosophy is an attitude and principle which is concerned with the ways of collecting, analysing and using data about a phenomenon. Theory of research has been discussed as a research philosophy defined as carrying out in a special field and considering the underlying assumptions of the research approach (Crotty, 1998; Hammersly, 2000; Karami, 2011). Research philosophy describes the ontological assumptions which deal with the nature of reality. Guba and Lincoln (1994) stated that



“A methodology is only one of the three elements of a paradigm that researchers either explicitly or implicitly work within- a paradigm includes the other elements of ontology and epistemology”.

Saunders et al. (2007) have divided the stages of research to six steps. They introduced these steps through the concept of a research onion. These stages are research philosophy, research approaches, research strategies, research choices, research time horizons, and research techniques and procedures. Crotty (2007) limited these aspects to epistemology; theoretical perspectives; methodology, and methods. What is obvious between these two models is that Saunders et al., (2007) mixed the two first stages of Crotty (2007) and have classified positivism and interpretivism as research philosophies. Therefore, positivism and interpretivism are two main paradigms as a philosophical framework of research.

**Positivism** is concerned with the philosophy of science. Macionis and Gerber (2011) asserted that positivism is the philosophy of science which is viewed in social science beside the natural sciences (Karami, 2011; Ponterotto, 2005). Positivism emphasises the efforts to construct, express, and verify hypotheses in operational terms which are most often definitive in quantitative methods, and can be converted into mathematical formulae proposing and expressing relationships among variables.(Guba and Lincoln, 1994; Karami, 2011; McGrath & Johnson, 2003).

The main and specific outcome of the positivistic approach modifies the theory in the light of the findings and outcomes, and an explanation that leads to prediction and control of phenomena (Romijin and Albaladejo, 2002; Prajogo and Ahmed, 2006).

**Interpretivist** approach focuses on the way people experience and participate in social phenomena and cultural life where they live (Karami, 2011). In the interpretivist philosophy, researchers attempt to understand how and why events take place, working with qualitative methods to collect data to construct different views of phenomena. He discussed that both research philosophies have advantages and disadvantages (see table 4.1). He asserts that interpretivism allows authors and researchers to develop a good understanding of social phenomena and process. Using an interpretivist philosophy, researchers are often faced with the uncertainty that may cause actual patterns not to emerge.

While in positivist philosophy, the researchers achieve a chance to maintain and control the research process. The disadvantages of positivism are that the researchers are less strong at understanding social phenomena and process. Also, positivism does not discover the meaning of peoples' ways and their attachment to social phenomenon.

**Table 4.1:** The two main Research Philosophies

	<b>Positivist Approach</b>	<b>Interpretivist Approach</b>
<b>Advantages</b>	<ul style="list-style-type: none"> <li>• More economical way for data collection in large amounts of data</li> <li>• clear theoretical focus</li> <li>• Best way for controlling the research process by researchers</li> <li>• Easily comparable data</li> </ul>	<ul style="list-style-type: none"> <li>• Facilitates understanding of ‘how’ and ‘why’</li> <li>• enables researcher to be alive to changes which will occur</li> <li>• good understanding of social processes</li> </ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>• Inflexible ( unchangeable of the direction after starting the data collection process</li> <li>• Poor understanding of social processes</li> <li>• Unable to discover the meanings people attach to social phenomena</li> </ul>	<ul style="list-style-type: none"> <li>• time consuming data collection</li> <li>• difficult data analysis</li> <li>• the researcher has to live with the uncertainty that clear patterns may not emerge</li> <li>• generally perceived as less credible by ‘non-researchers’</li> </ul>

**Source:** adapted from Karami (2011)

Generally speaking, selecting a particular paradigm for research is determined through the research assumptions and the nature of the research questions and problems which a researcher is investigating (Acur et al., 2012). Karami (2011) explains that before employing one paradigm in the research, it is important to consider all features of research philosophies and compare them and make sure that there is not any contradiction or deficiencies in the research design (see table 4.2).

**Table4.2:** Features of the two main Paradigms

<b>Positivism tends to:</b>	<b>Interpretivist tends to:</b>
Use large samples	Use small samples
Have an artificial location	Have a natural location
Be concerned with hypothesis testing	Be concerned with generating theories
Product precise, objective, quantitative data	Product 'rich', subjective, qualitative data
Product results with high reliability but low validity	Product finding with low reliability but high validity
Allow results to be generalized from the sample to the population	Allow finding to be generalized from one setting to another similar setting

**Source:** Adapted from Karami (2011, p.55)

It can be discussed that the choice of philosophical approach will have a key impact over the methodology of any research and shows the researcher's style. The reason for the research approach for this study was directed by the researcher's nature and the dominant research approach employed in the previous studies in the subject field.

The ontological position for this study is positivism, because this study is scientific research and views reality and relies on socially phenomena (quasi facts) and quantitative data (facts) and is also concerned with hypothesis testing.

The epistemology of this study is explanatory, since the authors explain reality (as it is an attempt to understand the relationship between product development strategy, innovation capacity and entrepreneurial performance) relying on this positivist ontology.

#### 4.3.2. Research approach

The main aim of this section is to illustrate the research approach of this study. Creswell and Clark (2007) stated that illustrating the research approach is very important because it leads to developing and increasing the validity of the research and acts as an effective strategy, enabling a more informed decision about the research design. According to Saunders et al., (2007), research approaches consist of two approaches: deductive and inductive.

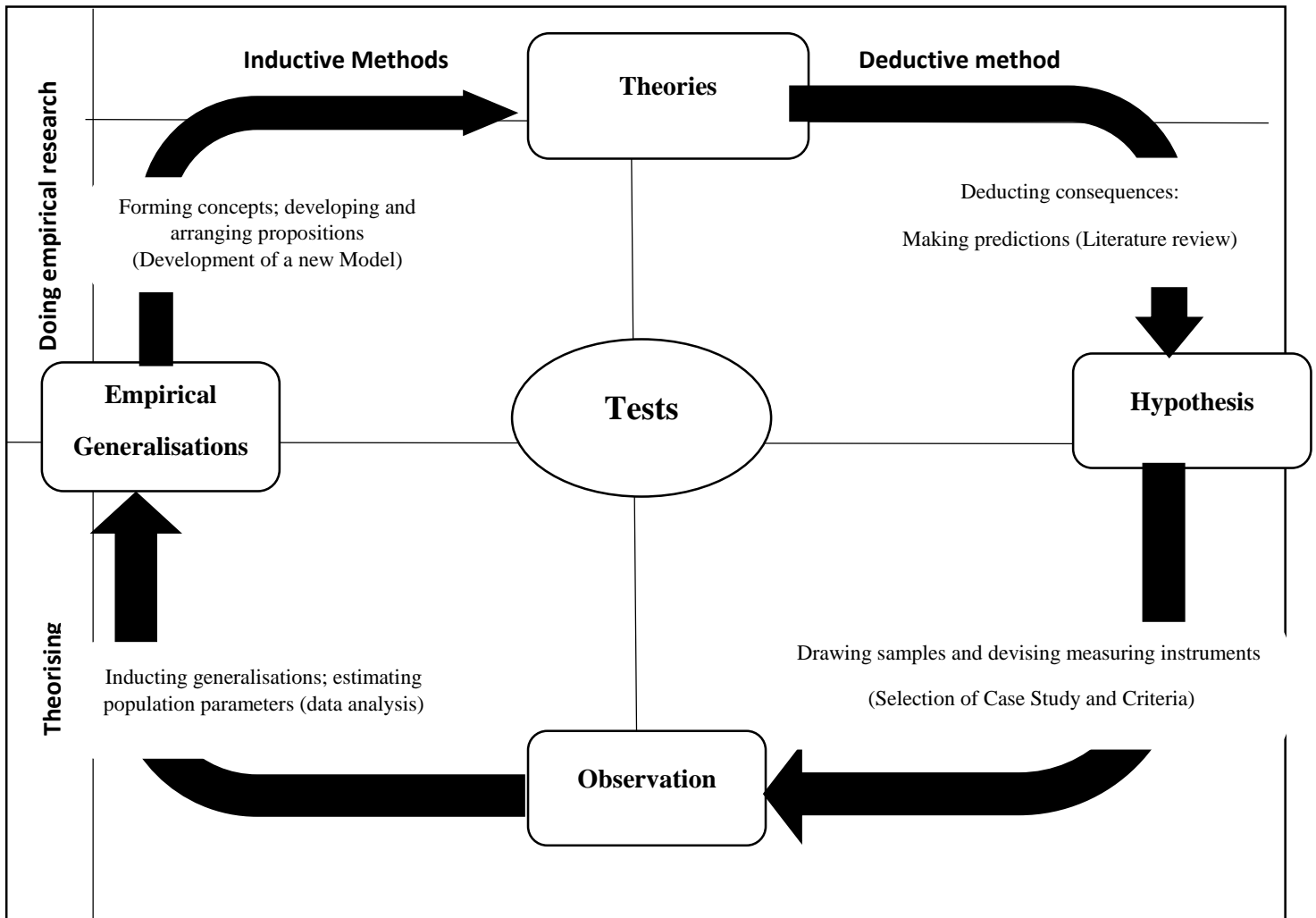
In *deductive research*, the researchers develop a theoretical or conceptual framework and specific hypotheses. The hypotheses are tested using empirical data (Lewis and Thornhill, 2007; Bahemia and Squire, 2010; Chen et al., 2010; Saunders et al., 2007). According to Robson (2007), in deductive approaches, there are five stages: firstly, literature is used to identify theories and ideas. Secondly, hypotheses are developed based on theories and thirdly, hypotheses are tested. Then, results and findings are reported.

The final stage of the deductive approach is modifying the theory. The differences between deductive and inductive approaches are illustrated in Figure 4.1. The deductive approach focuses on scientific principles and moving from theory to data. This approach explains causal relationships between variables and uses quantitative data collection (Karami, 2011). The

application of controls and operationalization of concepts ensures reliability of data and clarity of definitions. Deductive research is a highly structured approach to carrying out research.

In an *inductive approach*, it is not necessary to start with pre-determined theories or a conceptual framework. Using this approach, the researchers explore data and develop theories. Therefore, the inductive approach needs considerable analysis to develop new theories which will emerge (see Figure 4.1). As a whole, inductive research focuses on understanding humanistic behaviour and social life. The collection of data gathering is qualitative and the result of the analysis would be to generate new theory, therefore inductive approaches to research have a more flexible structure (Saunders, Lewis and Thornhill 2007; Karami, 2011).

Figure 4.1: Deductive Approach vs. Inductive approach

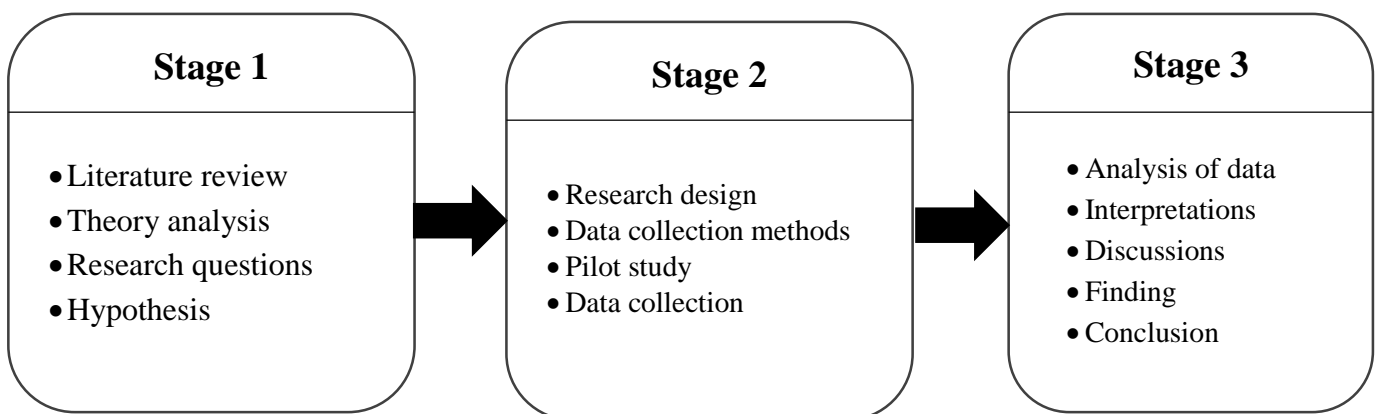


Source: Adapted from Blaikie (1993, p.157)

Since this research is looking at the associations between variables, from theory to hypothesis and testing them, this study has adopted the deductive approach and a quantitative methodology to conduct the research. Consequently, based on the nature of the current study and the need to test the conceptual model and hypotheses, the deductive approach seemed to be the appropriate approach for this study. In this study, the research has been carried out in three stages (See figure 4.2).

In the first stage the theories been reviewed and a conceptual framework of the study has been developed. Then the research strategy has been designed. In this stage the data collection instrument has been developed and the required data collected. In the third stage the data has been analysed and the hypotheses tested.

**Figure 4.2** The process of a deductive study



**Source:** Adapted from Karami (2011)

#### 4.3.2.1. Qualitative or quantitative research

Many researchers believe that it is helpful to classify and distinguish the differences between qualitative and quantitative research. Bryman and Bell (2003) stated that quantitative research is a research strategy that emphasizes quantification in the collecting and analysing of data while qualitative research stresses words rather than quantification. Hence, qualitative and quantities research are different in some aspects.

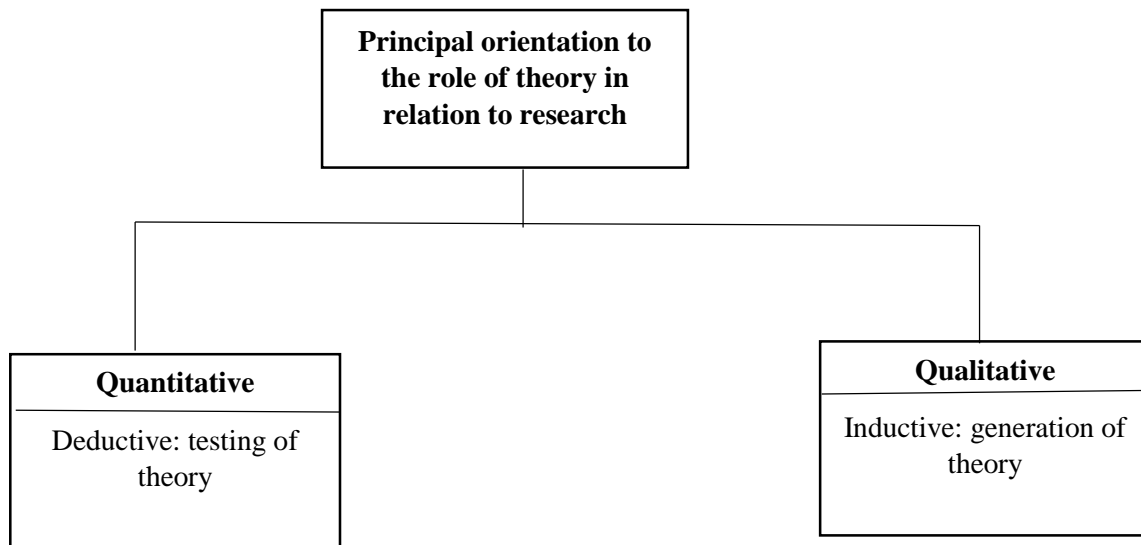


First, quantitative research requires a deductive approach to testing theories to be able to make links between theory and research, while qualitative research entails an inductive approach to generating theories.

Second, when the research aims to measure the data and know the relationship between variables, the quantitative research method is used. However, when a research question requires descriptive analysis, exploration of meaning and a deeper investigation and does not require e measurement or statistical analysis then the qualitative method is used (Picard, 2000).

Third, quantitative research deals with those studies that are concerned with the collection of numbers, proportions, statistics, and numeric forms (Picard, 2000). Generally, it tends to focus on large-scale sample data and often presents the gathering of “facts”. On the other hand, qualitative research is concerned with collecting and analysing information in many forms, mainly non-numeric and usually it hasn’t any measurement or statistical analysing, but just uses words, quotes, definitions to describe, explore and answer the questions (Eldabi et al, 2002; Picard, 2000).

Qualitative research tends to emphasize exploring, in as much detail as possible, smaller numbers of instances or examples which are seen as being interesting or illuminating, and aims to achieve ‘depth’ rather than ‘breadth’ (Eldabi et al., 2002; Blaxter et al, 2010,). The differences between qualitative and quantitative research methods are illustrated in figure4.3.

**Figure 4.3** Fundamental differences between quantitative and qualitative methods

**Source:** Adapted from Bryman and Bell (2003)

### 4.3.3. Research design

Saunders et al., (2007) noted that researchers should determine their research strategies and the design of a research project. Krishnaswamy (2004) stated that it is very important for a researcher to identify the strategy of the study because it is like a road map that shows the research questions and purpose. Karami (2011) and Saunders et al., (2007) classified research strategy into five items as follows: experimental research; survey; case study; action research; and archival research. Each research strategy can be applied in different situations depending on the nature of the data required for the research aim.

As stated above, analytical research is considered to be the best option for this study. Among three research designs which are related to analytical research – the use of survey, interviews, and observation – survey has been selected for this research.

The survey strategy is usually linked with the deductive approach and quantitative methods and is used to capture a wide variety of information regarding attitude and decisions. The choice of this method is due to the large population size of the SMEs and their wide geographical location across the UK. This method can be useful when the collection of data on phenomena cannot be directly observed.

#### **4.3.3.1. Source of the data and sampling**

The target population was SMEs in the high tech sector in the UK. This population was chosen based on prior and contemporary studies and given the importance of SMEs in the countries' economy (Nicholas et al., 2011). The population includes SMEs operating in high-tech sectors in the UK. The list of registered companies was taken from Company House directory.

Due to a large number of firms, the sample is framed using SIC codes to identify the firms operating in high tech industry, and then they were narrowed down to three major high-tech sectors namely: pharmaceutical, biotechnological and software development industries. As a whole, 3120 firms were selected.

#### **4.3.3.2. Data collection instrument**

The two main data collection methods which are used widely in positivist studies are questionnaires and interviews. A questionnaire is a list of structured questions and the aim is to collect data to answer the research questions. Therefore, it helps to know the respondents in the research group, what they feel, think and do. Sometimes, questionnaires are used in an interview

so that the researcher has a list of questions and, based on them, interviews the participants. In this case, it is called an 'interview schedule'.

There are many ways that the research questionnaire is completed by respondents, such as face to face, telephone interviews, postal or online surveys. Generally, a postal and online survey has low cost and less time-consuming. The main steps involved in designing a questionnaire or interview schedule are summarized in table 4.3.

**Table 4.3** designing a questionnaire or interview schedule

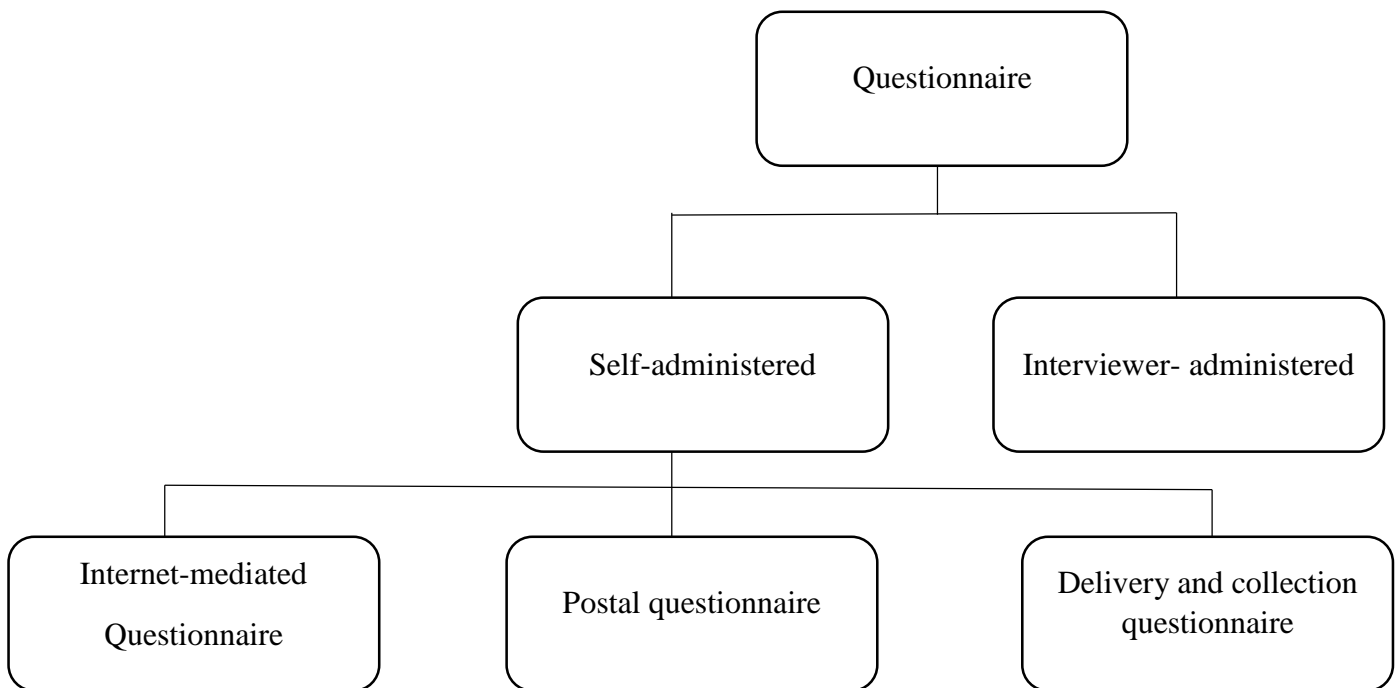
<b>Stage 1</b>	Design the questions and instructions
<b>Stage2</b>	Determine order of presentation
<b>Stage 3</b>	Write accompanying letter/request letter
<b>Stage4</b>	Test questionnaire with a small sample
<b>Stage5</b>	Choose method for distribution and return
<b>Stage6</b>	Plan strategy for dealing with non-responses
<b>Stage7</b>	Conduct tests for validity and reliability

**Source:** Adapted from (Karami, 2011, P.344)

As discussed earlier, there are a number of methods to distribute the questionnaire. Each of them has different strengths and weaknesses. One of the important factors is cost and the best method for a particular study often depends on the size and location of the sample. Based on Saunders

et al., (2007) there are two main categories of questionnaire: self- administered and interviewer- administered (see Figure 4.4). Self- administered questionnaires are classified into three groups namely: internet- mediated questionnaire, postal questionnaire, and delivery and collection questionnaire.

**Figure 4.4 Type of questionnaire**



**Source:** Adapted from Saunders et al., (2007)

The internet-mediated questionnaire is a web- based tool and online, such as survey monkey, and is completed by respondents electronically using the internet. This type of questionnaire allows the researcher to create their own survey via the internet and email it to potential respondents.

Postal or mail questionnaires are a commonly used method of distribution that is fairly easy to administer. The questionnaire and covering letter are posted to the population or the sample usually with a prepaid envelope for returning the completed questionnaires. Delivery and collection questionnaire: the questionnaire is distributed by the researcher to the participants and the completed questionnaires are collected later, sometimes a collection box can be left for the completed questionnaires to be left in. This method is only appropriate where the survey is being conducted in a small number of locations or a single one.

**Table 4.4.** Comparison of the questionnaires

	<b>Advantages</b>	<b>Disadvantages</b>
<b>Hard copy questionnaire</b>	<ul style="list-style-type: none"> <li>High anonymity</li> <li>Low bias</li> <li>Easy to analyze data</li> <li>High confidentiality</li> <li>Suitable for large sample size</li> </ul>	<ul style="list-style-type: none"> <li>Low flexibility and reliability</li> <li>Low response rate</li> <li>Low validity</li> </ul>
<b>Interview</b>	<ul style="list-style-type: none"> <li>Access to information</li> <li>Flexibility</li> <li>High Reliability and Validity</li> <li>High Response rate</li> <li>Small sample size</li> </ul>	<ul style="list-style-type: none"> <li>Low anonymity and confidentiality</li> <li>High cost</li> <li>High bias</li> <li>Difficulty in data analysis</li> <li>Time consuming</li> </ul>
<b>Email and web page survey</b>	<ul style="list-style-type: none"> <li>Fastest method</li> <li>The least expensive to large samples</li> <li>Efficient</li> <li>Complex questioning</li> <li>High anonymity</li> </ul>	<ul style="list-style-type: none"> <li>Limited sampling and respondent availability</li> <li>Low response rate for longer survey</li> <li>Limited control over response numbers and location</li> </ul>

Based on the reviewed literature and prior research, in this study the data collection instruments employed is the online and postal questionnaire. The researchers posted fifty questionnaires to the sample of 50 high-tech SMEs randomly for a pilot study. Final data were collected using questionnaires from the selected companies mainly using online and postal questionnaires. Saunders et al. (2007) made a comparison among the three types of questionnaires (see Table 4.4 and Table 4.5). Among the self-administered questionnaires (Internet-mediated, postal, delivery and collection), the postal or mail questionnaire has the lowest return rate (see Table 4.5).

**Table 4.5.** Main attribute of self- administrated questionnaires

Attribute	Internet and mediated	Postal or mail	Delivery and collect
Size of sample	Geographically dispersed due to large size of sample		Based on number of field workers
Likely response rate	Variable, 30% reasonable within organization/via intranet, 11% or lower using internet	Variable, 30% reasonable	Moderately high, 30-50% reasonable
Feasible length of questionnaire	Conflicting advice; however, fewer 'screens' probably better	6-8 A4 pages	6-8 A4 pages
Suitable types of questionnaire	Closed questions but not too complex, complicated sequencing fine if uses IT, must be of interest to respondent	Closed questions but not too complex, simple sequencing only, must be of interest to respondent	
Time taken to complete collection	2-6 weeks from distribution (dependent on number of follow-ups)	4-8 weeks from posting (dependent on number of follow-ups)	Dependent on sample size, number of field workers, etc.

Source: Adapted Saunders and et al., (2007)

One of the distribution methods of questionnaires is mail survey. In this method, the researcher mails the questionnaire to positional respondents and asked them to complete them and return them by post (Burns and Bush, 1998, P.264). Karami (2011, P 345) stated that in online questionnaires which are designed for research on line such as Survey Monkey, researchers can view the preliminary results as they come in and the data file can be exported in software packages like SPSS or Excel for analysis. Online and mail survey are used widely in business, management and social studies. This type of distribution method of questionnaires has advantages and disadvantages.

One of the important advantages and strengths of online and mail questionnaires is lower cost. This method is useful when the researcher needs to collect data from a large population. The primary cost of this method is the cost of designing, developing, sampling, printing and postage. If the researcher wants to use interviews in a large population, it would be too expensive . In this case, the best choice is mail or online questionnaires. (Frankfort-Nachmias and Nachmias, 2000; Hair et al, 2000; Karami, 2011).

Next, questionnaires have less bias than interviews. When the researcher uses interviews, some characteristics such as age, gender, dress, behavior, talking may have an effect on the responders' answers. In online and mail surveys, there aren't such problems so decreasing bias errors. Another advantage of this method is greater anonymity. When the respondents are assured about anonymity of the questionnaire, they tend to answer more questions and are more



likely to give honest answers. The major disadvantage of mail survey is low response rate. As Hair et al, (2000) mentioned, a significant problem of mail survey is low response rate, hence, the risk of non-response in this method is inevitable. Tingling et al (2003) listed some advantages and disadvantages of web-based surveys and pointed out that the researcher can increase response rate with improved design, better targeting of respondents, and identification of interested parties (see Table 4.6).

**Table 4.6.** Common advantages and disadvantage of web- based survey

Advantages	Disadvantages
<ul style="list-style-type: none"> <li>– Low marginal cost in logistics and mechanics of survey construction</li> <li>– Increased geographic reach</li> <li>– Accelerated data collection and streamlining of collection process</li> <li>– Fewer transcription errors</li> <li>– Increased response rate due to improved design, better targeting of respondents, and identification of interested parties</li> <li>– Questions may be easily modified at time prior to completion</li> </ul>	<ul style="list-style-type: none"> <li>– High startup and fixed costs</li> <li>– A high level of technical expertise maybe required of both the researcher and the respondent, resulting in a “digital divide” and hence sample bias</li> <li>– Inability to communicate with the respondent</li> <li>– Difficult to ensure data accuracy and fraud</li> </ul>

Source: Adapted from Tingling et al., (2003)

A postal questionnaire is a commonly used method for collecting data and is fairly easy to administer (Berry and Taggart, 1998; Karami 2011; Simsek et al, 2010). If it is a large survey, the researcher will need to consider the cost of printing, postage and stationery. Also, the researcher should leave plenty of time for getting the questionnaire printed, folding and inserting the contents, sealing the envelopes and franking or stamping them. On the other hand, this

method is quick and has a lower cost than traveling for interview. As discussed earlier, one of the drawbacks of postal questionnaires is low response rates, which is not uncommon and it leads to the problem of sample bias, because this kept keeps as short as possible, it may increase the response rate. The main advantages and disadvantages which are presented by Easterby-Smith et al., (2010) is shown in table 4.7)

**Table 4.7.** Advantages and disadvantages of postal questionnaires

Advantages	Disadvantages
Low cost of questionnaire per respondent in compared with face to face interview	Low respond rates
Suitable for widely dispersed samples	Have no control over who actually completes the questionnaire
Enhanced accuracy of responses as the respondent in an interview might be reluctant to speak the truth	The respondent might misinterpret a question
A respondent can check details for example how many employees there are in the organization, which they may not recall during an interview	Avoiding questions can lead to missing data
Feeling of anonymity	

**Source:** Adapted from Easterby- Smith et al., (2012)

This research started with reviewing the academic theories and prior research regarding the topic and to find out the major contributions of other research about strategic direction, innovation capacity and entrepreneurial firm performance. The research variables were identified and the data dictionary and the questionnaire designed in the light of the review of the existing literature

(see appendix 4.1). A number of samples were chosen randomly for a pilot study. The aim of the pilot study was to ensure the validity of the questionnaire, and ensure that the questions were easy for respondents to understand. The next stage was to amend the questionnaire based on the pilot study.

#### **4.3.3.3. Pilot study**

A pilot study is as a small scale preliminary study and an attempt to predict an appropriate sample size and improve the study design before a full scale study. Also, it is conducted on members of the relevant population to evaluate the information that used to construct the questionnaire based on academic theories and pervious researches as applicable and understood by practitioners. A pilot study helps researchers to get a clearer idea and advice from respondents about the questionnaire construction and the validity of the questionnaire. In this research, a pilot study was conducted on the target sample including 12 lecturers in Bangor Business School and 50 managers of high-tech SMEs. The responses provided a beneficial improvement in questionnaire construction regarding the structure, content and context of questions.

The collected questionnaires were assessed and if the questions were unanswered because of ambiguity, they were modified and reformatted. Next, the final questionnaire was amended and the final version was sent to the sample by both online and mail surveys. Of the 3120 questionnaires distributed, 449 completed questionnaire were returned from High-tech Small

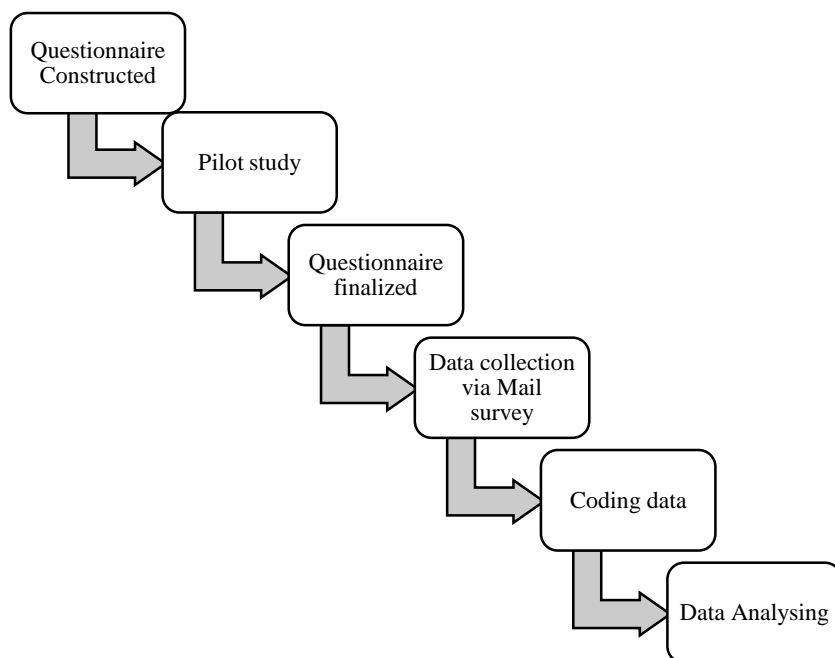
and medium enterprises. 28 questionnaires were disregarded due to incomplete information and the remaining 421 questionnaires were usable. This accounted for a response rate of 13 percent.

**Table 4.8:** the distribution of questionnaires

Questionnaires distributed: 3120	
Returned Questionnaires	Other responses
449 completed questionnaires	Returned by post office
421 usable	Company's policy
28 unusable	Closed the company
With an overall response rate: 14%	

After collecting completed questionnaires, the data was coded and entered to the computer to be analysed by SPSS and Lisrel. The flowchart of the study process is presented in Figure 4.5.

**Figure 4.5.** Flowchart of the data collection process



**Source:** Adapted from Karami (2011)

#### 4.3.4. Constructing questionnaire

In this study, after reviewing a very wide range of literature, the conceptual framework and hypothesis were drawn from literature and developed. The next step is designing a data dictionary for the questionnaire (see appendix 4.1). The questions for measuring variables are chosen from academic theory and prior research which had reliability and validity. The primary questionnaire is designed in four sections (appendix 4.2). The first section outlines management and SMEs' demographic profiles including respondents' age, gender, educational background, managerial experience, as well as the age of the firm, size of the firm and focus of the firm. The second section of the questionnaire is about product and market development strategy. The third section of questionnaire is about entrepreneurial firm performance. In this section, the questions measure the firm's innovation activities, risk-taking, pro-activity and financial performance, like net profit and turnover. The fourth section of the questionnaire is regarding innovation capacity. In this part, questions were divided in three sections. In the first part, questions designed for measuring innovation product in high-tech SMEs. The next part's questions measure process innovation and the last part ask questions about high-tech SMEs' investment in research and development (R&D).

##### 4.3.4.1 Level of measurement

There are different ways for measuring data. Statistically the primary data can be measured in four levels namely nominal, ordinal, interval and ratio levels. The lowest level of measurement is the nominal level because in this level, the researchers measure their own data using numbers

or symbols (Gill and Johnson, 2010). For example, when the researcher wants to know how many male or female participated in the study, they classify the question relate to gender to male and female and use the symbols 1 and 2. Other examples, when the researchers want to measure some variables such as how many years a manager worked in a company or how old she/ he is? They use this level of measurement. They classify the answer with typical relations such as categorical scales or dichotomous scales (Sarantakos, 1993, P.466). In such questions, the respondents are asked to mark the option as related to him/ her. Table 3.7 illustrates the types of data used in this research. For example in this research the respondents were asked about their working experience as follows:

- How many years you have worked in a management position?
  - 5 years and less
  - 6 to 10 years
  - 11 to 15 years
  - More than 16 years

When the researchers want to measure psychological attitudes of respondents about certain questions, they use an ordinal or interval level of measurement. For this, they rank a set of observations based on the relation. Zikmund (1991) stated that the “interval level provides information about the distance between the values and contains equal intervals”.

Likert's five points scale is commonly and frequently used by researchers to measure the variables in interval level measurement. In this study, for measuring the research variables, strategic directions, entrepreneurial firm's performance, innovation capacity, Likert's five point scale is applied with ranking of question as follows:

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly agree

When variables can be measured with natural zero points, the ratio level is used. Most of the financial research uses his level of measurement. This type of measurement isn't a suitable option for measuring attitudes and opinions of respondents. Hence, ratio level isn't applied in this study.

**Table 4.9** Types of data applied in this study

Type of Data	Characteristics of data	Basic empirical operation	Levels used in this study
Nominal	Classification but no order	Determination of equality	Gender (male, female) Position (manager or not manager) Level of Education Type of company
Ordinal	Classification and order but no distance or unique origin	Determination of greater or lesser value	Age Experience
Interval	Classification and order but no distance or no unique origin	Determination of equality of intervals or differences	Likert's five scale - Strategic directions - Entrepreneurial firm's performance - Innovation capacity
Ratio	Classification, order distance, and unique origin	Determination of equality of ratios	N/A

**Source:** Adapted from Cooper and Schindler (2003)

#### 4.4. The conceptual framework of the study and research variables

The conceptual framework is a theoretical structure of assumptions and ideas that illustrates the relationship between dependent and independent variables and hypothesis. It creates the structures that categorise subjects from which the researcher can organise and construct an action plan (Rowley and Slack, 2004). The terms of conceptual framework and theoretical framework have been used by the researchers to illustrate the same concept and the literature review is used as an agenda for their studies.



Prior to developing the research conceptual model, the key themes of the research discussed in chapter two were analysed to clarify the key variables of the research. The importance of small and medium enterprises (SMEs) is well documented; however research has focused on the importance of strategic direction or innovation capacity in large companies rather than SMEs.

Hence, there are limited studies which focus on investigating the relationship between strategic direction and entrepreneurial firm performance or consider the innovation capacity as a moderating role in relationships between strategic direction and entrepreneurial firms' performance. On the other hand, literature in the high-tech industries' area and specifically in SMEs is equally scarce. According to the critical role of strategic direction, entrepreneurial firms' performance, and innovation capacity in SMEs, these roles haven't been researched in prior studies. Thus, the gap in literature review leads to some questions to address these shortfalls.

#### **4.4.1 Product development strategy variable**

As discussed in chapter two, Ansoff (1969), cited in Johnson et al (2011, p. 258) defined strategic direction as market penetration, consolidation, product development, market development and diversification. Borch et al (1999) proposed that product/market strategies are more effective for SMEs since they allow identification and application of new strategies according to existing resources.

Product development occurs once the organization introduces a new product or service into the current market. When organizations wants to deliver modified or new products or services to existing markets, they need a high degree of innovation and creativity. On the other hand, developing new products (goods or service) would be expensive and high risk because of new strategic capabilities and project management being required. .Table 4.10 shows the questions used to measure the product development strategy variables in this research.

**Table 4.10** Measurement of product development

Variable	Items	References
<i>Product development</i>	In my organization new product development (NPD) is viewed as a long-term strategy.	<i>Nicholas and Ledwith, (2011)</i>
	Our mission and strategic plan help to define strategic arenas for new opportunities.	
	New product development goals are clearly aligned with organization mission and in the strategic plan.	
	Opportunity identification is ongoing and can redirect the strategic plan real-time in order to respond to market forces and new technologies.	
	In my organization selection of new product development project is derived by the firm's mission.	
	New product development projects are identified during budget process and resources are allocated accordingly.	
	There is keen consideration for balancing the number of NPD projects and available resources.	
	New product development concepts/project ideas are reviewed individually and independently.	
	Resources can be made available should a new opportunity for developing a product come onto the horizon.	
	There is a keen focus in the market development strategy on analysing competitors and their offerings.	
Subject matter experts are used for macro environmental research in the market development process.		

**Source:** Survey questionnaire

#### 4.4.2 Market development strategy variable

The other strategic directions statute in Ansoff's viewpoint is market development, which is market development strategy. When product development is expensive and risky, market development can be a substitute strategy for organizations. In this case, the organization can enter new markets with current products but the organizational scope is the same as product development, and limited. Market development can be in three different ways: new segments, new users, and new geographies. Table 4.11. shows the questions used to measure the market development strategy variables in this research.

**Table 4.11** Measurement of market development

Variable	Items	References
<i>Market development</i>	A formal market research function exists in my organization as a part of market development strategy.	<i>Nicholas and Ledwith, (2011), Calantone et al, (2003)</i>
	Ongoing market research is used to anticipate/identify future customer needs and problems due to market development.	
	Customer/user is an integral part of the market development process.	
	In my organization, the mission and strategic plan drives market development project selection.	
	Market development focuses on the organization's current needs and problems.	
	Future customer needs are given attention in the market development process.	
	There is a keen focus in the market development strategy on analyzing competitors and their offerings.	
	Subject matter experts are used for macro environmental research in the market development process.	

**Source:** Survey questionnaire

#### 4.4.3 Innovation capacity variables

Based on Schumpeter (1911) cited in Wong et al., (2005) definition of the concept of innovation, it is remarked that innovation can be as new products, new products process, new market or new forms of organizations. Innovation is a key factor for organizations to have sustainable competitive advantage and innovation capacity is known as one of the main features of the organizations which will lead to competitive advantage (Romijn and Albaladejo, 2002; Silva et al, 2008; Prajogo and ahmed, (2006). Innovation capacity is an important factor for innovation, initiative and entrepreneurship, creating new features, and improving existing technologies and stimulating competition in organizations.

According Suarez-Villa's definition (1990), innovation capacity "Measures the level of invention and the potential for innovation in any nation, geographical area or economic activity". Invention can be defined as ideas that are patented. The innovative capacity of firms and their capabilities can be improved combining knowledge of relevant internal and external resources which effect innovation during the time (Rothwell and Dodgson, 1994, Hurley and Hult, 1998; Morley and Boly, 2006; Silva and et al., 2008).

According to Koc and Ceylan's (2007, P.105) definition, innovative capacity "relates to the firm's capacity to engage in innovation, that is, the introduction of new processes, products, or ideas in the organization". They believed that product and process innovation are key factors for

firms, especially industrial companies. It is essential to distinguish between product innovation and process innovation. Product innovation is creating or improving new goods or services and involves the conversion of new knowledge into a new product, or service which is improvement in fundamental changes, technical specification, materials or components (Smith, 2003; Parker, 2000; Kodama, 2007).

In contrast, process innovation includes creating or improving the process of production or delivery methods. It can be changes in technical, equipment or software changes (Hassanian and Al-Saadi, 2005). Research and development is another aspect of innovation variable in this research. Research and development (R&D) is to develop new products or discover and create new knowledge about scientific and technological topics for the purpose of uncovering and enabling development of valuable new products, processes, and services. Generally, R&D activities are carried out by engineers or industrial scientists (Zedtwitz and Gassmann; 2002; Eng and Shackell, 2001).

Nowadays, new product design and development is a crucial factor for a company's survival. Because of changes in industries and also preference of customers, particularly in high-tech industry, firms should continually revise their design and range of products as effectively as other competitors (Marques and Monteiro, 2006; Mogollon and Vaquero, 2004). Table 4.12 illustrates the measures used in this research to measure the innovation capacity of the studied firms.

**Table 4.12** Measurement of innovation capacity

Variable	Items	References
<i>Product innovation</i>	We are increasing the range of new products/services	<i>Ferreira, (2003); Mogollon and Vaquero, (2004); Marques and Monteiro-Barata, (2006),</i>
	We are increasing the volume of new products/services	
	Entry to market with improvements in goods and services	
<i>Process innovation</i>	Our organization is continually seeking new methods and processes for developing new products	
	We place more importance on high product technology	
	We emphasize new distribution channels for products.	
<i>Investment in R&amp;D</i>	Our organization increases investment on Research and Development (R&D).	
	Research and development is acting continually on developing new products	
	Our organization places more emphasis on developing R&D, and advanced technology	

**Source:** Survey questionnaire

#### 4.4.4 Entrepreneurial firm performance variable

The third major variable in this research is entrepreneurial firm performance. The entrepreneurial firm performance has been measured using innovation, pro-activeness, risk taking, growth and profitability (see table 4.13).

**Table 4.13:** Measurement of entrepreneurial firm's performance

Variable	Items	References
<i>Innovation</i>	My organization is a pioneer in introducing new goods and services.	<i>Mogollon and Vaquero</i> ,(2004) <i>Stater et al</i> , (2006), <i>Anderson and Sandmann</i> (2009), <i>Rauch</i> (2009), <i>Becher and Huselid</i> (2010)
	The number of new products 'developed' or 'lunched' by my organization has increased during the last 3years.	
	Products/services are changed frequently.	
<i>Pro-activeness</i>	My organization always takes actions before its competitors.	
	We take the lead to bring in new products/service, management methods and/or operating methods.	
	We maintain the attitude of beating competitors through competitive measures.	
<i>Risk-taking</i>	We have preference for high-risk projects with high returns.	
	We take substantial action to attain the firm's targets.	
	We take a quick action to use opportunities	
<i>Turnover/sale</i>	Increase in firm's total turnover during the last 3 years	
	Increase of sales volume in the last 3 years	
<i>Net profit/loss</i>	Profitability growth in the last 3 years	
	Decrease of production costs in the last 3 years	

**Source:** Survey questionnaire

Sales rates are accessible in all firms and demonstrate the firm's long or short term changes over time. Also some arguments suggest that sales figures are the main interest indicator that entrepreneurs widely use, besides increased sales expresses the high demand for a firm's products, both goods and services (Barkham et al., 1996).

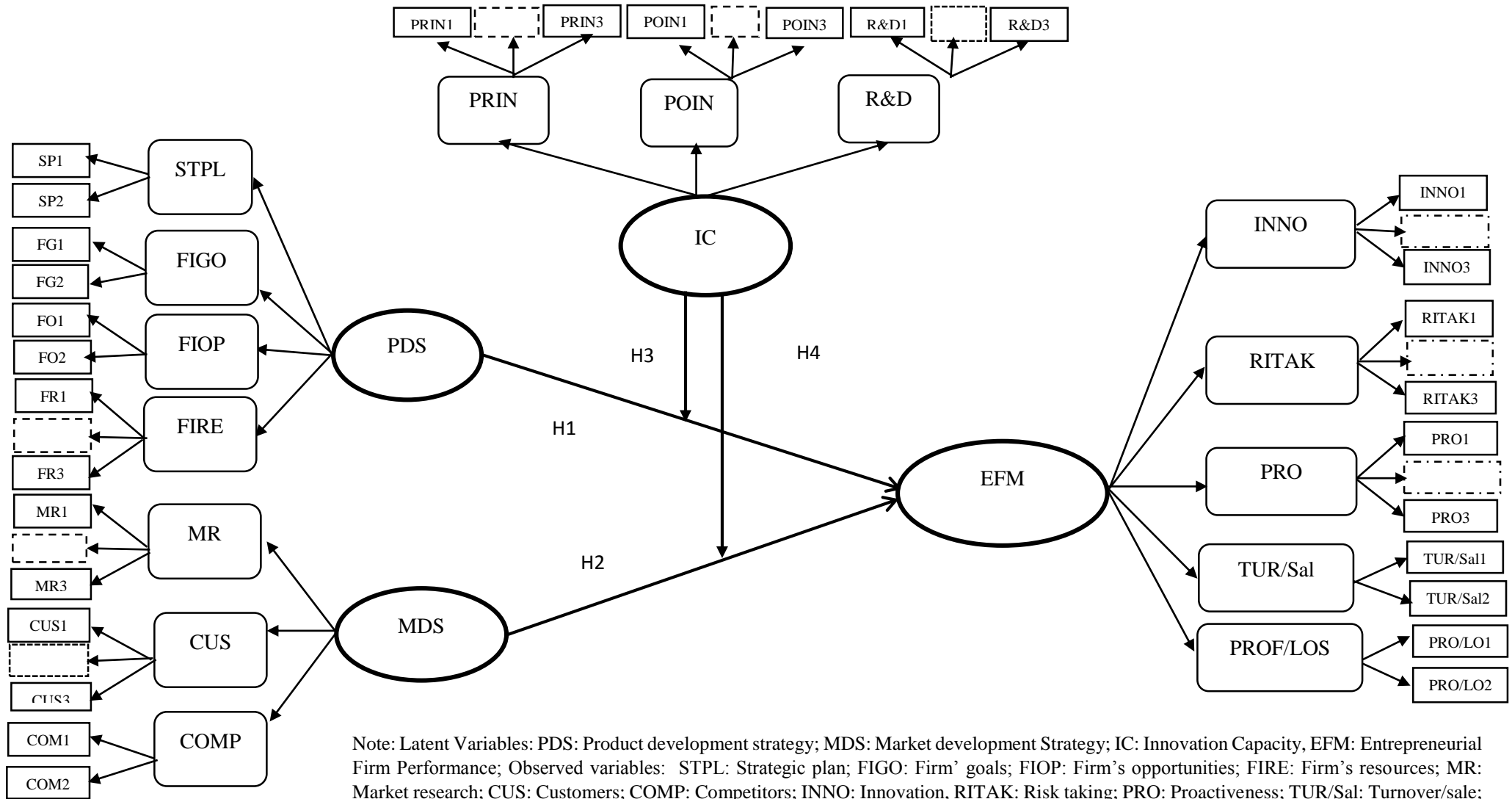


Although many researchers have tended to focus on organisational characteristics and entrepreneurs' characteristics in organisations, rather less attention has been paid to the link between the firm's strategic management practices and entrepreneurial performance. (Mogollon and Vaquero, 2004; Slater et al, 2006; Anderson and Sandmann, 2009; Rauch et al., 2009;) deliberated that some factors such as creativity and innovation, "first moving", risk bearing, sale volume and profit determine the entrepreneurial firm's performance.

#### **4.5. The proposed reached model and hypotheses**

The literature review revealed that a number of models for product/market development, innovation capacity and entrepreneurial firm performance have been used by researchers. These models have been applied successfully in large firms and researchers attempt to adopt them to fit the purpose. Using the literature outlined in chapter two and based on these models, in this study a research model (Figure 4.6) has been constructed using the following four dimensions: (1) product development (Ansoff, 1969); (2) market development (Ansoff, 1969); (3) the firm's innovation capacity (Rothwell and Dodgson., 1991; Silva et al., 2008); and (4) the entrepreneurial firm's performance (Ferreira, 2003; Acquah, 2007).

Figure 4.6 Hypothesized model of the effect of strategic direction on entrepreneurial firm performance with the moderate role of innovation capacity



Note: Latent Variables: PDS: Product development strategy; MDS: Market development Strategy; IC: Innovation Capacity, EFM: Entrepreneurial Firm Performance; Observed variables: STPL: Strategic plan; FIGO: Firm' goals; FIOP: Firm's opportunities; FIRE: Firm's resources; MR: Market research; CUS: Customers; COMP: Competitors; INNO: Innovation, RITAK: Risk taking; PRO: Proactiveness; TUR/Sal: Turnover/sale; PROF/LOS: Profit/Loss; PRIN: product innovation; POIN: Process innovation; R&D: Investment in R&D; - SP1 to SP25: 2 indicators to measure STPL; FG1 to FG2: 2 indicators to measure FIGO; FO1 to FO2: 2 indicators to measure FIOP; FR1 to FR3: 3 indicators to measure FIRE; MR1 to MR3 : 3 Indicators to measure MR; CUS1 to CUS3: 3 indicators to measure CUS; COM1 to COM2: 2 indicators to measure COMP; INNO1 to INNO3: 3 indicators to measure INNO RITAK1 to RITAK3: 3 indicators to measure RITAK; PRO1 to PRO3: 3 Indicators to measure PRO; TUR/SAL1 to TUR/SAL2: 2 indicators to measure TUR/Sal; PRO/LO1 to PRO/LO2: 2 indicators to measure PROF/LOS; PRIN1 to PRIN3: 3 Indicators to measure PRIN; POIN1 to POIN3: 3 indicators to measure POIN; R&D1 to R&D: 3 indicators to measure R&D.

The model suggests that choosing the best option of strategic direction (New Product Development) improves entrepreneurial firms' performance. It also suggests that innovation capacity moderates and enhances the relationship between product development strategy and entrepreneurial firm performance in high tech SMEs. The main research hypotheses have been developed and presented as follows:

*H1: There is a significant relationship between product development strategy and entrepreneurial firm performance in small and medium sized enterprises.*

*H2: There is a significant relationship between market development strategy and entrepreneurial firm performance in small and medium sized enterprises.*

*H3: The firm's innovative capacity has a positive influence on the relationship between product development strategy and entrepreneurial firm performance.*

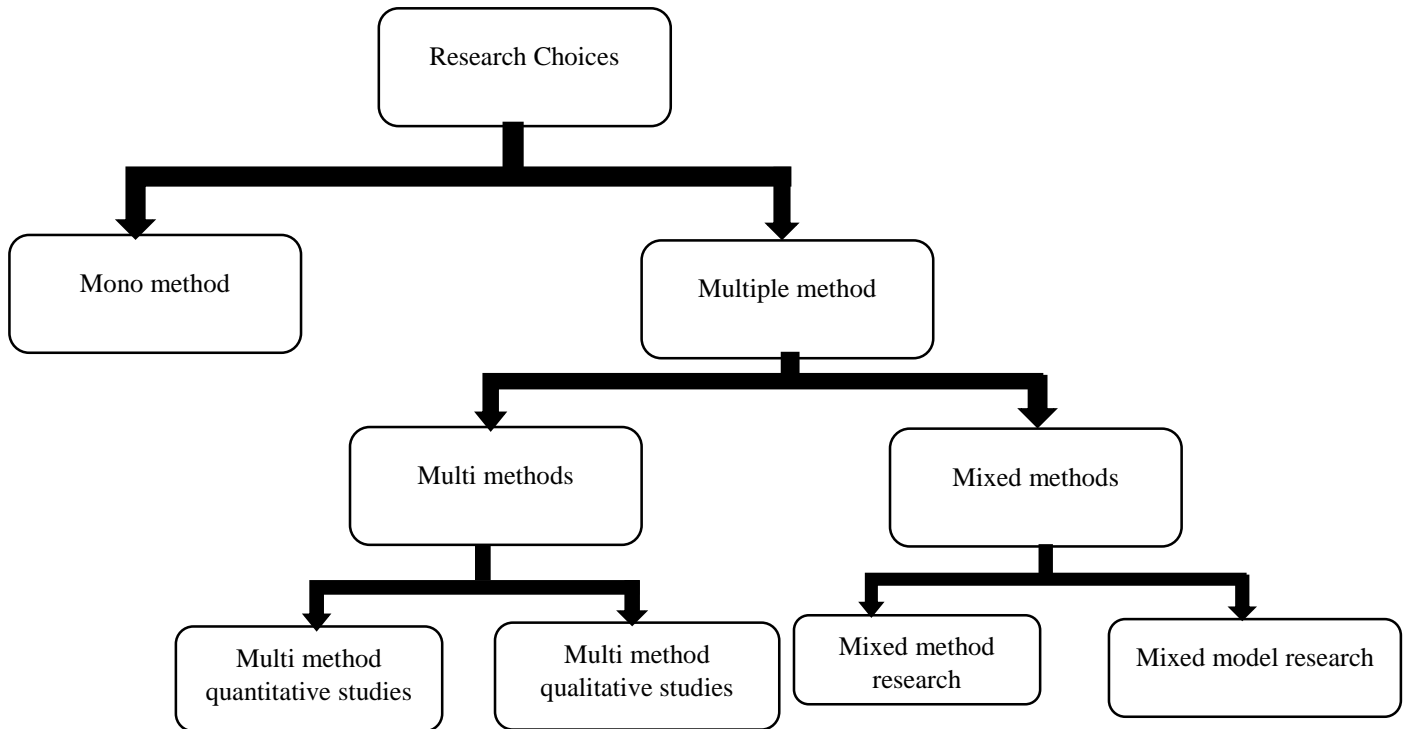
*H4: The firm's innovative capacity has a positive influence on the relationship between market development strategy and entrepreneurial firm performance.*

#### **4.6. Research choice and data analysis plan**

Creswell and Plano Clark (2007) and Cameron and Molina (2011) classified the research choices as mono methods and multiple methods (see figure 4.7). In mono methods just one method is used, either quantitative or qualitative, in one single project. In contrast, in mixed methods studies, these include both quantitative and qualitative methods applied in a single study. Mixed methods research has been used a great deal in studies in different fields such as

sociology, psychology, education and health sciences (Greene et al., 1989; O’Cathain, 2009; Tashakkori and Teddlie, 2003).

**Figure 4.7 the Research choice**



**Source:** Adapted from Karami (2011)

Creswell and Clark (2007) stated that the advantage of using integrated methods (quantitative and qualitative methods) is that it helps to better understand research questions and problems than the mono method. In contrast, it is time consuming, requiring more work and financial resources (Creswell and Clark, 2007; Niglas, 2004). However in business and management studies, integrated methods have been used rarely (Cameron and Molina, 2011). Phelan et al (2002) however, observed that research has been employed both in quantitative and qualitative methods in management studies but the rate of applying quantitative methods is higher. Table

4.14 illustrates a comparison of methodologies employed in a wide range of studies in the management subject field. The present study adopted the mono method and a quantitative methodology.

This study employs cross-sectional methods for collecting required data. Two types of time horizons for planning a survey are cross-sectional and longitudinal. Cross-sectional research refers to gathering data of a population at a specific and defined time. In contrast, in longitudinal studies, collecting data and information occurring over a period of time. Based on the type of collection method, in a single point of time, the time horizon of this survey can be described as cross-sectional, because the cross-sectional method is the appropriate option due to time and cost constraints.

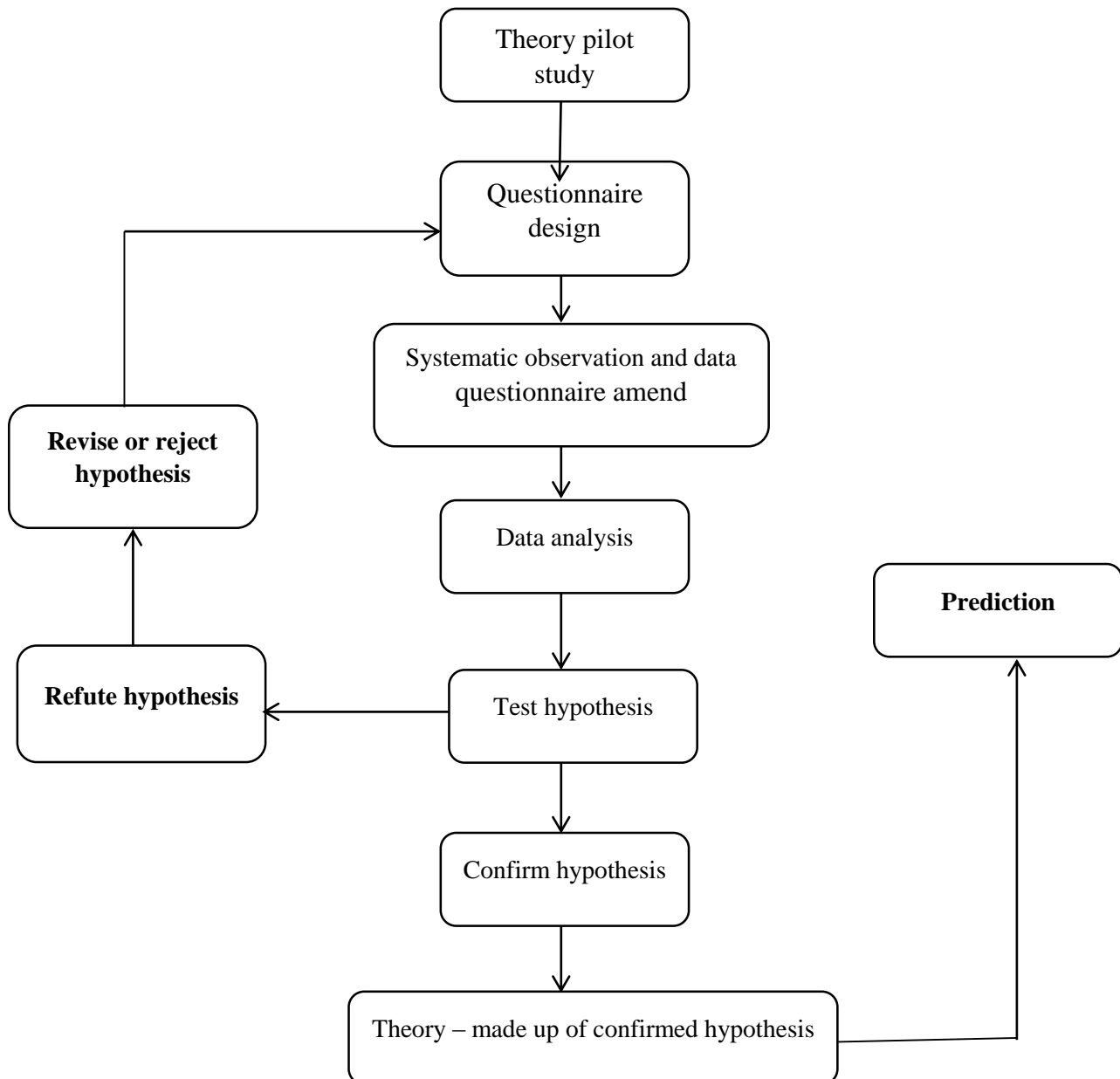
After collecting questionnaires and coding them to prepare for analysing data, all of the statistics analysis methods such as descriptive analysis and statistical analysis applied in this research; and for testing hypothesis structural equation modelling and path analysis were employed.

Tale 4.14: Research background methodology

	Author/ Concept	Data Collection tool/ Sampling	Analytical approach	Key Finding	Journal
1	Chadee and Roxas (2013) Innovation capacity and Firm performance	Questionnaire/ 787 firms in Russia	Structural equation modelling/ Lisrel	Innovation capacity strongly effect on firm performances	critical perspectives on international business
2	Nicholas and Ledwith (2011) New Product Development best practice in SMEs	Questionnaire/ UK and Ireland SMEs and large companies	Descriptive analysis SPSS	New product development is the best way to use in firms	European Journal of Innovation Management
3	Marques and Ferreira (2009) Innovation capacity and Firm performance	Questionnaire/ 59 SMEs in Portugal	The multiple linear regression/ SMEs in Portugal	Innovation capacity has positive and significant effect on firm performance	Technology Management & Innovation
4	Maidigue and Zirger (2009) New Product development and innovation	Questionnaire/ 120 U.S. Electronics Industry	Quantitative, Structural equation modelling, Lisral	Success and effective new product development strategy in high-tech industries in US is contingent on good planning and execution of the R&D process and innovation.	Engineering Management.
5	Liu et al (2005) New product development strategy on product development	Questionnaire/ Taiwan High-tech manufacturing	Descriptive analysis, T-test, , ANOVA , SPSS	the positive and strong relationship between  NPD and product development	Technovision
6	Calantone et al., (2003) New Product development and performance	Questionnaire/ U.S Large companies	Quantitative, Structural equation modelling, Lisral	Positive relationship between NPD and firm performance	Product Innovation Management
7	March-Chorda et al., (2002) Product development Process in Spanish SMEs	Questionnaire and interview/ 65 Spanish SMEs	Descriptive analysis, SPSS, regression	The cost of product development project discourage commitment to NPD	Technovision

As discussed earlier, in this research the researchers employ a research process which is based on the hypothetic-deductive discipline (see Figure 4.8). According to McNeill (1990), the hypothetic-deductive research process starts with the phenomena, out there in the world, which can be observed objectively.

**Figure 4.8 the hypothetic- deductive research process**



These sometimes-casual observations prompt ideas in the mind of the researcher, from which develop hypotheses. The researcher should try to prove the hypothesis wrong. An experiment

is then carried out (or data collected in the field) and results are analysed. The hypothesis is then tested against the results. If the evidence does not support the hypothesis, it can be rejected or revised, and a fresh hypothesis developed. If the evidence supports it, then it can be seen as a contribution to theory.

In terms of the nature of the data and its measurement , for the purpose of this study, a five point Likert type scale ranging from 1 (low extent of success) to 5 (high extent of success) is applied. Burns (2007) has developed the decision tree diagram, which one can use in deciding on the appropriate statistical tests to use. The choices to be made are based on the purpose of analysis, the number of samples being handled, the type of data available and the number of variables tested at a time.

Similarly, Siegel and Castellan (1988) and Burns (2007) have developed tables of most non-parametric tests, and the conditions under which they can be used. Generally, in this research, in order to have a broad picture of the data, descriptive statistics including mean, standard deviation as well as bar charts and histograms were used. To test the hypothesis and estimating relation between variables, Structural Equations Models were employed.

Lisrel software version 9.1 was used to do calculations. Structural Equations Models and path analysis were employed for the analysis of the data when the data is measured in interval levels, and an experimental design between subjects applied. In order to investigate the association between variables, the correlation analysis, Pearson correlation, was used.



#### 4.7 Chapter summary

Based on the research questions raised in chapter two and the hypotheses proposed in this chapter, this chapter discussed and reviewed the research methodologies and suggested an appropriate methodology to answer the research questions. The philosophy of this research is positivistic and it uses a deductive approach and a quantitative research strategy. The research design for this research is survey. The survey method has been chosen due to a large sample size and the wide spread of firms involved in this research. Consequently, based on the nature of the current study and testing the conceptual model and hypothesis, analytical research is the appropriate method for this research. This research in terms of the time horizon is cross sectional. Regarding collecting data, both online and postal questionnaires are employed. In terms of data analysis methods, this research uses a quantitative approach, employing Structural Equations Models and path analysis for testing the hypotheses and the data analysis.

**Chapter five**

# **Data analysis**

## 5.1. Introduction

The purpose of this chapter is to present the findings of the data analysis based on the empirical research in this study. In the next chapters, findings of the data analysis will be interpreted regarding the study's research questions and will be discussed according to the existing theories that were reviewed in previous chapters. The descriptive analysis helps to have a clear picture of data distribution to select an appropriate statistical test for testing the research hypothesis. In the second part, the data regarding the product and market development strategy, innovation capacity and entrepreneurial performance of firms in small and medium size enterprises (SMEs) will be analysed. Finally multivariate analysis among the research variables will be analysed and discussed.

## 5.2. Descriptive empirical findings

### 5.2.1. Characteristics of the studied firms

Of the 3120 questionnaires distributed, 449 completed questionnaire were returned from High-tech Small and medium enterprises. 28 questionnaires were disregarded due to incomplete information, the remaining 421 questionnaires were usable. This accounted for a response rate of 14 percent. Typically, the studied firms were operating in high-tech pharmaceutical, Biotechnology, and Software development. About 43% of firms are located in the bio technology sector across in UK. 25% are operating in the pharmaceutical industry, about 17%

of studied firms are located in software development sector and just 61 out 421 of respondent SMEs (14%) are situated in other sectors (see figure 5.1).

**Figure 5.1:** The location of SMEs according to industry

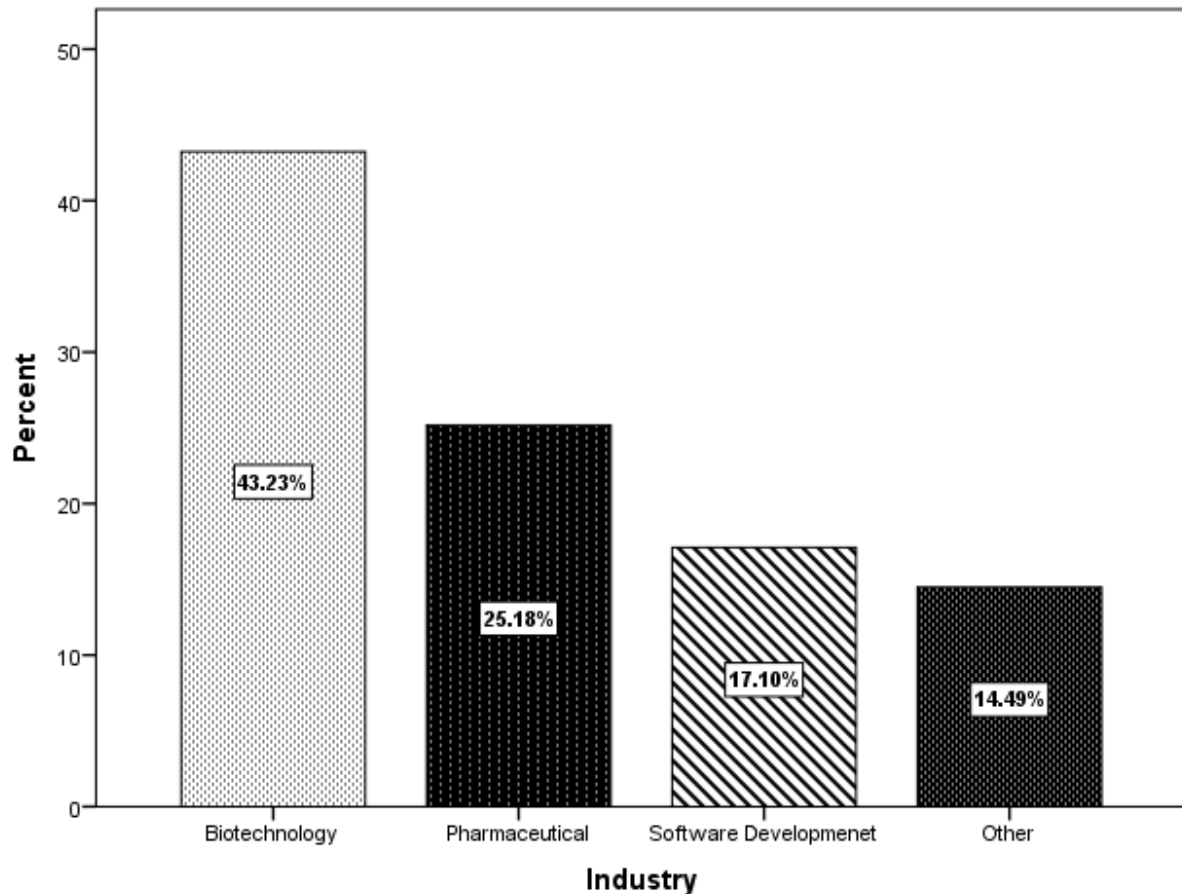
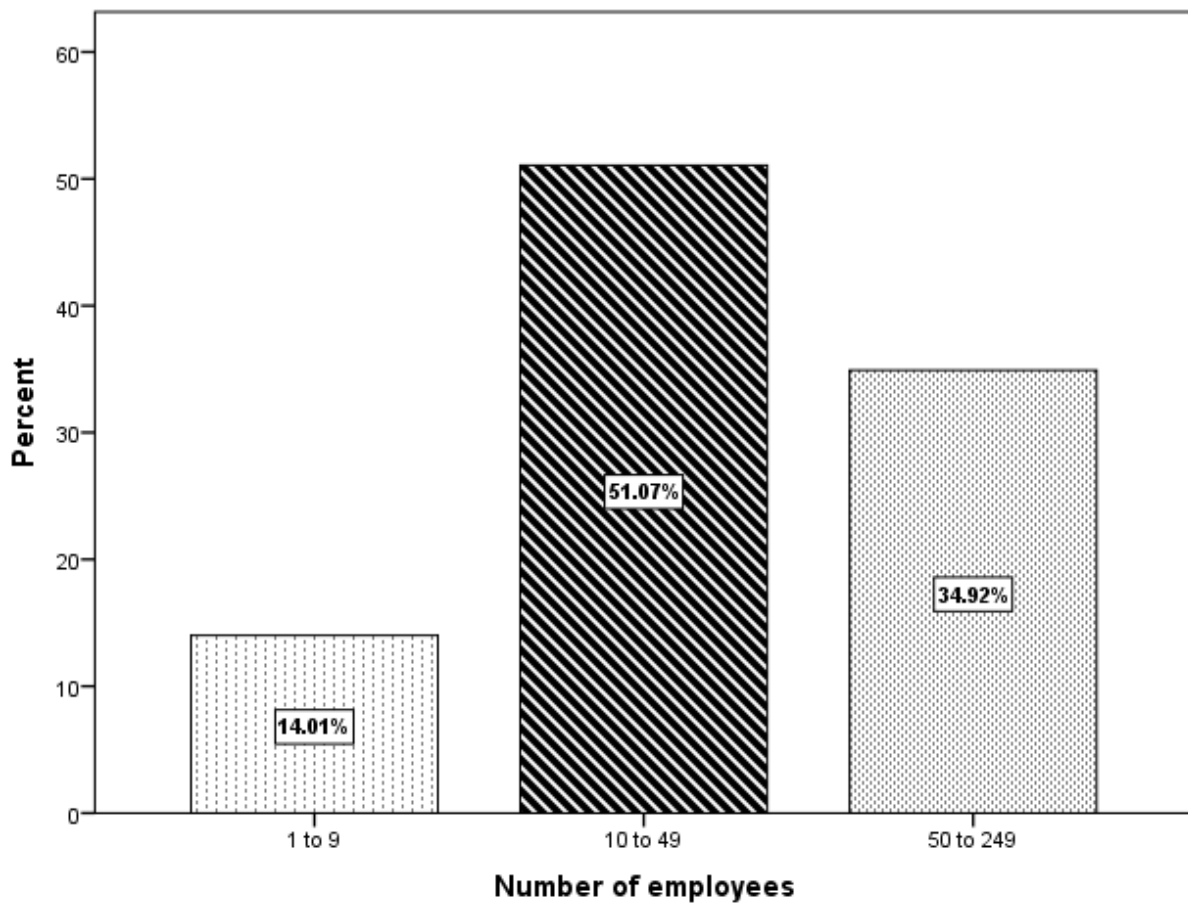


Figure 5.2 provides a summary of the employees' numbers in the sample firms. 14% of the survey firms (n= 59) are micro and 51% (n=215) are small size firms. Also, 34 % of the studied companies were located in the 50 to 240 employees group.

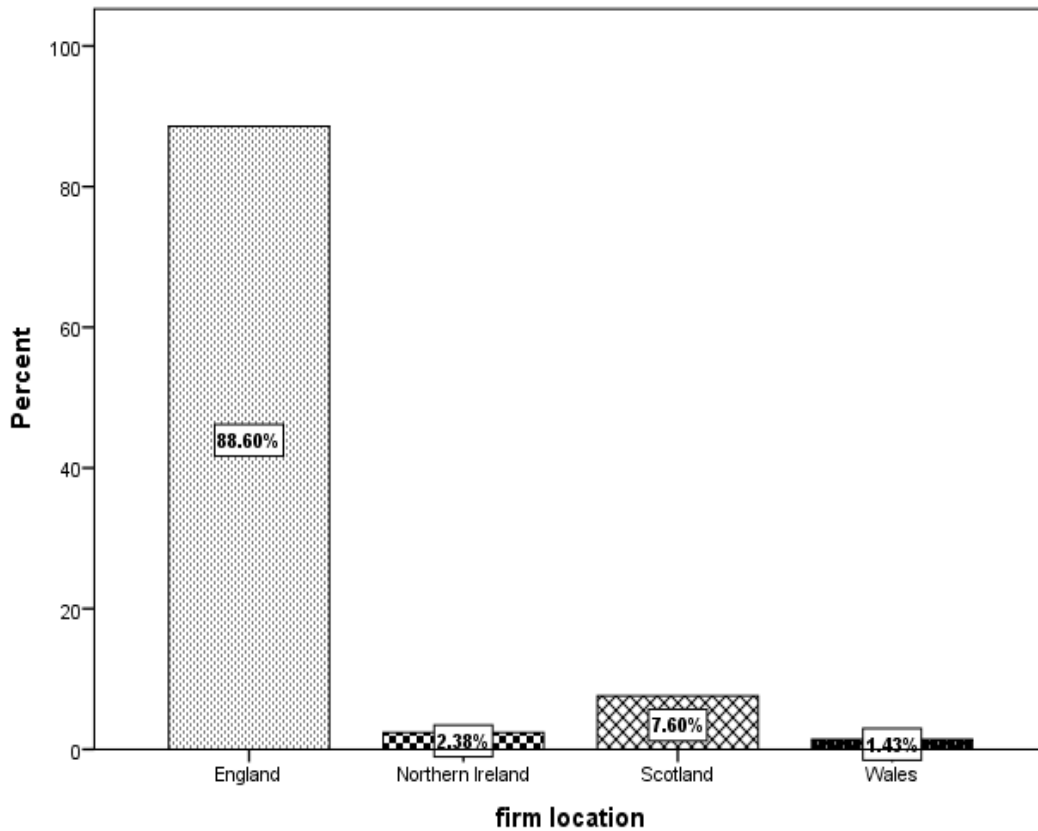
Figure 5.2: size of enterprises



Regarding the geographical distribution of the studied firms, the result of data analysis shows that the majority of the SMEs (88.60% ) were located in England while 7.6% of studied SMEs are operating in Scotland (n= 32); Northern Ireland ( n= 10, 2.4%); and Wales (n= 6, 1.4%).

These results are illustrated in figure 5.3.

Figure 5.3: Location of studied firms



The age structure of the studied firms is illustrated in table 5.1. This data demonstrates that the majority of SMEs ( $n=177$ , 42%) are 21 or more years of age. 22.6% ( $n=95$ , 6 to 10 years) and 15.7% ( $n= 66$ , 11 to 15 years) of SMEs are in the middle period of their life. 9.3% are less than 5 years old. The remaining, 10.5% are in the 16 to 20 years category.

**Table 5.1:** Age of SMEs

<b>Age of firm</b>	<b>Frequency</b>	<b>Percentage</b>	<b>Cumulative Percent</b>
1 to 5 years	39	9.3	9.3
6 to 10 years	95	22.6	31.8
11 to 15 years	66	15.7	47.5
16 to 20 years	44	10.5	58.0
21 or more	177	42.0	100.0
Total	421	100.0	

### 5.2.2. Managerial characteristics of the respondents

In this section, the general information regarding managerial and personal characteristics of the respondents in studied SMEs, such as their age, gender, work experience, managerial position, educational background, are reported. In table 5.2, the respondents' demographic profile is summarized.

**Table 5.2:** The demographic profile of the respondents in studied SMEs

<i>Age of respondent</i>	<i>N, %</i>	<i>Position in company</i>	<i>N, %</i>
20-39	6 (1.4%)	CEO	267 (63.4%)
30-39	35(8.3%)	Middle manager	82(19.5%)
40-49	131(31.1%)	Supervisor	66(15.7%)
50 or more	249(59.1%)	Other	6(1.4)
<i>Respondent's gender</i>	<i>N, %</i>	<i>Level of education</i>	<i>N, %</i>
Male	356 (84.6%)	A level or less	65 (15.4%)
Female	65 (15.4%)	Bachelor	127 (30.2%)
		Master	99(23.5%)
<i>Respondent's years of work experience</i>	<i>N, %</i>	PhD	130(30.9%)
0-5	6(1.4%)		
6-10	6(1.4%)		
11-15	18(4.3%)		
16-20	61(14.5%)		
20 or more	330(78.4%)		

Source: Survey questionnaire

- **The age of respondents**

It has been discussed that the manager's age is highly related to their work experience and managerial tenure. For example, it has been suggested that older and more experienced top managers feel more commitment compared with young managers. The respondents' ages were classified into four groups: 1.4% of the respondents are in the first group (20-39 years old). 35



of respondents (8.3%) reported their age to be between 30 and 39 years old. 31.1% of the respondents reported their age between 40-49 years old. The majority of the respondents (n=249, 59.1%) were in the fourth group and 50 years old and more.

- **Work experience**

As mentioned in the previous part, age is highly associated with the managers' work experience. In the wake of testing this proposition, this study measured the work experience of managers as well as their age. As the data shows that 2.8% (n=12) of respondents had less than 10 years' work experiences while the majority of them (78.4%, n=330) had 20 or more than 20 years' work experience. Although 61 of respondents (14.5%) are in the age group of 16-20 years old; only 18 people (4.3%) had work experiences between 16-20 years old.

Hence, briefly the findings demonstrate that the majority of respondents (n= 330) had a work experience of 20 years or more and minority of them (n=12) had a total work experience in two group of less than 10 years. Table 5.3 presents the cross tabulation between the respondents' age and the years of work experience.

**Table 5.3:** the cross tabulation of age and work experiences of respondents

Age		Work experience					Total
		0-5	6-10	11-15	16-20	20 or more	
<b>20-29</b>	Count	3	3	0	0	0	6
	Expected						
	Count	0.1	0.1	0.3	0.9	4.7	6.0
	<b>% of Total</b>	0.7%	0.7%	0.0%	0.0%	0.0%	1.4%
<b>30-39</b>	Count	0	3	9	20	3	35
	Expected						
	Count	0.5	0.5	1.5	5.1	27.4	35.0
	<b>% of Total</b>	0.0%	0.7%	2.1%	4.8%	0.7%	8.3%
<b>40-49</b>	Count	0	0	3	28	100	131
	Expected						
	Count	1.9	1.9	5.6	19.0	102.7	131.0
	<b>% of Total</b>	0.0%	0.0%	0.7%	6.7%	23.8%	31.1%
<b>50 or more</b>	Count	3	0	6	13	227	249
	Expected						
	Count	3.5	3.5	10.6	36.1	195.2	249.0
	<b>% of Total</b>	0.7%	0.0%	1.4%	3.1%	53.9%	59.1%
<b>Total</b>	Count	6	6	18	61	330	421
	Expected						
	Count	6.0	6.0	18.0	61.0	330.0	421.0
	<b>% of Total</b>	1.4%	1.4%	4.3%	14.5%	78.4%	100.0%

**Source:** Survey questionnaire

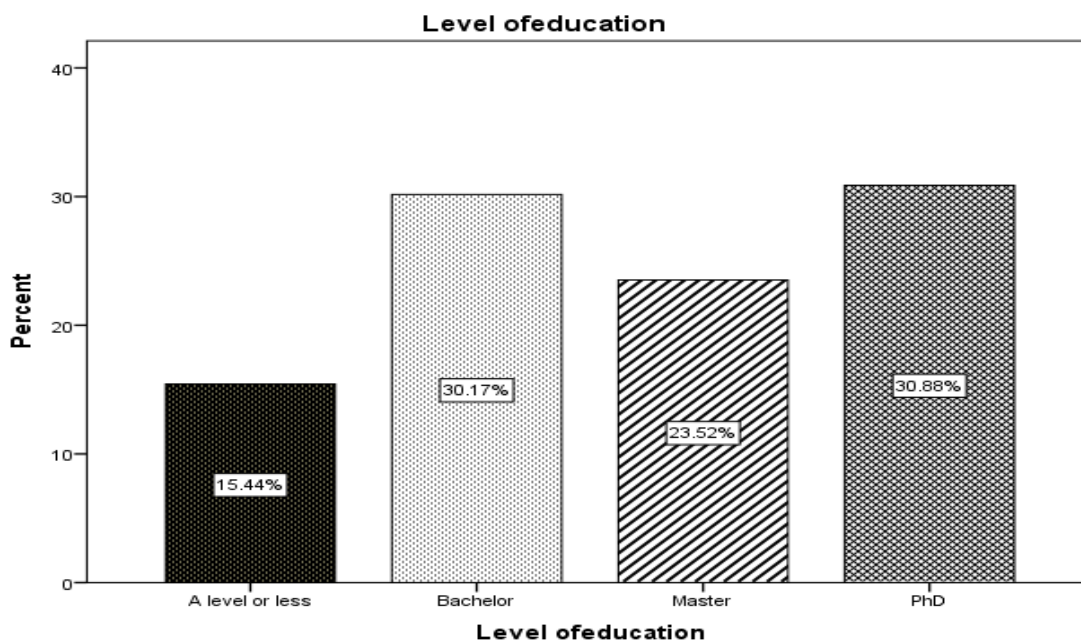
- **Gender of respondents**

In terms of gender, the majority of the respondents (84.6%, n =356) were male in the studied firms while only 15.4% (n=65) of respondents were female. This result indicates that most of the top managers and executive position were occupied by men in studied SMEs. Furthermore, the availability of policies has more effect on attitudes of male managers than female.

- **Education**

One of the indicative factors of a person’s knowledge and skill is education that is considered as an important characteristic of top managers. Hitt and Tyler (1991) asserted that the manager who has had one type of formal education background can be expected to have different mental models regarding formulating strategy and approaches to problem solving. Therefore, this study measures the managers’ educational level. The level of respondents’ education was categorized in four groups including: A level, Bachelor degree, Masters degree and PhD. Almost, the numbers of respondents who had Bachelor degrees (30.2%, n=127) and PhD degrees (30.9%, n= 130) are the same. 99 of respondents (23.5%) had a Master’s degree and the remaining respondents’ highest qualification level was A level (15.4%, n=65) (See Figure. 5.4).

**Figure 5.4:** Educational level of respondents



### 5.2.3. Managerial position of the respondents

This study investigates the respondents' position according to the manager's level within the firms. It reveals that 63.4% of respondents (n= 267) are CEOs or senior managers in high-tech SMEs. Also, the data analysis reveals that 19.5% (n=82) are middle managers and 15.7% (n=15.7%) are in the supervisors' group (first level managers). 1.4% of respondents (n=6) chose "other". Answers given to "other" option were: technical director, chairman, chief clinical officer, etc. consequently, this result indicates that nearly all of questionnaires (98.57%) in this research were completed by managers who are dealing with strategic decisions on product development strategy in the firms studied. Hence, the result of this research could be deemed to be reliable.

### 5.3. The descriptive statistics analysis

The descriptive statistics analysis aims to describe the main features of the distributed data which has been reflected by the mean and the standard deviation. This part will apply the descriptive statistics analysis for the four research variables (product development strategy; market development strategy, innovation capacity, entrepreneurial firm performance) to illustrate the basic distribution features of them.

#### 5.3.1 The descriptive statistics analysis of product development strategy

In order to measure product development strategy, four variables (strategic plan, firm's goal; firm's opportunities, firm's resources) have been used in this research. Based on the literature review and theoretical background,, these variables for measuring product development

strategy have been chosen in nine questions. The results of the descriptive statistics analysis for product development strategy through using SPSS 22 are illustrated in table 5.4.

**Table 5.4:** the descriptive statistics analysis of product development strategy

Factor	Number of items	Mean	Standard deviation
Strategic plan	2	3.99	0.69
Firm's goal	2	3.91	0.87
Firm's opportunities	2	3.92	0.67
Firm's resources	3	3.59	0.74

As can be viewed from the data in table 5.4, strategic planning among high-tech SMEs is in the higher level (its mean is 3.99), after that, the firm's opportunities and firm's goal are in the next ranks with means of 3.92 and 3.91. This result suggests that strategic planning as one of the factors of product development strategy is more significant than other variables.

The first item for measuring product development strategy is strategic planning which has been considered by two questions. The second item is the firm's goal which has been measured by one question. The third one is the firm's opportunities; that has been tested by two questions; and fourth and last item for measuring product development strategy is the firm's resources, which has been considered in three questions.

The participants have been asked to choose the position of their firm in every question in one of five categories that has been indicated above the questions. After collecting data, the frequency and percentage frequency of all answers has been measured through descriptive

analysis using SPSS 22. The mean of answers for each question has been calculated as well.

The results of descriptive statistics analyses for product development strategy are shown in table 5.5.

Considering table 5.5, the value of the mean for all items is higher than average. Also, frequency and percentage frequency for every item is high in the scale of agree and strongly agree. Therefore, it can be concluded that the product development strategy level in investigated firms is high.

**Table 5.5:** The descriptive analysis for product development strategy

N	Product development strategy	Strongly disagree		Disagree		Neutral		Agree		Strongly agree		Total		Mean
		f	%F	f	%F	f	%F	f	%F	f	%F	f	%F	
1	NPD is viewed as a long term strategy	6	0.01	15	0.03	47	0.11	177	0.42	176	0.41	421	100	4.19
2	Strategic plan helps to define strategic arenas for NPD	6	0.01	16	0.03	88	0.21	180	0.42	131	0.31	421	100	3.98
	<b>Firm's goal</b>	f	%F	f	%F	f	%F	F	%F	f	%F	f	%F	Mean
3	Goals are aligned with firm's mission and strategic plan	3	0.01	20	0.04	101	0.23	183	0.43	114	0.27	421	100	3.91
4	Selection of NPD project by firm's mission	6	0.01	30	0.07	152	0.36	169	0.40	64	0.15	421	100	3.60
	<b>Firm's opportunities</b>	f	%F	F	%F	f	%F	F	%F	f	%F	f	%F	Mean
5	Opportunities identification is ongoing and respond to market forces and new technology	3	0.01	3	0.01	34	0.08	230	0.54	151	0.35	421	100	4.24
6	NPD projects ideas are reviewed independently and independently	6	0.01	55	0.13	71	0.16	193	0.45	96	0.22	421	100	3.75

	Firm's resources	f	%F	f	%F	f	%F	F	%F	f	%F	f	%F	Mean
7	NPD projects are identified during budget process and resources	18	0.04	97	0.23	125	0.29	123	0.29	58	0.13	421	100	3.25
8	Balancing the number of NPD project and available resources	9	0.02	39	0.09	99	0.23	168	0.39	106	0.25	421	100	3.77
9	Availability of recourses for a new opportunity	10	0.02	32	0.07	69	0.22	246	0.59	64	0.15	421	100	3.76

### 5.3.2. The descriptive statistics analysis of market development strategy

The second research variable is market development strategy. Based on literature review and the theoretical background of this study, the main variables which are used to measure the MDS were market research, customers and competitors. It consists of eight questions. The participants had been asked to choose the position of their firm in one of five categories (strongly disagree to strongly agree) that have been written above the questions.

After collecting data, the frequency and percentage frequency of all answers has been measured through descriptive analysis using SPSS 22. The mean of answers of every question has been calculated as well. The results of descriptive statistics analyses for market development strategy are shown in table 5.6.

Table 5.6: the descriptive analysis for market development strategy

N	Market development strategy	Strongly disagree		Disagree		Neutral		Agree		Strongly agree		Total		Mean
		f	%F	f	%F	f	%F	f	%F	f	%F	f	%F	
1	Market research as a part of MDS	63	0.14	130	0.30	86	0.20	103	0.24	39	0.09	421	100	2.82
2	Product and market testing is consistently undertaken and expected with all NPD projects	18	0.04	61	0.14	112	0.26	176	0.41	54	0.12	421	100	4.03
3	formal market research function exists in the organisation	13	0.03	50	0.11	139	0.33	172	0.40	47	0.11	421	100	3.45
	<b>Customers</b>	f	%F	f	%F	f	%F	f	%F	f	%F	F	%F	Mean
4	Customer/user is an integral part of the NPD process	3	0.01	6	0.01	51	0.12	273	0.64	88	0.20	421	100	4.03
5	MDS is used to anticipate/identify future customer needs and problems	15	0.03	65	0.13	107	0.25	209	0.49	25	0.05	421	100	3.44
6	Future customer needs are given attention in the market development process	0	0.00	4	0.00	72	0.17	262	0.62	83	0.19	421	100	4.00
	<b>Competitors</b>	f	%F	f	%F	f	%F	f	%F	f	%F	F	%F	Mean
7	keen focus on analysing competitors and their offerings	12	0.02	61	0.14	115	0.27	168	0.39	65	0.15	421	100	3.50
8	Subject matter experts are used for analysing macro environmental research and firm's competitors.	41	0.09	102	0.24	109	0.25	132	0.31	37	0.08	421	100	3.05

The results of descriptive analysis for market development strategy indicate that the value of the mean for all items is higher than average. Also, frequency and percent of frequency for every item is high in the chosen scales of neutral and agree. Therefore, it could be concluded that the market development strategy in investigated firms is medium



### 5.3.3. The descriptive statistics analysis of innovation capacity

Innovation capacity has been measured with three items (Product innovation, Process innovation and investment in R&D) and nine questions. The participants had been asked to select the innovation position of their firms based on the five categories (from strongly disagree to strongly agree) that has been indicated above the questions. The results of the descriptive statistics analysis of innovation capacity have been presented in Table 5.7.

**Table 5.7:** the descriptive analysis for innovation capacity

N	Innovation capacity	Strongly disagree		Disagree		Neutral		Agree		Strongly agree		Total		Mean
		f	%F	f	%F	f	%F	f	%F	f	%F	f	%F	
	<b>Product development</b>													
1	Increasing the range of new products/services	9	0.21	28	0.06	78	0.18	251	0.59	55	0.13	421	100	3.74
2	Increasing the volume of new products/services	13	0.03	41	0.09	122	0.28	198	0.47	47	0.11	421	100	3.53
3	Entry to market with improvements in goods and services	13	0.03	43	0.10	116	0.27	208	0.49	41	0.09	421	100	3.52
	<b>Process development</b>													
4	Continually seeking new methods and processes for developing new products	9	0.02	28	0.06	100	0.23	216	0.51	68	0.16	421	100	3.72
5	Place more importance on high product technology	19	0.04	34	0.08	117	0.27	151	0.35	100	0.23	421	100	3.66
6	Emphasize new distribution channels for products	28	0.06	80	0.19	156	0.37	127	0.30	30	0.07	421	100	3.12
	<b>Investment in R&amp;D</b>													
7	Increases investment on Research and Development (R&D).	18	0.04	40	0.09	127	0.30	167	0.39	69	0.16	421	100	3.54
8	Research and development is acting continually on developing new products	15	0.03	31	0.07	100	0.23	183	0.43	92	0.21	421	100	3.72
9	Places more emphasis on developing R&D, and advanced technology	18	0.04	56	0.13	112	0.26	128	0.30	107	0.25	421	100	3.59

As can be viewed on Table 5.7, for all items' the values of mean are higher than average. Also, frequency and percent of frequency for every item is high in the range of neutral and agree. Therefore, it could be concluded that innovation capacity in investigated firms was more than medium and high.

#### 5.3.4. The descriptive statistics analysis of entrepreneurial firm performance

In order to measure entrepreneurial firm performance, five variables (innovation, pro-activeness, risk taking, turnover/sale, and profit/loss) have been used in this research. Also, thirteen questions has been applied to measuring those five items. The participants had been asked to select the entrepreneurial performance of their firms during last three years in every question in one of five categories (from strongly disagree to strongly agree) for three items namely innovation, pro-activeness and risk taking, and for measuring turnover/sale and profit/loss items (from very low to very high) that had been written above the questions. After collecting data, the value of mean, frequency and percent of frequency of all answers has been measured through descriptive analysis using SPSS version 22.

The results of the descriptive statistics analysis of entrepreneurial firm performance have been illustrated in Table 5.8 the results of the descriptive statistics analysis for entrepreneurial firm performance indicate that the level of all items are average and tend to high. Since the means of the innovation, pro-activeness, risk taking, turnover/sale, and profit/sale in high-tech SMEs haven't significant differences, the entrepreneurial firm performance in this research is in an appropriate level.

Table 5.8: the descriptive analysis for entrepreneurial firm performance

N	Innovation capacity	Strongly disagree		Disagree		Neutral		Agree		Strongly agree		Total		Mean
		f	%F	f	%F	f	%F	f	%F	f	%F	f	%F	
1	A pioneer in introducing new goods and services.	19	4.5	32	7.6	73	17.3	175	41.6	122	29	421	100	3.82
2	The number of new products 'developed' or 'lunched' by my organization has increased during the last 3 years.	18	4.3	67	15.9	112	26.6	161	38.2	63	15	421	100	3.43
3	Products/services are changed frequently.	37	8.8	132	31.4	123	29.2	117	27.8	12	2.9	421	100	2.84
	<b>Proactiveness</b>	<b>f</b>	<b>%F</b>	<b>f</b>	<b>%F</b>	<b>f</b>	<b>%F</b>	<b>f</b>	<b>%F</b>	<b>f</b>	<b>%F</b>	<b>F</b>	<b>%F</b>	<b>Mean</b>
4	Organization always takes actions before its competitors.	6	1.4	73	17.3	224	53.2	106	52.2	12	2.9	421	100	3.10
5	Take the lead to bring in new products/service, management methods and/or operating methods.	9	2.1	71	16.9	150	35.6	150	35.6	41	9.7	421	100	3.39
6	Maintain the attitude of beating competitors through competitive measures	15	3.6	49	11.6	128	30.4	197	46.8	32	7.6	421	100	3.43
	<b>Risk taking</b>	<b>f</b>	<b>%F</b>	<b>f</b>	<b>%F</b>	<b>f</b>	<b>%F</b>	<b>f</b>	<b>%F</b>	<b>f</b>	<b>%F</b>	<b>F</b>	<b>%F</b>	<b>Mean</b>
7	Preference for high-risk projects with high returns.	57	13.5	135	32.1	139	33	71	16.9	19	4.5	421	100	2.66
8	Take substantial action to attain the firm's targets	15	3.6	19	4.5	130	30.9	213	50.6	44	10.5	421	100	3.59
9	Take a quick action to use opportunities	9	2.1	24	5.7	105	24.9	231	54.9	51	12.4	421	100	3.69
	<b>Turnover/sale</b>	<b>f</b>	<b>%F</b>	<b>f</b>	<b>%F</b>	<b>f</b>	<b>%F</b>	<b>f</b>	<b>%F</b>	<b>f</b>	<b>%F</b>	<b>F</b>	<b>%F</b>	<b>Mean</b>
10	Increase in firm's total turnover during the last 3 years	25	5.9	61	14.5	149	35.4	166	39.4	20	4.8	421	100	3.22
11	Increase of sales volume in the last 3 years	22	5.2	54	12.8	160	38	163	38.7	22	5.2	421	100	3.25
	<b>Profit/sale</b>	<b>f</b>	<b>%F</b>	<b>f</b>	<b>%F</b>	<b>f</b>	<b>%F</b>	<b>f</b>	<b>%F</b>	<b>f</b>	<b>%F</b>	<b>F</b>	<b>%F</b>	<b>Mean</b>
12	Profitability growth in the last 3 years	19	4.5	54	12.8	164	39	157	37.3	27	6.4	421	100	3.28
13	Decrease of production costs in the last 3 years	19	4.5	67	15.9	257	61	72	17.1	6	1.4	421	100	2.95

#### 5.4. Measurement scales

The research questionnaire has been developed based on the contemporary empirical studies in two sections including 50 questions. The first section consisted of eleven questions which measures the demographical characteristics of participants and firms. Section two measures research four variables as product development strategy (9 questions), market development strategy (8 questions), innovation capacity (9 questions) and entrepreneurial firm performance (13 questions). All the items are measured through five-point scales. The respondents were asked to rate their answers using a different five-point scale. Table 5.9 provides an overview of the mean, standard deviations of the constructs, and the correlations between the variables.

The Product Development Strategy (PDS) variable involves four items with nine questions and the Market Development Strategy (MDS) variable involves three items with eight questions, which have been drawn from the previous empirical study by Nicholas et al., (2011) and Calanton et al., (2003). Innovation capacity (IC), which involves three items, namely process innovation and investment in research and development (R&D) has been measured with 9 questions (Prajogo and Ahmed, 2006; Chen and Huang, 2009; Marques and Monteiro, 2006; Mogollon and Vaquero, 2004; Ferreira, 2003). The measurement of entrepreneurial firm performance (EFP) has built on the studies of which five items were employed to measure entrepreneurial firm performance: innovation, risk taking, and pro-activity, turn over/sale, net profit/loss with 13 questions (Lumpkin and Dess, 1996; Matsuno et al., 2002; Mogollon and

Vaquero, 2004; Rauch et al., 2009; Callaghan and venter, 2011). Descriptive statistics for the variables in the model and bi-variate correlations among them are presented in Table 5.9.

Before examining the results of the regression analysis in relation to the hypotheses, it is beneficial to look at the results of a bi-variate correlation analysis between all the research variables. It can be viewed table 5.9: the correlation was carried out among research variables. The results identify the significant and positive correlations between entrepreneurial firm performance and product development strategy ( $\gamma = 0.501$ ,  $p < 0.01$ ), market development strategy ( $\gamma = 0.360$ ,  $p < 0.01$ ) and innovation capacity ( $\gamma = 0.607$ ,  $p < 0.01$ ). Also, according to the result of the Pearson correlation, there are positive and significant correlations between observed variables as well. Therefore, significant correlations between independent variables indicated a need for an SEM-type analytical approach to test the study hypothesis.

**Table 5.9:** Construct correlation matrix

Construct	Mean	S.D	Correlations																			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
<b>1.Strategic plan</b>	3.92	0.69	1																			
<b>2.firm's goal</b>	3.91	0.87	.779**	1																		
<b>3.Firm's opportunities</b>	3.99	0.67	.467**	.354**	1																	
<b>4. Firm's resources</b>	3.59	0.74	.529**	.523**	.425**	1																
<b>5.Market research</b>	3.24	1.13	.359**	.341**	.226**	.377**	1															
<b>6. Customers</b>	3.82	0.59	.388**	.431**	.325**	.382**	.346**	1														
<b>7.Competitors</b>	3.50	1.01	.413**	.428**	.221**	.333**	.293**	.381**	1													
<b>8. Innovation</b>	3.37	0.80	.388**	.329**	.288**	.363**	.240**	.283**	.258**	1												
<b>9. Proactiveness</b>	3.61	1.11	.174**	.209**	.255**	.236**	.099*	.154**	.104*	.315**	1											
<b>10.Risktaking</b>	3.32	0.70	.302**	.338**	.323**	.413**	.207**	.423**	.365**	.502**	.320**	1										
<b>11.Turnover/sale</b>	3.24	0.90	.291**	.145**	.262**	.318**	.184**	.180**	.204**	.449**	.332**	.367**	1									
<b>12.Profit/loss</b>	3.11	0.68	.282**	.163**	.222**	.269**	.201**	.381**	.144**	.297**	.285**	.263**	.540**	1								
<b>13.Product innovation</b>	3.60	0.76	.464**	.400**	.435**	.412**	.242**	.322**	.350**	.583**	.300**	.446**	.538**	.408**	1							
<b>14.Process innovation</b>	3.59	1.32	.240**	.242**	.155**	.276**	.209**	.219**	.223**	.318**	.182**	.263**	.224**	.190**	.343**	1						
<b>15.Investment R&amp;D</b>	3.62	0.96	.345**	.298**	.281**	.210**	.090	.197**	.278**	.517**	.253**	.386**	.183**	.207**	.349**	.195**	1					
<b>16.NPD</b>	3.83	0.58	.870**	.787**	.680**	.828**	.416**	.470**	.432**	.436**	.269**	.433**	.341**	.309**	.536**	.292**	.347**	1				
<b>17.MPD</b>	3.49	0.73	.467**	.468**	.312**	.465**	.928**	.638**	.515**	.316**	.142**	.352**	.232**	.296**	.345**	.267**	.178**	.539**	1			
<b>18.Entrepreneurial Performance</b>	3.29	0.60	.393**	.345**	.386**	.446**	.251**	.377**	.296**	.736**	.740**	.693**	.708**	.587**	.626**	.333**	.452**	.501**	.360**	1		
<b>19. Innovation Capacity</b>	3.60	0.74	.451**	.409**	.362**	.396**	.246**	.326**	.373**	.612**	.320**	.475**	.397**	.342**	.697**	.797**	.666**	.507**	.354**	.607**	1	

\*\* Correlation is significant at the 0.01 level (2-tailed). \* Correlation is significant at the 0.05 level (2-tailed).

### 5.4.1. Data measurement process

According to Biedenbach and Müller, (2011, p. 23), “The validity analysis aims to test the coinciding degree of the measurement content to the research objectives”; factor analysis generally has been applied for validity analysis. The Bartlett’s sphericity test and KMO’s test is a measure of Sampling Adequacy and in this research it has been applied to measure whether variables are suitable to scrutiny with factor analysis or not.

Based on Biedenbach and Müller (2011) if the value of significant Bartlett’s test is ( $<0.05$  in general), and KMO is greater than 0.5, then the variable is suitable to be dealt with through factor analysis. In this research, the values of significance of the Bartlett test ( $0.000 < 0.05$ ) and Kaiser–Meyer– Olkin ( $KMO=0.80 > 0.5$ ) indicate that the collection is well correlated and the factor analysis is feasible (see Table 5.10).

**Table 5.10: KMO and Bartlett's Test**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.808
Bartlett's Test of Sphericity	Approx. Chi-Square	8928.873
	df	741
	Sig.	.000

This study has used Structural Equations Models (SEM) to test the relationship between variables by Partial Least Squares (PLS). Firstly, the data was analyzed through the measures of central tendency and dispersion and then the PLS technique was applied to test the models and hypotheses. The result of factor analyzing in table 5.6 illustrates that all variables of the

research have significant and high factor loading values ( $FL > 0.5$ ). In the second step, the reliability and validity of both of the multi- item scales are evaluated (see table 5.11).

The reliability of data is confirmed by Cronbach's alphas. All items exceeded the 0.7 threshold (Nunnally, 1978) and were accepted. In the next step, a principle component analysis is performed on each item. A number of items are dropped because of low indicator loading.

Convergent Validity was estimated as the average variance extract (AVE). All of the items' AVE were above 0.5. Therefore, it is confirmed: (Table 5.11).



Table 5.11: Measurement Model

Construct	Indicators	Factor Loading*	Composite reliability**	R <sup>2</sup> ***	AVE****
PDS			0.82		0.825
	PDS1	0.54		0.27	
	PDS2	0.71		0.70	
	PDS3	0.83		0.72	
	PDS4	0.57		0.29	
	PDS5	0.77		0.48	
	PDS6	0.61		0.32	
	PDS7	0.57		0.20	
	PDS8	0.55		0.51	
PDS9	0.51		0.47		
MDS			0.88		0.516
	MDS1	0.70		0.77	
	MDS2	0.58		0.67	
	MDS3	0.53		0.25	
	MDS4	0.65		0.33	
	MDS5	0.49		0.47	
	MDS6	0.61		0.30	
	MDS7	0.57		0.54	
MDS8	0.48		0.42		
IC			0.72		0.752
	PRIN1	0.62		0.55	
	PRIN2	0.65		0.74	
	PRIN3	0.70		0.41	
	POIN1	0.64		0.47	
	POIN2	0.51		0.68	
	POIN3	0.50		0.52	
	R&D1	0.55		0.56	
	R&D2	0.54		0.38	
R&D3	0.50		0.26		
EFP			0.79		0.65
	INNO1	0.69		0.58	
	INNO2	0.63		0.32	
	INNO3	0.66		0.41	
	PRO1	0.73		0.20	
	PRO2	0.70		0.43	
	PRO3	0.62		0.51	
	RITAK1	0.50		0.39	
	RITAK2	0.84		0.31	
	RITAK3	0.83		0.29	
	TUR/Sal1	0.63		0.41	
	TUR/Sal2	0.82		0.35	
	Prof/Loss1	0.69		0.56	
Prof/loss2	0.59		0.44		

Notes: \* it is significant when it is above 0.5; \*\* Scale reliability is satisfactory when it is above 0.7; \*\*\* R-Square; \*\*\*\* Convergent validity is satisfactory when it is above 0.50

PDS indicates Product Development Strategy; MDS: Marker Development Strategy; IC: Innovation Capacity; EFP: Entrepreneurial Firm performance; PRIN: Product Innovation; POIN: Process Innovation; R&D: Investment in R&D; INNO: Innovation; PRO: Proactiveness; RITAK: Risk Taking; TUR/SAL: Turnover/sale; Prof/Loss: Profit/loss

Using appropriate constructs is very significant for developing and designing survey tools in managerial studies. Since developing new constructs or scales of measurement is very complicated, the researchers try to pre-test the constructs of previous empirical studies to make sure of their research validity and reliability (Joreskog and Sorbom, 1996). Therefore a confirmatory factor analyses (CFA) is a special form of factor analysis and a dominant tool to test whether the research data fit the hypothesized measurement model of research or not (Kline, 2010; Preedy and Watson, 2009).

In the present study also, CFA has been used to validate the research scales. Although there are different indicators that determine the fitness of model, Kline (2010) suggested the absolute fit indicates as Chi-squared test, GFI, AGFI and RMSEA. Table 5.12 indicates the result of confirmatory factor analyses. The results of that confirmatory factor analyses demonstrate that the scales are uni-dimensional and have high validity and reliability.

**Table 5.12: Confirmatory factor analysis (CFA)**

	Mean	SD	Items	$\chi^2$	GFI	AGFI	RMSEA	Alpha Cronbach	SCR <sup>a</sup>	AVE <sup>b</sup>
<b>Product development strategy</b>	3.83	0.58	9	266.66	0.90	0.88	0.014	0.82	0.860	0.587
<b>Market development strategy</b>	3.49	0.73	8	112.76	0.94	0.89	0.01	0.88	0.713	0.522
<b>Innovation capacity</b>	3.29	0.60	9	114.52	0.94	0.98	0.021	0.72	0.801	0.684
<b>Entrepreneurial performance</b>	3.60	0.74	13	59.80	0.90	0.80	0.0173	0.79	0.656	0.589

a Scale composite reliability

b Average variance extracted

Regarding the reliability of the measures, CFA has been conducted for each one of the constructs using Lisrel 9.1 (Joreskog and Sorbom, 1996). The Measurement model shows high reliability and validity for the scales (Table 5.12). Cronbach's alpha is above the 0.70 level recommended by literature (Hair et al., 2001). Scale composite reliability indexes are higher than 0.70, as recommended by studies, and average variance extracted is above 0.50, the minimum value proposed by Fornell and Larcker (1981). As may be observed from table 5.12, the measurement model shows appropriate indices of goodness-fit: a non-significant  $\chi^2$ , GFI, CFI and IFI above 0.90, and RMSEA below 0.08.

### 5.5. The statistical data analyzing and testing hypothesis

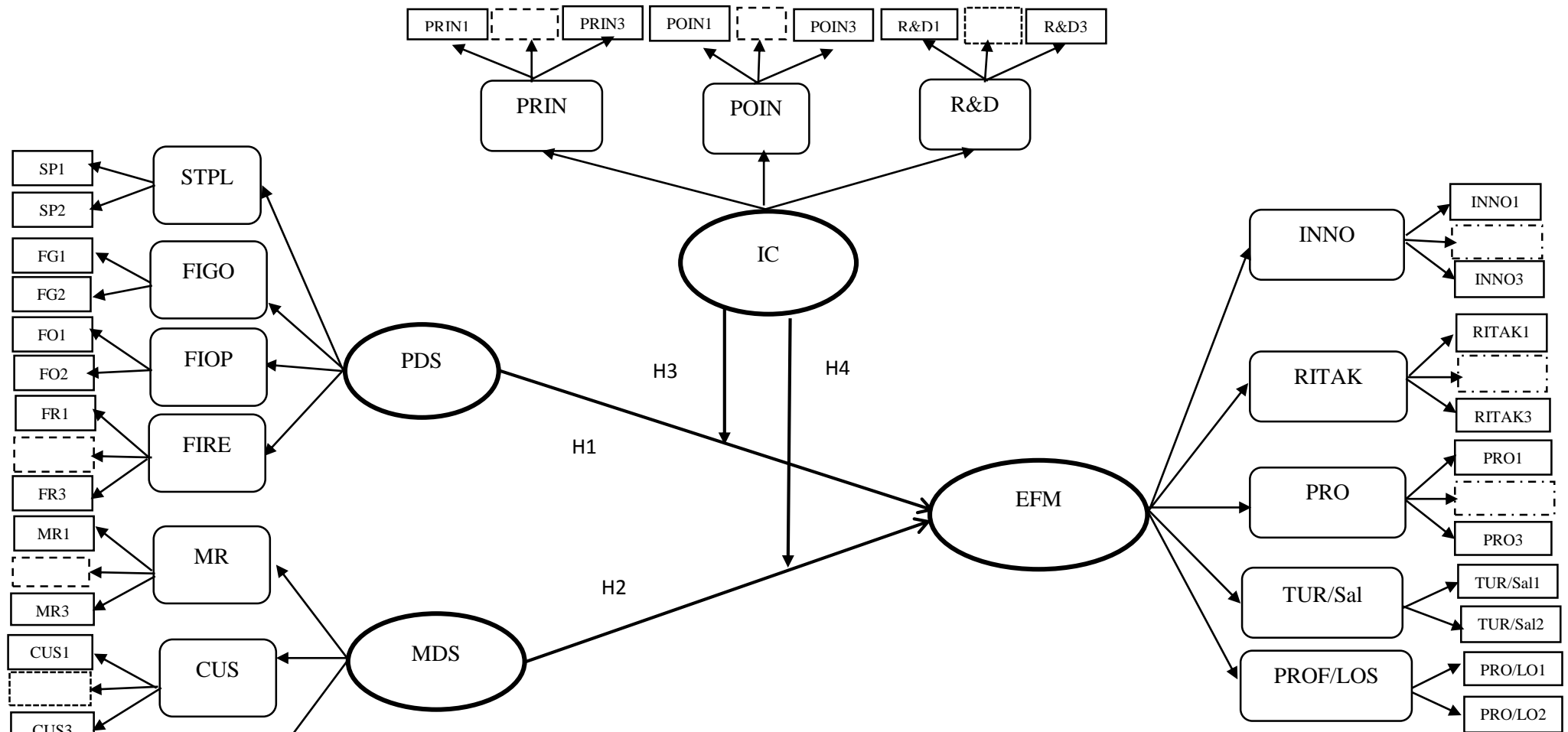
The aim of this research is to analyse the relationship between strategic direction (product and market development strategy) and entrepreneurial firm performance and the impact of innovation capacity as a moderator variable on the relationship between product and market development strategy and entrepreneurial firm performance of SMEs. The research hypotheses have been tested by applying Structure Equation Modelling (SEM) methodology. The Lisrel 9.1 software was used to test and analyse the relationships among variables in the research model.

As it can be observed on the structural model figure 5.5, there are 4 latent variables namely product development strategy, market development strategy, innovation capacity and entrepreneurial firm performance. In order to measure these latent variables, fifteen observed variables have been designed to measure them, namely strategic plan, firm's goals, firm's opportunities, firm's resources for product development strategy; market research, customers,

competitors for market development strategy; product innovation, process innovation, investment in R&D for innovation capacity; and innovation, pro-activeness, risk-taking, turnover/sale and profit/loss for entrepreneurial firm performance.

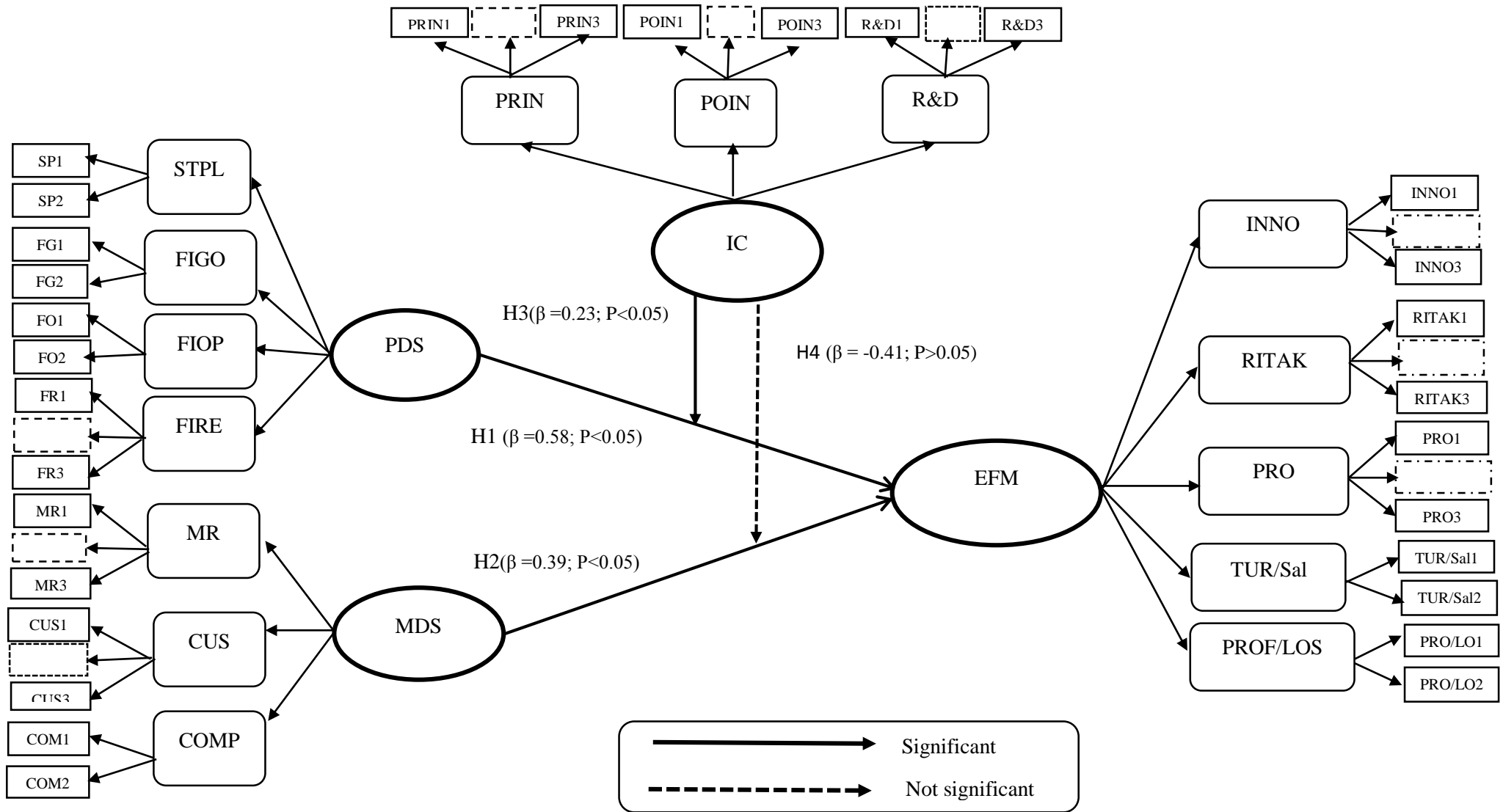
As can be viewed on figure 5.6, for each item, there are indicators to measure them. This research has four hypotheses, which are indicated on the structural model. The results of all path coefficient and T-values are illustrated in figure 5.7 and table 5.13. If t-value is estimated more than 2 with acceptable p-value ( $p < 0.05$ ) then it could be concluded it supports the determined hypothesis.

Figure 5.5: Hypothesized Model of the research



Note: Latent Variables: PDS: Product development strategy; MDS: Market development Strategy; IC: Innovation Capacity, EFM: Entrepreneurial Firm Performance; Observed variables: STPL: Strategic plan; FIGO: Firm’s goals; FIOP: Firm’s opportunities; FIRE: Firm’s resources; MR: Market research; CUS: Customers; COMP: Competitors; INNO: Innovation, RITAK: Risk taking; PRO: Proactiveness; TUR/Sal: Turnover/sale; PROF/LOS: Profit/Loss; PRIN: product innovation; POIN: Process innovation; R&D: Investment in R&D; - SP1 to SP25: 2 indicators to measure STPL; FG1 to FG2: 2 indicators to measure FIGO; FO1 to FO2: 2 indicators to measure FIOP; FR1 to FR3: 3 indicators to measure FIRE; MR1 to MR3 : 3 Indicators to measure MR; CUS1 to CUS3: 3 indicators to measure CUS; COM1 to COM2: 2 indicators to measure COMP; INNO1to INNO3: 3 indicators to measure INNO RITAK1 to RITAK3: 3 indicators to measure RITAK; PRO1 to PRO3: 3 Indicators to measure PRO; TUR/SAL1 to TUR/SAL2: 2 indicators to measure TUR/Sal; PRO/LO1 to PRO/LO2: 2 indicators to measure PROF/LOS; PRIN1 to PRIN3: 3 Indicators to measure PRIN; POIN1 to POIN3: 3 indicators to measure POIN; R&D1 to R&D: 3 indicators to measure R&D.

Figure 5.6 The results of the estimated mode



**Table 5.13:** Construct structural model

Linkages in model	Hypotheses		Path coefficient	t-values
	Number	sign		
<b>Hypothesis</b>				
1.Product development strategy → Entrepreneurial firm performance	H1	+	0.58	6.91***
2. Market development strategy → Entrepreneurial firm performance	H2	+	0.39	8.25***
3. Product development strategy * innovation capacity → Entrepreneurial firm performance	H3	+	0.23	7.29***
4. Market development strategy* innovation capacity → Entrepreneurial firm performance	H4	-	-0.41	-1.02
Strategic plan → Product development strategy			0.82	10.58***
Firm's goal → Product development strategy			0.87	19.61***
Firm's opportunities →Product development strategy			0.51	10.70***
Firm's resources→ Product development strategy			0.79	12.81***
Market research →Product development strategy			0.55	11.17***
Customers → Product development strategy			0.69	14.74***
Competitors → Product development strategy			0.71	8.02***
Product innovation → Innovation capacity			0.74	3.82***
Process innovation → Innovation capacity			0.40	7.95***
Investment in R&D → Innovation capacity			0.51	10.25***
Innovation → Entrepreneurial performance			0.76	4.59***
Proactiveness → Entrepreneurial performance			0.45	8.57***
Risk taking → Entrepreneurial performance			0.62	12.01***
Turnover/sale → Entrepreneurial performance			0.64	12.27***
Net profit/loss → Entrepreneurial performance			0.51	9.80***

Fit statistics for the measurement model:  $\chi^2 = 1928.06$ ; AIC=702.00; CAIC=2322.45; RMR=0.01; GFI=0.91; NNFI=0.89; CFI=0.90.

\*\*\* p<0.05

The result of data analysis shows that both hypotheses are supported and there are positive and significant relationships between variables except hypothesis four. Regarding hypothesis one, there is a positive, significant and strong relationship between product development strategy and entrepreneurial firm performance ( $\beta = 0.58$ ;  $P < 0.05$ ). So, the first hypothesis is confirmed. On the other hand, the effects of innovation ( $\beta = 0.76$ ;  $P < 0.05$ ); pro-activeness ( $\beta = 0.45$ ;  $P < 0.05$ ); risk taking ( $\beta = 0.45$ ;  $P < 0.05$ ); Turnover/sale ( $\beta = 0.64$ ;  $P < 0.05$ ); Net profit/loss ( $\beta = 0.51$ ;  $P < 0.05$ ); on entrepreneurial firm performance in high tech SMEs are significant. The entrepreneurial firm performance variable has been measured in two main extremes, namely low performance and high performance. High performance was associated with pro-activeness, high risk-taking, high investment in R&D, and high profitability. Pro-activeness as one of the main characteristics of successful entrepreneurial firms, enables firms to be innovative and react fast toward changes.

It also enables firms to perform better than their competitors. The firms which are taking a high level of risk in product development are more successful than those firms which put less emphasis on developing risky products. Therefore, risk taking is one of the important characteristics of SMEs's owner/managers which helps firms to be open for new product development positively.

The result of analysis indicated that there is positive and significant relationship between market development strategy and entrepreneurial firm performance ( $\beta = 0.39$ ;  $P < 0.05$ ).

Therefore, the second hypothesis is confirmed. The results identify developing market strategy



and entering new markets with existing products through focusing on competitors' activities ( $\beta = 0.71$ ;  $P < 0.05$ ), customer's needs ( $\beta = 0.69$ ;  $P < 0.05$ ), and ongoing market research ( $\beta = 0.55$ ;  $P < 0.05$ ) leads to increasing entrepreneurial firm performance in high-tech SMEs.

The result of path analysis shows that innovation capacity moderated the relationship between product development strategy and entrepreneurial performance ( $\beta = 0.23$ ;  $P < 0.05$ ). So, the third hypothesis is also confirmed. In other words, the firms putting more emphasis on product innovation, process innovation, and investment in R&D are more likely to develop new products. These will in turn, improve those firms' performance. Table 5.13 also indicates that amongst the observed items, product innovation t has strongest impact on innovation capacity ( $\beta = 0.74$ ;  $P < 0.05$ ).

Innovation capacity has moderated negatively and non-significant the relationship between market development strategy and entrepreneurial performance ( $\beta = -0.41$ ;  $P > 0.05$ ). Therefore, fourth hypothesis is not supported. It can be concluded that firms that are engaging in market development to enter to new markets with existing products need more innovative products. They put more emphasis on competition ( $\beta = 0.71$ ;  $P < 0.05$ ), customers ( $\beta = 0.69$ ;  $P < 0.05$ ), and needs market research ( $\beta = 0.55$ ;  $P < 0.05$ ) rather than innovation. This result confirms that the firms that invested in product innovation to produce new products were more successful in designing and offering new products to their existing markets.

Overall it is concluded that increasing firms' innovation capacity through product innovation, easing process innovation and investment in R&D enhances firms' entrepreneurial

performance. This can be done through increasing and strengthening the firm's product development capabilities. Therefore, innovation is a key factor for organizations to have sustainable competitive advantage and innovation capacity is one of the main features of the successful firms leading to competitive advantage (Romijin and Albaladejo, 2002; Silva et al, 2008; Prajogo and Ahmed , 2006).

### 5.6. The Model Fit Statistics

The important part of any model is the goodness- of-fit which reflects the predictive power of the estimated inner and outer model relationships. A Goodness of fit index (GFI), the root mean squared error of approximation (RMSEA), the normed fit index (NFI), and comparative fit index (CFI), is used based on Bollen (1989). The chi-square ( $\chi$ ) test and the normed-chi-square test ( $\chi /df$ ) are applied. If the chi-square/df value becomes less than 3, it could be concluded that the data has a good fit. This scale value is 2.52, so it is acceptable (see table 5.14)

According to Judge and Hulin, (1993), the GFI index should be higher than 0.70 in complex models. The RMSEA index is used to estimate the fit of the research model to the covariance/correlation matrix. If the value of RMSEA goes lower than 0.08, it represents a good estimation. In addition, NFI and CFI indexes were applied (Bentler and Bonett 1980, Bentler 1990) to evaluate the research model's best fit to the data. These indices should be higher than 0.90, but the lowest acceptable value for this index in complex models is 0.80 (Hart,1994).

The resulting values of GFI, NNFI and CFI index in our model were GFI=0.91; NNFI=0.89; CFI=0.91. Respectively which can be considered as satisfactory (Tenenhaus et al., 2005). The index of GoF is AIC. As the value of Model AIC = 702.0051 is smaller than Independence AIC = 10301.88. It is satisfactory too. According to the described criteria for each index, all of the values are acceptable based on model fit statistics and support the validity of the research model according to the empirical data (table 5.14).

**Table 5.14:** Fit indices and the model Fit Statistics

Fit index	Acceptable threshold levels	The model statistics	Description
Chi-Square $\chi^2$	Low $\chi^2$ relative to degrees of freedom with an insignificant p value ( $p > 0.05$ )	$\chi^2_{\text{model}}=1928.06$ , $P=0.061$	
Relative $\chi^2$ ( $\chi^2 / \text{df}$ )	2:1 (Tabachnik and Fidell, 2007) 3:1 (Kline, 2005)	$(\chi^2 / \text{df})_{\text{model}}= 2.52$	Adjusts for sample size.
Root Mean Square Error of approximation (RMSEA)	Values less than 0.07 (Steiger, 2007)	$\text{RMSE}_{\text{model}}= 0.041$	Values less than 0.03 represent excellent fit
GFI	Values greater than 0.90	$\text{GFI}_{\text{model}}= 0.92$	Scaled between 0 and 1, with higher values indicating better model fit.
AGFI	Values greater than 0.90	$\text{AGFI}_{\text{model}}=0.93$	Adjusts the GFI based on the number of parameters in the model. Values can fall outside the 0-1.0 range.
RMR	Good models have small RMR (Tabachnik and Fidell, 2007)	$\text{RMR}_{\text{model}}= 0.1$	Residual based. The average squared differences between the residuals of the sample covariances and the residuals of the estimated covariances. Unstandardised.
Incremental Fit Indices (NFI)	Values greater than 0.90	$\text{NFI}_{\text{model}}=0.90$	Assesses fit relative to a baseline model which assumes no covariances between the observed variables. Has a tendency to overestimate fit in small samples.
NNFI (TLI)	Values greater than 0.90	$\text{NNFI}_{\text{model}}=0.89$	Non-normed, values can fall outside the 0-1 range. Favours parsimony. Performs well in simulation studies (Sharma et al, 2005; McDonald and Marsh, 1990)
CFI	Values greater than 0.90	$\text{CFI}_{\text{model}}= 0.91$	Normed, 0-1 range.

Source: Hooper et al., (2008)

### 5.7. Chapter summary

In this chapter, the survey data that was collected by the postal and online questionnaires has been analyzed through descriptive and statistical analysis. The descriptive statistics have provided information regarding the demographics information, the background of respondents' characteristics and profile of managers and firms operating in high-tech SMEs in the UK, through frequency and descriptive analysis such as mean, standard deviation, tables and graphs. Also, this chapter has applied statistical data analysis using correlation and SEM analysis for the research hypothesis.

The results of analysis are summarized in terms of hypothesis and the path analysis. It is concluded that for small and medium-sized firms product development, rather than market development, is an appropriate strategy. The findings of this research show that there is a strong relationship between pursuing new product development rather than market development strategy and entrepreneurial firm performance. Successful small and medium-sized firms are more involved in pursuing a related product development strategy.

In addition, innovation capacity positively moderates the relationship between product development strategy and entrepreneurial firm performance in the firms studied. In other words, for small and medium-sized enterprises, product development is a better choice than entering new markets. Focusing on developing new products will result in better entrepreneurial performance. The other main conclusion is that, in order to be successful, SMEs needs to enhance their innovation capacity. One of the tools for this is creating and developing

an ethos of innovation within the firms. This in turn will result in enhanced product innovation as well as process innovation. Increasing the R&D budget and investment in the unique capabilities of the firm can help it to achieve this goal.

## Chapter six

# Findings and discussion

## 6.1. Introduction

This chapter reviews the research questions and hypothesis and discusses the findings which are presented through descriptive and statistical analysis in Chapter five. This chapter presents the finding of data analysis regarding the research hypothesis and the conformity of results with previous empirical studies and incumbent literature. The chapter begins with a discussion on product development strategy and entrepreneurial firm performance in SMEs, and provides a critical analysis of innovation, pro-activeness, risk taking, turnover/sale, and profit/loss in high tech SMEs. The relationship between market development strategy and entrepreneurial firm performance is also discussed. Then the discussion focuses on the moderating role of innovation capacity in facilitating product development with consequently increased entrepreneurial firm performance, rather than market development.

## 6.2. The research hypothesis

### 6.2.1. Product development strategy and entrepreneurial firm performance

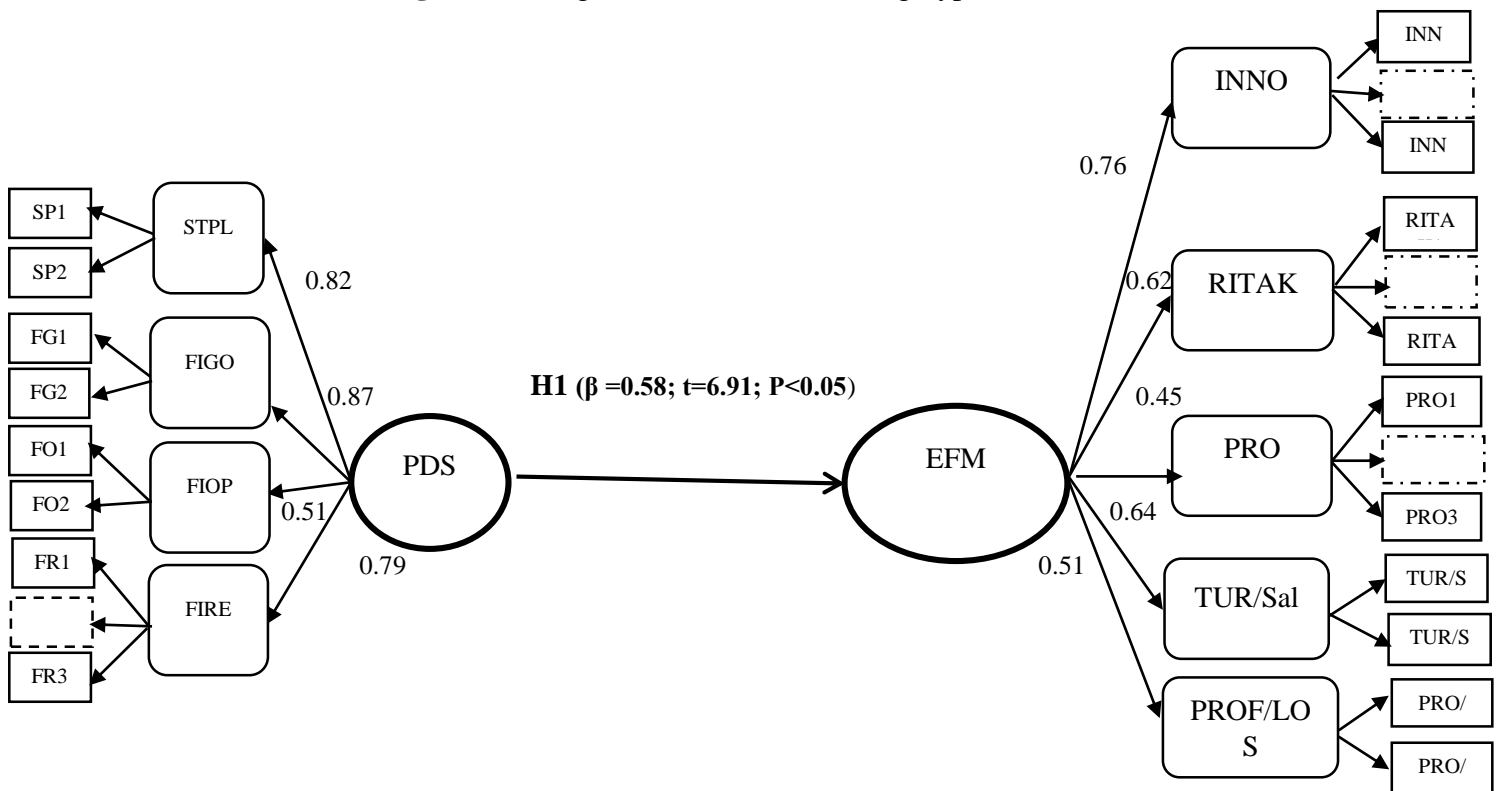
Regarding the relationship between product development strategy and organizational factors, the results of this study demonstrate that product development strategy has a positive and significant effect on entrepreneurial firm performance ( $\beta = 0.58$ ,  $p < 0.05$ ). The result of data analysis shows that the main hypothesis is supported and there are positive and significant relationships between product development strategy and entrepreneurial firm performance.

So, the first hypothesis is confirmed. On the other hand, the effects of strategic plan ( $\beta = 0.82$ ;  $P < 0.05$ ); firm's goal ( $\beta = 0.87$ ;  $P < 0.05$ ); firm's opportunities ( $\beta = 0.51$ ;  $P < 0.05$ ); firm's



resources( $\beta = 0.76$ ;  $P < 0.05$ ) on product development strategy and also innovation ( $\beta = 0.76$ ;  $P < 0.05$ ); proactivity ( $\beta = 0.45$ ;  $P < 0.05$ ); risk taking ( $\beta = 0.45$ ;  $P < 0.05$ ); Turnover/sale ( $\beta = 0.64$ ;  $P < 0.05$ ); Net profit/loss ( $\beta = 0.51$ ;  $P < 0.05$ ); on entrepreneurial firm performance in high tech SMEs is significant too. These results are illustrated in figure 6.1.

Figure 6.1. Regression results for testing hypothesis H1



Note: Latent Variables: PDS: Product development strategy; EFM: Entrepreneurial Firm Performance; Observed variables: STPL: Strategic plan; FIGO: Firm's goals; FIOP: Firm's opportunities; FIRE: Firm's resources; INNO: Innovation, RITAK: Risk taking; PRO: Proactiveness; TUR/Sal: Turnover/sale; PROF/LOS: Profit/Loss; - SP1 to SP25: 2 indicators to measure STPL; FG1 to FG2: 2 indicators to measure FIGO; FO1 to FO2: 2 indicators to measure FIOP; FR1 to FR3: 3 indicators to measure FIRE; INNO1 to INNO3: 3 indicators to measure INNO RITAK1 to RITAK3: 3 indicators to measure RITAK; PRO1 to PRO3: 3 Indicators to measure PRO; TUR/SAL1 to TUR/SAL2: 2 indicators to measure TUR/Sal; PRO/LO1 to PRO/LO2: 2 indicators to measure PROF/LOS

performance of firms since there is not any universal measure for SMEs performance, in this research, entrepreneurial performance has been measured by multiple indicators namely innovation, pro-activity, risk-taking, turnover/sale, net profit/loss. Also, According to Nicholas

and Ledwith (2011), there are different factors to measure product development strategy in firms such as strategic plan, firm's goals, firm's resources and firm's opportunities. In this research, those factors are used for measuring product development strategy. The respondents were asked to indicate the extent of the importance of strategic plans, firm's goal, firm's resources, firm's opportunities, innovation, pro-activity, risk taking, turnover/sale; and profitability for developing product development and enhancing entrepreneurial firm performance.

The data analysis illustrates that entrepreneurial SMEs have significantly better innovation performance in enhancing entrepreneurial firm performance. Employing one sample T-test it has been found that innovation ( $t(420) = 9.44, P < 0.05$ ); Pro-activity ( $t(420) = 6.66, P < 0.05$ ); Risk-taking ( $t(420) = 9.96, P < 0.05$ ); significantly impacts on enhancing entrepreneurial firm performance and are significant factors in improving entrepreneurial performance. Also, it has been concluded that turnover/sale ( $t(420) = 5.46, P < 0.00$ ) and Net profit/loss ( $t(420) = 3.46, P < 0.01$ ) are considered to be the main factors in enhancing and improving entrepreneurial performance effectively. Also, the result of a T-test for product development strategy indicates that strategic plan ( $t(420) = 27.20, P < 0.05$ ); Firm's goal ( $t(420) = 21.53, P < 0.05$ ); Firm's opportunities ( $t(420) = 30.37, P < 0.05$ ); firm's resources ( $t(420) = 16.47, P < 0.05$ ) are the significant factors in developing product strategy (see table 6.1).

**Table 6.1.** Product development strategy and Entrepreneurial firm performance, result of t-test

Variables	Mean	S.D	df	t-statistics	P-value	Mean Difference
Strategic plan	3.92	0.69	420	27.208	.000	.92716
Firm's goal	3.91	0.87	420	21.533	.000	.91449
Firm's opportunities	3.99	0.67	420	30.370	.000	.99881
Firm's resources	3.59	0.74	420	16.474	.000	.59462
Innovation	3.37	0.80	420	9.448	.000	.37055
Proactiveness	3.80	1.11	420	6.662	.000	.36184
Risk-taking	3.32	0.70	420	9.391	.000	.32067
Turnover/sale	3.24	0.90	420	5.467	.000	.24228
Net profit/loss	3.11	0.68	420	3.462	.001	.11639

(Scale: 1= Low; 3= Average, 5= High)

The linear covariance relationships between exogenous and endogenous latent constructs is tested by SEM. Entrepreneurial firm performance and Product development strategy are latent constructs and strategic plan, firm's goal, firm's opportunities, firm's resources, innovation, pro-activity, risk-taking, turnover/sale; profit/loss, product development strategy are exogenous constructs. As can be shown in table 6.2, the *t-values* present the significance of the relationship between variables. The path coefficient ( $\beta$ ) and t values are given by PLS analysis. The result of analyzing shows that the hypothesis is supported and there are positive and significant relationships between variables.

**Table 6.2:** Construct structural model

Linkages in model	Hypotheses		Standardized parameter estimates	t-values
	Number	sign		
<b>Hypothesis</b>				
<b>H1.</b> Product development strategy → Entrepreneurial performance	H <sub>1</sub>	+	0.58	6.91*
Innovation → Entrepreneurial performance			0.76	4.59*
Proactiveness → Entrepreneurial performance			0.45	8.57*
Risk taking → Entrepreneurial performance			0.62	12.01*
Turnover/sale → Entrepreneurial performance			0.64	12.27*
Net profit/loss → Entrepreneurial performance			0.51	9.80*
Strategic plan → Product development strategy			0.82	10.58*
Firm's goal → Product development strategy			0.87	19.61*
Firm's opportunities → Product development strategy			0.51	10.70*
Firm's resources → Product development strategy			0.79	12.81*

Fit statistics for the measurement model:  $\chi^2 = 442.08$ ; AIC=597.10; CAIC=743.33; RMR=0.049; GFI=0.91; NNFI=0.89; CFI=0.90.

\* p<0.05

As the result of SEM analysis indicates it can be concluded that, in firms that operate in the high-tech sector, the undertaking of technological innovation is not the firms' choice. Because the firms' survival and growth rely on their innovation and entrepreneurship against competitors. In other words, high innovation in SMEs develops and brings more new products and services to the market. As the finding reveals, innovation has a positive and strong ( $\beta = 0.76$ ;  $P < 0.05$ ) impact on increasing entrepreneurial firm performance

The other important factor in measuring firm entrepreneurial performance is risk taking. Risk taking refers to a manager's tendency to take risks and show high tolerance in facing failure. Risk taking sometimes includes risky actions such as entering new markets or allocating a large amount of resources to developing new products with uncertain outcomes (Lumpkin and Dess,

2001). The result shows that risk taking has a positive and strong effect ( $\beta = 0.62$ ;  $P < 0.05$ ) in enhancing entrepreneurial performance of high-tech SMEs.

Pro-activity is the other variable for measuring the studied firms entrepreneurial performance. Pro-activity has been introduced as an entrepreneurial quality, as a characteristic of entrepreneurship (Hornaday and Aboud, 1971). Moreover, pro-activity has been defined as an “opportunity-seeking” and “forward-looking” perspective for developing new products for achieving competitive advantages (Lumpkin and Dess, 2001). Pro-activity enables firms to anticipate future market demands and react fast to environmental changes before the competitors. As the result of this study indicates, proactivity has a positive and strong impact ( $\beta = 0.45$ ;  $P < 0.05$ ) on enhancing entrepreneurial performance.

As reviewed in previous sections, in the entrepreneurial literature there is high attention on firm turnover by both academics and owner/managers. It has been noticed that firm growth is a key factor that affects the entrepreneurial performance (Gartner, 1997). Therefore, growth has been identified as a main element in increasing firms’ competitive advantages (Markman and Gartner, 2002). It is also reported that a firm’s rapid growth leads to enhancing profitability and also encouragement for firms entering new markets (MacMillan and Day, 1987). In a similar line, the finding of this study supports the prior theories and researchers and indicates that significantly growth in firms turnover/sale has a positive and strong impact ( $\beta = 0.64$ ;  $P < 0.05$ ) in improving entrepreneurial performance in high-tech firms.

Net profit is an important measure for entrepreneurial performance in SMEs (Fitzsimmons et al, et al, 2005) and refers to the money which has ended up as profit after reducing all business costs and after taxes. The result of data analysis indicates that firm's profitability has a positive and significant effect ( $\beta = 0.51$ ;  $P < 0.05$ ) on enhancing high-tech SMEs entrepreneurial performance.

Generally speaking, this result indicates that high-tech SMEs which have been involved in developing strategy for producing new products have a stronger capability for enhancing innovation capacity and entrepreneurial performance, rather than SMEs without any strategy.

The important part of the model is the goodness- of-fit which reflects the predictive power of the estimated inner and outer model relationships. The main indicators of G.o.F are the Akaike Information Criterion (AIC); Goodness of Fit Index (GFI); Adjusted Goodness of Fit Index (AGFI); Root Mean Square Error of Approximation (RMSE); Non-Normed Fit Index (NNFI); and Comparative Fit Index (CFI). The resulting value of GFI, NNFI and CFI index in our model were GFI=0.91; NNFI=0.89; CFI=0.90 respectively which can be considered as satisfactory (Tenehaus et al., 2005). The index of GoF is AIC. The value of Model AIC =597.10 is smaller than Independence AIC = 33876.18. So it is satisfactory as well.

As it has been argued in chapter two, in order to survive and grow in ever changing business environments, enterprises tend to be innovative. Entrepreneurial firms are very interested in developing new products (Davidsoon et al., 2002). However the main goal of entrepreneurial

firms is achieving growth and firm performance which has been measured by its growth rate (Gartner, 1997; Delmar et al., 2003). The literature also supports the role of growth in enhancing performance and achieving competitive advantages, therefore measuring the growth rate of firms for getting a broad picture of performance in enterprises, particularly in small and medium sized enterprises is very common (Markman and Gartner, 2002).

Although many researchers have tended to focus on organizational characteristics, entrepreneurs' characteristics and manners in organizations, rather less attention has been paid to the link between a firm's strategic management practices and its entrepreneurial performance. Based on the studies of Stevenson and Jarillo (1990) and Dess et al(1999), a connection can be made between entrepreneurship and strategic management. The findings of this study show that product development strategy has a positive and strong effect on entrepreneurial performance. In other words, successful SMEs follow product development rather than market development strategy. Diversification in both product and market directions simultaneously could be potentially a pitfall for small and medium sized enterprises.

Regarding product development strategy, the strategic plan ( $\beta = 0.76$ ;  $P < 0.05$ ) is an important factor in developing product development in studied firms. Barczak and Kahn(2007) stated that strategy is considered as the planning and defining of a firm's vision through focusing on R&D and technology in order to develop new products. Cooper et al., (2002) mentioned the importance of new product development strategy to the success of new product development in the long term and asserted that a strategic plan is a core factor in developing new products.

The other important factor in product development strategy is the firm's goal ( $\beta = 0.87$ ;  $P < 0.05$ ) that has a significant and positive relationship in developing product strategy. This finding is similar to the result of Cooper and Kleinschmidt (1995, 1996) that indicated that an effective new product development strategy defined by firms' goals leads to the new product development's long term focus.

According to the result of SEM analysis, a firm's resources have a positive and significant effect in association with product development strategy ( $\beta = 0.79$ ;  $P < 0.05$ ). Previous research- has demonstrated that considering firm's resources as human, financial, and technical resources is a critical issue in developing product strategy ( Brown and Eisenhardt, 1995; Pittiglio et al., 1995; Cooper and Kleinschmidt, 1996; Griffin, 1997, Cooper et al. 2002; Barczak and Kahn, 2007).

According to Griffin, (1997) and Cooper and Kleinschmidt (1995), the firm's opportunities are a critical factor for developing product strategy success. Razeghi (2008) found that the identification of opportunities for firms is a vital factor in the release of innovative new products and developing product strategy. The result of analysis indicated that a firm's opportunities ( $\beta = 0.51$ ;  $P < 0.05$ ) has a significant and positive effect in developing product strategy.

### **6.2.2. Market development strategy and entrepreneurial performance**

Regarding the relationship between market development strategy and organizational factors, the results of this study demonstrates that market development strategy has a positive and significant effect on entrepreneurial firm performance ( $\beta = 0.39$ ,  $p < 0.05$ ). The result of data analysis shows that the main hypothesis is supported and there are positive and significant relationships

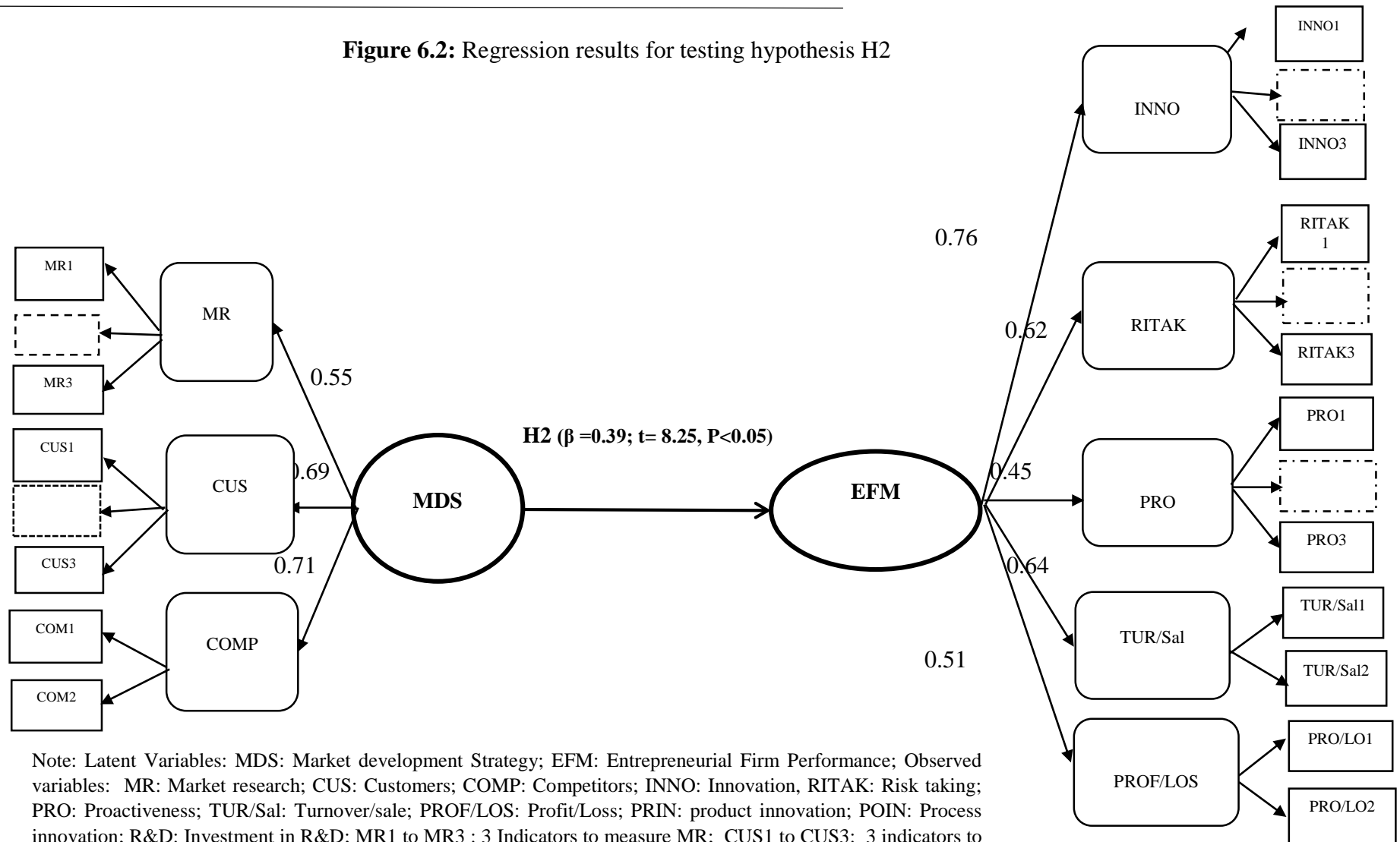


between market development strategy and entrepreneurial firm performance .So, the second hypothesis is confirmed.

On the other hand, the effects of market research ( $\beta =0.55$ ;  $P<0.05$ ); customers ( $\beta =0.69$ ;  $P<0.05$ ); competitors( $\beta =0.71$ ;  $P<0.05$ ) on market development strategy in high tech SMEs are significant too. These results are illustrated in figure 6.2.

According to Barczak and Kahn, (2007), developing market strategy requires the applications of techniques and methods to identify and explore customers. Competitors and the macro environment that has effect on the market. The previous researches have supported and illustrated the strong relationship between market research, customers' needs and demands, and competitors' activities and offering market development strategy projects' success (Cooper and Kleinschmidt, 1995; Martensen and Dahlgard, 2000). Griffin (1997) asserted that successful firms apply a variety of market research in the process of market development strategy. It can include the testing of concepts, products and the market (Coopet et al., 2002). Cooper and Kleinschmit (1995) indicated that effective market research in the early stages of market development leads to success in entering new markets.

Figure 6.2: Regression results for testing hypothesis H2



Note: Latent Variables: MDS: Market development Strategy; EFM: Entrepreneurial Firm Performance; Observed variables: MR: Market research; CUS: Customers; COMP: Competitors; INNO: Innovation, RITAK: Risk taking; PRO: Proactiveness; TUR/Sal: Turnover/sale; PROF/LOS: Profit/Loss; PRIN: product innovation; POIN: Process innovation; R&D: Investment in R&D; MR1 to MR3 : 3 Indicators to measure MR; CUS1 to CUS3: 3 indicators to measure CUS; COM1 to COM2: 2 indicators to measure COMP; INNO1to INNO3: 3 indicators to measure INNO RITAK1 to RITAK3: 3 indicators to measure RITAK; PRO1 to PRO3: 3 Indicators to measure PRO; TUR/SAL1 to TUR/SAL2: 2 indicators to measure TUR/Sal; PRO/LO1 to PRO/LO2: 2 indicators to measure PROF/LOS

### 6.2.3. Moderating role of innovation capacity

In this section, the effect of innovation capacity as a moderating variable that facilitates the relationship between product development and entrepreneurial firm performance is investigated.

The moderation model tests whether the prediction of a dependent variable Y (entrepreneurial performance), from an independent variable, X (product development strategy or market development strategy), differs across levels of a third variable, Z (innovation capacity).

Moderator variable, and innovation capacity, affect the strength and/or direction of the relation between a predictor and an outcome, such as enhancing, reducing, or changing the influence of the predictor. Moderation effects are typically discussed as an interaction between factors or variables, where the effects of one variable depend on levels of the other variable in analysis (Aiken and West, 1991; Fairchild and MacKinnon, 2009). Alternate path diagram representations of the moderation model

This study has used Structural Equations Models (SEM) to test the relationship between variables by Partial Least Squares (PLS) methodology. Firstly, the data were analysed through the measures of central tendency and dispersion and then the PLS technique was applied to test the models and hypotheses. It is notable that in this study the research variables are as follows:

X= *the* independent variable: product/ Market development strategy;

Y= the dependent variable: Entrepreneurial performance;

Z= the moderator variable: innovation capacity.

The casual and linear covariance relationships between exogenous and endogenous latent constructs are tested by SEM. The finding of t-values analysis reveals the significant association of relationship between variables. The path coefficient ( $\beta$ ) and P-values are given by PLS analysis.

### **6.2.3.1. Innovation capacity moderates the relationship between product development strategy and entrepreneurial firm performance**

The result of analysing with SEM shows that the third hypothesis is supported and there are positive and significant relationships between variables. The result of path analysis with SEMs shows that innovation capacity moderated the relationship between product development strategy and entrepreneurial performance ( $\beta = 0.23$ ;  $P < 0.05$ ). So, the third hypothesis is confirmed. The goodness-of-fit (G o F) section in SEM model is a significant part which reflects the predictive power of the estimated inner and outer model relationships.

The main indicators of GoF are Akaike Information Creterion (AIC); Goodness of Fit Index (GFI); Adjusted Goodness of Fit Index (AGFI); Root Mean Square Error of Approximation (RMSE); Non-Normed Fit Index (NNFI); and Comparative Fit Index (CFI). The resulting values of GFI, NNFI and CFI index in our model were GFI=0.85; NNFI=0.85; CFI=0.88. respectively which can be considered as satisfactory (Tenehaus et al., 2005). The index of GoF is AIC. The value of Model AIC = 1295.51 is smaller than Independence AIC = 7722.32. So it is satisfactory too.

Generally, It can be concluded that innovation capacity moderates the relationship between product development strategy and entrepreneurial performance and has a positive effect on their association ( $\beta=0.23$ ;  $P<0.05$ ). In other words, innovation capacity leads to enhancing the effect of product development strategy on entrepreneurial performance.

Although, with reviewing the literature and prior studies regarding investigating the moderating role of innovation capacity in the relationship between product development strategy and entrepreneurial firm performance, there is no attempt to cover this issue, a growing body of researches have evaluated the direct effect of product development strategy on innovation capacity and also the impact of innovation capacity on entrepreneurial performance (e.g, Acur et al., 2012; Henard and McFadyen , 2012; Cucculelli and Ermini, 2012; parkman et al., 2012). Therefore, this research has been an attempt to cover this gap in literature reviews and considered innovation capacity as a moderated variable and examined the effect of the moderating role of innovation capacity on the connection of product development strategy and entrepreneurial performance (See figure 6.3).

#### **6.2.3.2. Innovation capacity moderates the relationship between market development strategy and entrepreneurial firm performance**

Regarding the fourth hypothesis, innovation capacity has moderated negatively and shows as non-significant the relationship between market development strategy and entrepreneurial performance ( $\beta = -0.41$ ;  $P>0.05$ ). Therefore, the fourth hypothesis is not supported. It can be

concluded that firms that are engaging in market development to enter to a new market with existing products have no need of more innovative products.

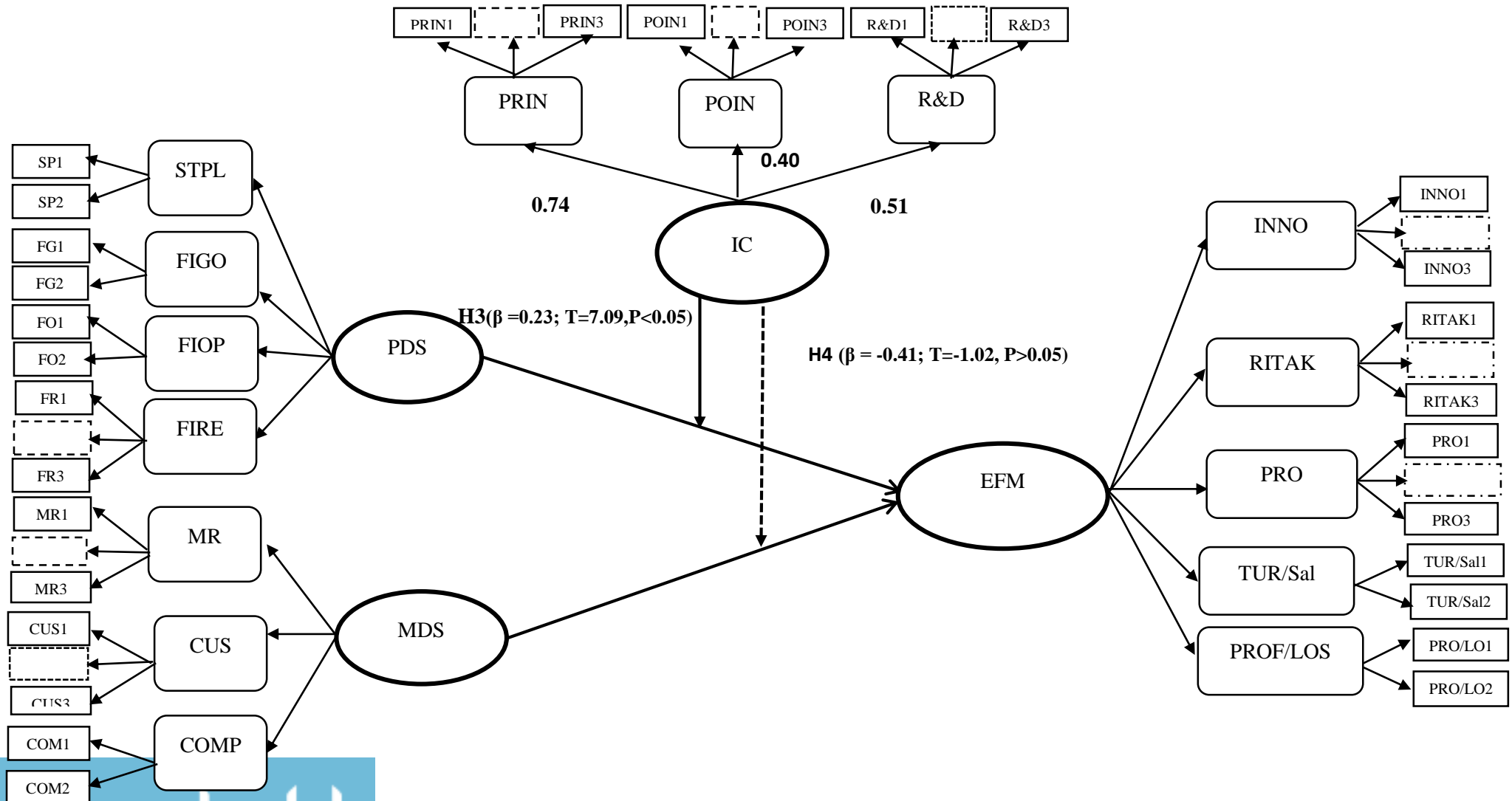
According to Ansoff's matrix, when product development is expensive and risky for firms, market development can be a substitute strategy for organizations. In this case, the organization can enter new markets with current products but the organizational scope is the same as for product development. Market development can be in three different ways: new segments, new users, and new geographies. Hence, firm are not engaged in enhancing innovation capacity or innovative products. They place more emphasis on market research and testing markets to develop market strategy.

Als, with reviewing the literature and prior and contemporary studies investigating the moderating role of innovation capacity in the relationship between market development strategy and entrepreneurial firm performance there is no attempt to cover this issue, this study has attempted to cover this gap by examining the moderating role of innovation capacity in the relationship of market development strategy and entrepreneurial firm performance (See figure 6.3).

Furthermore, previous empirical studies about the relationship between innovation and performance reported different and mixed results. Some findings don't support the positive relationship between them as reported, that innovation does not have impact on firm performance (Birley and Westhead, 1990,Heunks, 1998; McGee et al., 1995; Vermeulen et al.,

2005). But a number of studies found out a positive relationship between them (De Carolis and Deeds, 1999; Li and Atuahene-Gima, 2001:2002; Guo et al., 2005; Thornhill, 2006). Those findings are very similar to the finding of above researchers. Most of the reported findings in the literature refer to large established firms and surprisingly there are few studies on finding the effect of product/market development strategy on innovation capacity in SMEs (Hunter and Schmidt, 2004; Rosenbousch and et al., 2011).

Figure 6. 3: The path diagram of the research conceptual model





### 6.3. Innovation capacity, product/market development strategy and firm performance

A great body of literature addresses the innovation context of SMEs due to their significant role in the country's economic and technological development (Acs and Audretsch, 1988). Even though small and medium sized enterprises face resource limitations, most of them are very successful in developing innovation projects (Nooteboom, 1994 and Vossen, 1998).

According to Schumpeter (1934) innovation activity benefits SMEs by providing an opportunity for getting rent through establishing monopoly and durable entrepreneurial success. Therefore, due to small size and being quick off the mark, and moving faster than big organizations, SMEs can achieve monopoly rents for a long time. Innovation is an opportunity for SMEs to gain competitive advantages by offering new products, services and processes (Porter, 1980).

It has been discussed that innovative SMEs can enter niche markets, gain brand loyalty of customers, and have less price sensitivity due to offering valuable and unique and innovative products or services (Lieberman and Montgomery, 1988). As SMEs possess small size it makes them more nimble than large firms; entering in niches with new innovative products is a valuable advantage for them in comparison with large enterprises. Highly innovated products help SMEs to escape price competition. Moreover, producing innovative products attracts more customers and eventually makes growth (Porter, 1980).

It has been argued that in order to survive and grow in an ever changing business environment, enterprises tend to be innovative. Entrepreneurial firms are very interested in developing new products (Davidson et al., 2002). The main goal of entrepreneurial firms is achieving growth and firm performance has been measured by its growth rate (Delmar et al., 2003). The literature also supports the role of growth on enhancing performance and achieving competitive advantages, therefore measuring growth rate of the firm gets a broad picture of performance in enterprises, particularly in small and medium sized enterprises (Markman and Gartner, 2002).

MacMillian and Day (1987) stated that the firms with high innovation rate are growing fast and are more profitable due to entering new markets. Firm growth is multidimensional which means that growth in firms includes size, number of employment, sales rate and profitability, etc. (Lumpkin and Dess, 1996). In SMEs sales growth and financial profitability have been considered as firm performance (Wiklund, 1999). One of the main factors for firms' growth is being innovative and developing innovative products that are difficult for the competitors to imitate.

It is important for entrepreneurs to have an idea that none of the competitors can copy. It means that an innovative idea is a key for small and medium sized enterprises to be successful in business and compete against other firms (Lumpkin and Dess, 1996). This belief has been supported by entrepreneurship scholars who are stressing that innovation is a fundamental factor of entrepreneurship (Schumpeter, 1982; Davidsson, 2004). Moreover, it has been argued

by strategists that small firms are making more profit since they are very flexible and can adjust to environmental changes faster than large organizations (Nootboom, 1994; Vossen, 1998).

It has been noted that SMEs are more interested in investment in innovation than large organizations which are dealing with hierarchies and slow decision-making processes (Lee and Chen, 2011). In consequence, entrepreneurs and SMEs owner/managers are accepting this belief that innovation is essential for their firms' success. But on the other hand, innovation demands a huge amount of resources which is very difficult for SMEs to provide, since they are resource strained and don't have access to sufficient resources and capabilities (Van de Ven, 1986; Nootboom, 1994; Berggren and Nacher, 2001).

Furthermore, innovation is a risk taking action and there is always uncertainty and the scare of failure for firms. However, large organizations possess sufficient resources so they can absorb the negative effects of failure in innovative projects, small firm can't make it and their existence will be under risk (Nohria and Gulati, 1996; Eisenhardt and Martin, 2000).

In addition, since large organizations have more experience in dealing with innovation projects, the risk of failure is less and they are able to build organizational innovation capabilities upon it; (Danneels, 2002) on the other hand the lack of experience in SMEs or new firms makes the risk of failure or unprofitability high (Majchrzak et al., 2004; Danneels, 2002).

The impact of innovation on firm performance has been discussed from two viewpoints in the literature (Danneels and Kleinschmidt, 2001): strategic orientation (Durand and Coeurderoy,

2001;Edelman et al., 2005;Narver et al., 2004) and entrepreneurial orientation (Covin and Slevin, 1989;Miller, 1983). Strategic orientation deals with the ways that firms recognizes the environment (Kohli and Jaworski, 1990 and Lumpkin and Dess, 1996), defines objective, assigns resources (Rajagopalan and Finkelstein, 1992; Siguaw et al., 2006) and structures and creates dynamic capabilities (Eisenhardt and Martin, 2000). Strategy orientation has a significant impression on shaping and implementing the organization innovation strategy (Miller and Friesen, 1982).

The literature in entrepreneurial orientation proposes that innovation improves firm performance especially when the firm has resource constraints or whenit is going to enter new markets (Covin and Slevin, 1989 and Miller, 1983). Therefore innovation orientation is very important in the SMEcontext. According to Lumpkin and Dess (1996, p:142) innovation orientation is a “... tendency to engage in and support new ideas, novelty, experimentation, and creative processes that may result in new products, services, technological processes.”

Furthermore, previous empirical studies regarding the relationship between innovation and performance reported different and mixed results. Some findings don't support the positive relationship between them as reported, and claim that innovation does not have an impact on a firm's performance (Birley and Westhead, 1990,Heunks, 1998;Vermeulen et al., 2005). But a number of studies found out the positive relationship between them (DeCarolis and Deeds, 1999; Li and Atuahene-Gima, 2001). Most of the reported findings in literature refer to large

established firms and surprisingly there are few studies on finding the effect of innovation on SMEs (Hunter and Schmidt, 2004; Rosenbousch and et al., 2011).

Product development processes in SMEs is considered as a dynamic capability which effects the firm by increasing the access to resources and positioning it in value-creating strategies (Eisenhardt and Martin, 2000; Branzei and Vertinsky, 2006). According to the Resource Base View (RBV), dynamic capabilities lead to great effect on firm performance. Therefore considering SMEs constraint in accessingsufficient resources and capabilities, innovation as a catalyst for dynamic capability can directly enhance small and medium sized performance (Rosenbousch et al., 2011). Moreover, it affects learning which happens during innovation processes (Van De Ven and Polley, 1992) and develops the absorptive capacity of firms. Absorptive capacity is defined as the firm's capability for recognizing, integrating and applying knowledge (Cohen and Levinthal, 1990). Therefore, innovation in SMEs leads to developing absorptive capacity which implies competitive advantages (Zahra and George, 2002). Innovation also enhances firm learning, economy of scale, synergy by combination of resources and setting standards (Shepherd and Shanley, 1999).

Despite all the positive effects of innovation on SMEs performance, literature also mentions different negative impacts .It includes the resistance to adapting innovation in firms and markets (Ram and Jung, 1991; Hultink and Atuahene-Gima, 2000; Damanpour, 1991), or a risky action which demands a huge amount of firm resources (Li and Atuahene-Gima, 2001; Van de Ven, 1986; Eisenhardt and Martin, 2000 ). Additionally, being innovative and

doing new product development projects in SMEs requires superior organizational resources and capabilities which may be difficult or costly to access (Schumpeter, 1934; Thornhill, 2006; Branzei and Vertinsky, 2006; Sethi and Sethi, 2009).

It can be concluded from the literature that innovation capacity in small and medium enterprises is a vital factor to success which is the result of investigation, learning, assessment and adaptation of technologies. Firm capabilities have been considered as transformers of firms resources to innovation objectives (Dutta et al., 2005). A great body of literature stated that firms can increase their innovation capacity by accumulating existing knowledge (Cohen and Levinthal, 1990; Forsman and Temel, 2011). In cases where the firms existing knowledge is low, it is not able to access, explore and deploy external knowledge. In this context the absorptive capacity refers to the firm's ability to understand the external knowledge in order to absorb and exploit it for commercial means (Zahra and George, 2002).

Therefore, in this research an attempt has been made to identify these elements in high-tech, small and medium enterprises and examine the moderating role of innovation capacity in the relationship between product/market development strategy and entrepreneurial performance. The variables that have been applied to measure innovation capacity include product innovation, process innovation and investment in research and development (R&D). In this section, the respondents' perception of the importance of these elements in their firms has been explored.

### 6.3.1. Product innovation

The respondents were asked to indicate the extent of importance of their firm's preferences for innovation capacity. The data analysis shows that the majority of respondents (Mean=3.60, Std = 0.76) believe that their firms are pioneering in introducing new products and frequently change, and developing, and improving their products for entering the market. Also, employing one-sample T test ( $t(421) = 16.185, P < 0.01$ ) it has been found that product innovation product in high-tech SMEs is an important factor in developing innovation capacity. In other words, the respondents believed that the increasing number of new products that are developed or launched by their firms could have an effect on enhancing the capacity of innovation in high-tech SMEs effectively (see Table 6.3).

**Table 6.3:** One sample test on innovation capacity variables

Variables	t	df	Sig. (2-tailed)	Mean Difference
Product innovation	16.185	420	.000	.60253
Process innovation	9.181	420	.000	.59382
Investment in R&D	13.273	420	.000	.62154

### 6.3.2. Process innovation

Process innovation is another variable for measuring innovation capacity. The respondents were asked to indicate whether they agree or disagree with the association between process innovation and innovation capacity in high-tech SMEs. In general, the respondents believed (Mean= 3.59, Std=1.32) that their firms are continuously seeking new methods and processes for developing new products and place more importance on high product technology. Also, data analysis ( $t(421) = 9.181, P < 0.01$ ) shows that new distribution channels for a product that is considered as a process innovation is a significant factor in innovation capacity (see figure 6.3).

### 6.3.3. Investment in research and development (R&D)

In order to enhance innovation capacity, investment on R&D known as technological "gate keeping" results in a significant positive effect on innovation in enterprises. Accordingly, innovative companies, especially high-tech SMEs usually are managing excellent R&D activities which determine successful innovation performance (Chiaromonte, 2002). Moreover, R&D has the ability to change the strategic path of enterprises in instances such as attacking the competitors, enhancing market share, creating new markets all of which are in a strong relationship with firm innovation capacity. In this regards, the respondents in the studied firms were asked to assess research and development (R&D) activities. They strongly believe that (Mean= 3.6215, STD=0.96) investment on research and development leads to enhancing the



capacity of innovation. Also, the findings of data analysis ( $t(421) = 13.273, P < 0.01$ ) indicate that research and development places more emphasis on developing research and development and advanced technology. Therefore, firms should increase investment on research and development due to enhancing innovation capacity (see figure 6.3).

#### **6.4. Chapter summary**

In this chapter, a comprehensive model that includes product development strategy, market development strategy, innovation capacity and entrepreneurial firm performance has been discussed and empirically tested. Overall it is concluded that there is a significant relationship between product development strategy and entrepreneurial firm performance, and innovation capacity positively moderates this relationship in the firms studied. The findings of this research show that there is a strong relationship between pursuing new product development rather than market development strategy and entrepreneurial firm performance. Furthermore, the result indicates that innovation capacity has a negative and non-significant effect on the relationship between market development strategy and entrepreneurial firm performance. It can be interpreted that firms with market development strategy don't need more innovation because they enter new markets successfully with current products.

In other words, for small and medium-sized enterprises, product development strategy is a better choice rather than entering new markets. Focusing on developing new products will result in better entrepreneurial performance. The other main conclusion is that, in order to be

successful, SMEs needs to enhance their innovation capacity. One of the tools for this is creating and developing an ethos of innovation within the firms. This in turn will result in enhanced product innovation as well as process innovation. Increasing the R&D budget and investment in the unique capabilities of the firm can help it to achieve this goal.

It is concluded that for small and medium sized firms product development strategy is an appropriate strategy rather than market development. The findings of this research show that there is a strong relationship between pursuing new product development rather than market development strategy and entrepreneurial firm performance. Successful small and medium sized firms are more involved in pursuing a related product development strategy.

## Chapter seven

# Conclusion

## 7.1. Introduction

The main objective of this study was to examine the effect of new product development strategy and market development strategy on entrepreneurial firm performance in the high-tech SMEs of the UK.

Chapter one introduced the objective and scope of the study. It also demonstrated the main works in the areas of new product development and entrepreneurial firm performance. Then it discussed the research objectives and questions and briefly the methodological perspective.

Chapter two discussed strategic management in the context of small and medium sized enterprises. It covered the theories and definitions of strategy and strategic management, product development and market development and new product development strategies in SMEs. This chapter also reviewed the concepts of innovation and entrepreneurship. It discussed the innovation model, innovation capacity and entrepreneurial firm performance.

Chapter three began with outlining the research objectives and questions. It also discussed the synthesis of literature regarding product and market development strategy, innovation capacity and entrepreneurial firm performance. It introduced the research variables measured in detail and the research conceptual framework has been developed.

Chapter four reviewed research design and methodology. It introduced the research philosophy, approach and design of the research. Then it provided the research's proposed conceptual

model and hypotheses about the relationship between new product/market development and entrepreneurial performance in SMEs. It ended with a data analysis plan of the study.

Chapter five began with descriptive analysis and provided a wide picture regarding the research data. It continued with statistical data analysis and bivariate and multiple regression analysis through SEM and path analysis.

Chapter six presented the findings of data analysis and reviewed product/market development strategy, innovation capacity and entrepreneurial firm performance in small and medium sized enterprises. Furthermore it reviewed the importance of innovation capacity for firm product development and performance. It also connected the findings with incumbent literature and prior researches.

Chapter seven is the final chapter and is concerned with the findings of the research. It explains the theoretical contribution of research and covers the policy and managerial implications. And finally it discusses the limitations of the study and gives some suggestions of future studies

## **7.2 Revisiting the research questions and objectives of the study**

The research questions have evolved from the literature review which highlights the fact that most prior researches undertaken in the area of strategic direction have focused on one dimension of strategic direction and not investigated which strategy is the best option for high tech SMEs. Also, in the area of innovation capacity and entrepreneurship, it is well documented

by researchers that innovation and entrepreneurship are vital factors for SMEs to survive and to get competitive advantages. There is lack of comprehensive empirical studies to research strategic direction, innovation capacity and firm entrepreneurial performance. Hence, the main objective of this study is to cover the gap in the literature and to investigate the relationship between product and market development strategy as the strategic direction that firms pursue, and entrepreneurial firms' performance with the moderating role of innovation capacity in high-tech SMEs. Hence, the questions aim to enhance the body of knowledge through empirical Investigation.

The interest of this study is that strategic direction enhances entrepreneurial firms' performance more. Though prior researchers have identified that new product development has a positive and significant effect on firm performance in SMEs (Ghobadian and Gallea, 1997; Bartlett and Bukvi, 2001; Kaufmann and Todtling, 2002; Acur et al., 2012) some believe that SMEs are sometimes unsuccessful in developing new products due to limited access to human and financial resources and where they have a lack of contacts with external networks (Voss et al., 1998; Hadjimanolis, 1999; Bartlett and Bukvi, 2001; Kaufmann and Todtling, 2002; Tidd et al., 2005).

To answer the research question , it will be identified which of the strategic directions are suitable and best options for SMEs especially in High-tech and also which of them enhances the entrepreneurial firm's performance the most. This research is also investigates the

moderating role of innovation capacity in enhancing the relationship between product development strategy and entrepreneurial firms' performance.

Research has been undertaken into the benefits to firms for those who invested in innovation capacity to produce new products and how this can moderate the relationship between strategic direction and entrepreneurial firm's performance. As it can be observed from the background of the study, innovation is a key factor for organizations to have sustainable competitive advantage; and innovation capacity is known as one of the main features of the organizations which will lead to competitive advantage (Romijin and Albaladejo, 2002; Silva et al, 2008; Prajogo and ahmed , 2006).

Innovation capacity is an important factor for innovation, initiative and entrepreneurship, creating new features, and improving existing technologies and stimulating competition in organizations. To answer the research question two, the importance of the innovation capacity in high-tech SMEs and its moderating role on the relationship between strategic directions, namely product development strategy, market development strategy and entrepreneurial firm's performance has been investigated.

### **7.3 Summary of major findings**

In this section the major conclusions of the research relationship between propositions has been discussed. The major findings of each two propositions are outlined as follows.

- Overall the result of data analysis shows that there is positive and significant relationship between product and market development strategy and entrepreneurial firm performance. Therefore pursuing new product development strategy by small and medium sized enterprises leads to better entrepreneurial firm's performance.
- Innovation is a factor that has more positive effect on firm entrepreneurial performance. Therefore innovative firms have better performance than other SMEs which don't emphasise innovation.
- Pro-activity as one of main characteristics of entrepreneurial firms which enables firms to be innovative and react fast toward changes also enables firms' overall performance more than than that of their competitors.
- The firms which are taking risk are more successful firms. Risk taking is one of the important characteristics of SMEs owner/managers and helps firm to be open for new product development positively associates with high entrepreneurial performance.
- In the studied firms, the firms adapting new product development strategies, the increase of turnover/sale positively affects entrepreneurial performance. Consequently the SMEs following new product development strategies are more profitable in comparison to those firms with no new product development strategies.



- The findings reveal that innovation capacity positively increases the relationship between product development and entrepreneurial firm performance. Therefore firms which are focusing on innovation capacity projects are able to enhance firm entrepreneurial performance.
- Innovation capacity has negatively and non-significant moderated effects on the relationship between market development strategy and entrepreneurial firm performance. It can be concluded that firms that are engaging in market development to enter to new markets with existing products have no need of more innovative products.
- Enterprises which deal with process innovation in their firms are also able to increase innovation capacity.
- Investment in R&D, on the other hand, has a positive effect on innovation capacity in small and medium sized enterprises in high tech sector.

#### 7.4 Theoretical contributions

This research has made a significant contribution to the existing body of knowledge in strategic management in the SME context. During the last decade, new product development was one of the interest areas for scholars (e.g. Leonard-Barton, 1992; Muffato, 1998; Kleinschmidt et al., 2007; Afonso et al., 2008; Gmelin and Seuring, 2014). It also attracts researchers from different areas such as the technical, engineering, and service sectors (Perrone et al., 2010;

Rauniar and Rawski, 2012). New product development emphasises capturing market opportunities and producing a product for supply in markets with a short development cycle (Krishnan and Ulrich, 2001; Atuahene-Gima and Murray, 2007; (Hu and Bidanda, 2009; Gmelin and Seuring, 2014).

New product development management is very complex and challenging. In order to achieve competitive advantages firms should strain to launch new products faster than other competitors (Lane et al., 2006). Therefore it has been argued that new product development is considered as a key competence for companies success by top managers (Harmsen and et al., 2000).The previous studies in this context found that innovation plays a catalytic role in developing new products in firms. According to Damanpour (1991) innovative enterprises are able to adapt new ideas or behaviours which affect all organizational activities such as product processes, technology, structure and administrative systems and even organizational plan. Innovative organizations are focusing mainly on product, process and administrative innovations. Furthermore, due to the significant role of SMEs in the technological and economic development of countries, there is much interest in the literature (Ndubisi and Iftikhar, 2012).

Nooteboom (1994) stated that even with considerable resource limitations, SMEs are successful in innovation issues. That is because of flexibility and small size, entrepreneurial SMEs are moving faster than other large companies and have a more proactive and risk taking nature (Ndubisi et al., 2005). Innovation enables SMEs to enter niche markets and achieve

superior customer value which leads to competitive advantages (Porter, 1980; Lieberman and Montgomery, 1988). Entrepreneurial SMEs by offering innovative niche products can develop their performance.

The other main contribution of this research is to add innovation capacity as a moderating variable to the existing conceptual frameworks in the subject field. It has been argued that even though small and medium sized enterprises face resource limitations, most of them are very successful in developing innovative projects (Nooteboom, 1994; and Vossen, 1998).

Furthermore, it has been proposed that innovation usually starts with creating a new idea, and idea generation is considered as a significant factor for firm innovation capacity. Idea generation is influenced by gathering, exchanging, sharing and exploiting knowledge by organizations (Koc and Ceylan, 2007). Therefore, it has been added by a number of researchers that technological information flow leads to idea generation and eventually has effects on the innovation capacity of firm (Cohen and Levinthal, 1990; Macdonald and Williams, 1994). As argued in literature, the innovation capacity refers to firms' R&D efforts and innovative new products (Kirner et al., 2009). Besides, it considers the R&D activities and the firm's technological knowledge as a base for technological innovation.

The theoretical association between entrepreneurship and innovation has been deliberated in the literature for several years. Moreover, in recent years, some scholars as (Stoneman, 1995; Arora et al., 2002; Grupp, 2001) have paid more attention to entrepreneurship, especially

innovation, in their studies. From the viewpoint of Schumpeter (1934), Drucker (1994), Sundbo (1998) and Kanungo (1999), innovation is a precise instrument of entrepreneurs to exploit opportunities for increasing an organization's performance and competitive advantages. Consequently, there is significant intersection between entrepreneurship and innovation. In recent decades, the amount of literature published in the field of innovation capacity, especially in small and medium enterprises (SMEs), has been limited. Innovative SMEs can enter niche markets, and gain the brand loyalty of customers, with less price sensitivity due to offering valuable and unique and innovative products or services (Lieberman and Montgomery, 1988).

As SMEs possess small size and it makes them more nimble than large firms, entering in niches with new innovative products is a valuable advantage for them in comparison with large enterprises. Highly innovated products help SMEs to escape price competition. Moreover, producing innovative products attracts more customers and eventually makes growth (Porter, 1980).

Moreover, Santamaria et al., (2009) argued that the innovation in small enterprises is the result of investigation, learning, assessment and adaptation of technologies. Since in small firms the development activities are integrated in daily business efforts it is very difficult to differentiate the daily business development from innovation (Forsman, 2008). Entrepreneurial firms are much more interested in developing new products (Davidson et al., 2002). The main goal of entrepreneurial firms is achieving growth, and firm performance has been measured by its growth rate (Gartner, 1997; Delmar et al., 2003). This research supports the existing literature

on the role of innovation in enhancing performance and achieving competitive advantages. It focuses on firm innovation capacity and measuring innovation, investigating its effects on performance in enterprises particularly in small and medium sized enterprises (Markman and Gartner, 2002).

Accordingly, the literature on the relationship between entrepreneurship and innovation proposes that entrepreneurial firms by a market-oriented culture are more innovative (Slater, 1997). Moreover in a study by Nasution et al. (2011), it has been noted that entrepreneurial firms with learning and integrated market orientation also are often successful innovative enterprises. The significant values of entrepreneurial firms in regard to innovation can be classified as autonomy, risk taking and pro-activeness (Nasution et al., 2011; Ndubisi and Iftikhar, 2012). Moreover, considering the existing literature and previous studies, there are fewer attempts to investigate the relationship between innovation capacity and strategic direction. It seems there is a gap in this issue. Therefore this study tries to cover the gap in the literature.

### **7.5 Policy implications**

In previous chapters the significance of small and medium sized enterprises on the economy of national government and industries has been discussed. In certain industrial sectors, SMEs are critical for achieving competitive advantages due to creating innovation. Since SMEs growth leads to achieving economic prosperity, the policy makers in UK are focusing on it in recent decades. Therefore the findings of this research might be attractive for policy makers in

the UK. It can help them to formulate effective policies toward small and medium sized enterprises which have an influence on country's economic growth. Although the UK government provides a wide range of financial support for small and medium sized enterprises, their failure rate is still high.

The findings of this research show that enterprises adapting new product development strategies have high performance are more successful than the firms not focusing on this strategy. Also on the other hand it would be attractive for policy makers that innovative firms, especially in high tech sectors, can achieve competitive advantages which guide policy makers to emphasise supporting innovative projects.

It is concluded that the SMEs managers and CEOs knowledge of supporting innovation in their firms and changing the firms to learning firms can directly affect firm performance. So the governmental agencies by providing special training for SMEs owner/managers particularly in high tech sector will help the SMEs to achieve high performance. Having strategic knowledge will affect the managing of innovation in high tech SMEs and eventually the success of firms.

### **7.6 Managerial implications**

The findings of this research show that strategic awareness of managers in small and medium sized enterprises positively affects the management style of dealing with new ideas and how to support them. Moreover it is concluded that adapting new product development strategies impacts on firm performance. It is important, especially in high tech sectors, that managers

increase their knowledge of the industry and competitors which consequently leads them to undertake strategies to help them for achieving competitive advantage.

The results of the current study have lessons for SMEs managers. It encourages them to have more focus on innovation in their firms, as innovation plays a crucial role on the success of firms to achieve competitive advantage. Also it reveals that in order to support innovation it is necessary to increase organizational knowledge and strengthen firm capabilities and R&D.

The other important implication for managers is in increasing their capabilities in taking risk and being brave in making risky decisions. As it is concluded that risk taking is a key factor which demonstrates the success of entrepreneurial performance in SMEs. Involvement in developing new products or services are samples of risk taking behaviours for SMEs managers.

Finally, this study suggests that the managers in SMEs should have a strategic thinking approach in managing their business. Lack of strategic thinking may involve the top managers in just daily and routine decision, neglecting strategic decisions such as developing new products.

### **7.7. Generalisability of finding**

Although this research was conducted in three sectors of high-tech industry, the results could be generalisable to other sectors. Representative samples has been framed and data has been collected from a large sample. Therefore, the result of this study can be generalized to the high-tech SMEs in different countries.

The findings suggest that this approach would also be beneficial in other industries and small and medium-sized enterprises. The main characteristics of high-tech SMEs are the same in most of the countries and regions, therefore the result of this study should be generalizable to other technology based SMEs in different countries as well.

### **7.7 Limitations of the study**

Despite its extensive contribution and both managerial and theoretical implications, this study has some unavoidable limitations. This study has been conducted in high tech SMEs in the UK operating in three sectors namely the biotechnological, software and pharmaceutical industries.

Therefore the first limitation refers to the focus of study on three sectors.

The other limitation of this study deals with the methodological limitation. A quantitative study using a survey was the chosen method of research and was felt justified due to the large population size of SMEs and their widespread geographical location across the UK. The data for this research has been collected via survey method. Therefore the response rate was slightly low it was challenging for researchers to increase it

### **7.8. Suggestions for future research**

Taking into account the main findings and limitations of this research some new avenues for further research have been suggested.

First: this research has been conducted in three sectors of high tech industry in SMEs. The researchers recommend to carry out similar studies with a focus on other high tech sectors and



industry through which the first limitation of this research would be addressed. Extending this study to other research settings and contexts (which may provide further insights) will test the robustness of this study through clarifying the extent to which the findings of this study are generalizable.

Second: since this study focused on the SMEs in the United Kingdom, therefore the suggestion of this study for future researchers is to carry out the research in other countries such as the USA, Europe or in Asian developed countries. The results of those studies could help to provide a comprehensive approach toward the performance of SMEs internationally.

Third: due to the large population of high-tech SMEs in the UK and also very wide geographical location across the UK, a mono method by using questionnaire was chosen for collecting data. For further research, mixed methods using questionnaires and interviews in order to increase the response rate is recommended.

# Appendix

	Number of question	Variable code name in SPSS	Variable	Measurement Scale
<b>General Information</b>				
<b>General information</b>	1	AGE	Age of manager	1= 19 years and less 2= 20 – 29 years 3= 30-39 years 4= 40-49 years 5= 50 years or more
	2	Gender	Gender	1= Male 2= Female
	3	JOBPOS	Job Position	1= Owner- manager 2= Manager 3= Other
	4	EDUC	Education	1= Diploma 2= Bachelor 3= Master 4= PhD
	5	TYPCOM	Type of company	1= private 2= public
	6	TYPPRO	Type of production	1= Manufacturer 2= Service provider 3= R&D 4= Product designer 5= other
	7	UKLOC	Location in UK	1= England 2= Northern Ireland 3 = Scotland 4= Wales
	8	TYPIND	Type of industry	1= Biotechnology 2= Pharmaceutical 3 = software 4= Other
	9	SIZE	Size of firm	1= 1 to 9 2= 10 to 49 3 = 50 to 249
	10	AGEFIR	Age of firm	1= 1 to 5 2 = +5 to 10 3 = +11 to 15 4 = 16 to 20 5 = 21 or more
	11	NUMEMP	Number of employees	1= 1 to 9 2 = 10-49 3 = 50-249
<b>Strategic directions</b>				
<b>Product development</b>	12	STRPLA	Strategy plan	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = agree 5 = Strongly agree
	13	STRARE	Strategic arenas	1 = Strongly disagree

				2 = Disagree 3 = Neutral 4 = agree 5 = Strongly agree
	14	COMGOAL	Company goals	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = agree 5 = Strongly agree
	15	COMOPPO	Company's opportunities	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = agree 5 = Strongly agree
	16	COMMIS	Company's mission	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = agree 5 = Strongly agree
	17	COMBUD	Company's budget	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = agree 5 = Strongly agree
	18	COMBALAN	Balance between projects and resources	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = agree 5 = Strongly agree
	19	COMNPDIDE	NPD project ideas of company	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = agree 5 = Strongly agree
	20	COMRESOU	Company's resources	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = agree 5 = Strongly agree
Market development	21	MRKRESE	Market research	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = agree 5 = Strongly agree
	22	COSNEED	Customer needs	1 = Strongly disagree 2 = Disagree 3 = Neutral

				4 = agree 5 = Strongly agree
	23	COST	Costumers is an inseparable part of MD	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = agree 5 = Strongly agree
	24	STRPLA	Strategic plan	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = agree 5 = Strongly agree
	25	COMNEED	Company needs	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = agree 5 = Strongly agree
	26	FUTCOSNED	Future costumer need	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = agree 5 = Strongly agree
	27	COMPET	Focus on competitors	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = agree 5 = Strongly agree
	28	COMPET	Focus on competitors	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = agree 5 = Strongly agree
<b>Entrepreneurial firm's performance</b>				
<b>Innovation</b>	29	NUMPROD	The number of new products	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = agree 5 = Strongly agree
	30	CHAFRQ	Changing frequently	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = agree 5 = Strongly agree
	31	TAKACT	Taking action before competition	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = agree 5 = Strongly agree

Pro-activeness	32	LEAD	Leader in new products	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = agree 5 = Strongly agree
	33	COPMACT	Competitive activities	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = agree 5 = Strongly agree
	34	TENRISK	Tend to high risk projects	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = agree 5 = Strongly agree
Risk-taking	35	SUBAACT	Taking substantial action	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = agree 5 = Strongly agree
	36	RADAPPR	Taking radical approach	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = agree 5 = Strongly agree
Turnover/ sale	37	TOTTUR	Total turn over	1 = Very low 2 = Low 3 = Neutral 4 = High 5 = Very high
	38	SALVOL	Sale volum	1 = Very low 2 = Low 3 = Neutral 4 = High 5 = Very high
	39	PROFGRO	Profitability growth	1 = Very low 2 = Low 3 = Neutral 4 = High 5 = Very high
Net profit/ loss	40	DECPRCOS	Decrease of production costs	1 = Very low 2 = Low 3 = Neutral 4 = High 5 = Very high

	41	DECPRPCOS	Decrease of production costs	1 = Very low 2 = Low 3 = Neutral 4 = High 5 = Very high
<b>Innovation capacity</b>				
<b>Product innovation</b>	42	PRONEPRO	Producing new products	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = agree 5 = Strongly agree
	43	ENTMAR	Entry to market with new products	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = agree 5 = Strongly agree
	44	SEENEME	Seeking new methods continually	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = agree 5 = Strongly agree
<b>Process innovation</b>	45	IMPTECH	High importance on technology	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = agree 5 = Strongly agree
	46	DISCHAN	New distribution channel	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = agree 5 = Strongly agree
	47	INVR&D	Investment on research and development	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = agree 5 = Strongly agree
<b>Investment in R&amp;D</b>	48	ACTCON	R&D act continually	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = agree 5 = Strongly agree
	49	IMPCRETECH	Pacing importance on R&D, Creativity and technology	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = agree 5 = Strongly agree

# Questionnaire





PRIFYSGOL  
**BANGOR**  
UNIVERSITY

The General Manager

May 15, 2013

**Dear Sir/madam**

***Re : Miss Mina Tajvidi's Doctoral Research***

I have the pleasure of informing you that Miss Mina Tajvidi is carrying out a research for her PhD on "Strategic management in small and medium sized enterprises in UK" at the Bangor Business School, Bangor University, UK.

Your firm has been selected, from among all firms operating in the sector, to take part in this research. I would like to emphasize that your participation is very important for the researcher. The result of this research will be presented in aggregate form, and in such a way that no single respondent can be recognized. Please note that all information gathered in this survey will be held in the strictest confidence, and will never be disclosed to a third party. More specifically, the gathered data will be used solely for academic and scientific purposes.

Mina's questionnaire contains more details of the planned project. She is an able and committed researcher. She had completed a number of researches for various organizations. I am confident that she will conduct this research according to the highest professional standards and I will be most grateful if you can facilitate the process by giving your support. Your approval will be highly appreciated.

I would like to take this opportunity to thank you in advance for your approval and assistance. Please do not hesitate to contact me if you require further information.

Yours sincerely

Azhdar Karami (Ph.D)

Senior Lecturer in Strategy and Management

Supervisor and Programme Coordinator



Dear participant,

My name is Mina Tajvidi and I am a PhD student at Bangor Business School, Bangor University, undertaking research into the role of strategic management in SMEs in the UK. I would appreciate it if you could complete the questionnaire and return it to Bangor Business School. A pre-paid envelope is enclosed. Please attach your business card to the completed questionnaire if you would like to be sent a summary of the research findings. Please note that all information gathered in this survey will be held in the strictest confidence, will not be disclosed to a third party and solely used for academic and scientific purpose. I would like to take the opportunity of thanking you in advance for your participation in this research.

Sincerely yours

Mina Tajvidi

Email: m.tajvidi@bangor.ac.uk

Section 1: Demographic information	
1. Please indicate your age band (in years):	<input type="checkbox"/> 19 and less <input type="checkbox"/> 20-29 <input type="checkbox"/> 30-39 <input type="checkbox"/> 40-49 <input type="checkbox"/> 50 or more
2. Please indicate your Gender:	<input type="checkbox"/> Male <input type="checkbox"/> Female
3. What is your working experience? (in Years)	<input type="checkbox"/> 0-5 <input type="checkbox"/> 6-10 <input type="checkbox"/> 11-15 <input type="checkbox"/> 16-20 <input type="checkbox"/> 20+
4. What is your position in your company?	<input type="checkbox"/> CEO <input type="checkbox"/> Middle manager <input type="checkbox"/> Supervisor <input type="checkbox"/> Other (please specify) .....
5. Please indicate your level of education?	<input type="checkbox"/> A level or less <input type="checkbox"/> Bachelor <input type="checkbox"/> Master <input type="checkbox"/> PhD
6. Type of your company:	<input type="checkbox"/> Private <input type="checkbox"/> Public
7. Type of your production:	<input type="checkbox"/> Manufacturer <input type="checkbox"/> Service provider <input type="checkbox"/> R&D <input type="checkbox"/> Product designer <input type="checkbox"/> Other (please specify).....
8. Age of your firm:	<input type="checkbox"/> 1 to 5years <input type="checkbox"/> 6 to 10 years <input type="checkbox"/> 11 to 15 years <input type="checkbox"/> 16 to 20 years <input type="checkbox"/> 21 or more
9. Where is the firm located:	<input type="checkbox"/> England <input type="checkbox"/> Northern Ireland <input type="checkbox"/> Scotland <input type="checkbox"/> Wales
10. How many employees do you have?	<input type="checkbox"/> 1 to 9 <input type="checkbox"/> 10 to 49 <input type="checkbox"/> 50 to 249
11. Which industry you are in:	<input type="checkbox"/> Biotechnology <input type="checkbox"/> Pharmaceutical <input type="checkbox"/> Software Development <input type="checkbox"/> Other (please specify) .....

**Section2: Survey questions**

**2.1. Items 1-9 in this question are concerned with the different aspects of New Product Development (NPD) strategy. Please indicate to what extent you agree with each item in your organization according to your perception.**

N	Questions	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	In my organization new product development (NPD) is viewed as a long-term strategy.					
2	Our mission and strategic plan help to define strategic arenas for new opportunities.					
3	New product development goals are clearly aligned with organization's mission and strategic plan.					
4	Opportunity identification is ongoing and can redirect the strategic action plan in order to respond to market forces and new technologies.					
5	In my organization selection of new product development project is derived by the firm's mission.					
6	New product development projects are identified during budget process and resources are allocated accordingly.					
7	There is keen consideration for balancing the number of NPD projects and available resources.					
8	New product development concepts/project ideas are reviewed individually and independently.					
9	Resources can be made available should a new opportunity of developing a product come onto the horizon.					

**2.2. Items 1-8 in this question are concerned with the different aspects of New Market Development (NMD) strategy. Please indicate to what extent you agree with each statement in regards to your organization.**

N	Questions	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	A formal market research function exists in my organization as a part of market development strategy.					
2	Ongoing market research is used to anticipate/identify future customer needs and problems due to market development.					
3	Customer/user is an integral part of the market development process.					
4	In my organization, the mission and strategic plan drives market development project selection.					
5	Market development focuses on the organization's current needs and problems.					
6	Future customer needs are given attention in the market development process.					
7	There is a keen focus in the market development strategy on analysing competitors and their offerings.					
8	Subject matter experts are used for macro environmental research in the market development process.					

**2.3. Please rate the following statements and indicate your level of agreement from strongly disagree to strongly agree.**

N	Questions	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	My organization is a pioneer in introducing new goods and services.					
2	The number of new products 'developed' or 'launched' by my organization has increased during the last 3 years.					
3	Products/services are changed frequently.					
4	My organization always takes actions before its competitors.					
5	We take the lead to bring in new products/service, management methods and/or operating methods.					
6	We maintain the attitude of beating competitors through competitive measures.					
7	We have preference for high-risk projects with high returns.					
8	We take substantial action to attain the firm's targets.					
9	We take a quick action to use opportunities					

**2.4. Please rate your firm's overall performance using following indicators.**

N	Questions	Very low	Low	Neutral	High	Very high
1	Increase in firm's total turnover during the last 3 years					
2	Increase of sales volume in the last 3 years					
3	Profitability growth in the last 3 years					
4	Decrease of production costs in the last 3 years					

**2.5. Please indicate to what extent you agree with each of the items (1-6) in your organization according to your perception.**

N	Questions	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	We are increasing the range of new products/services					
2	We are increasing the volume of new products/services					
3	Entry to market with improvements in goods and services					
4	Our organization is continually seeking new methods and processes for developing new products					
5	We place more importance on high product technology					
6	We emphasize new distribution channels for products.					

**2.6. This question assesses the Research and Development (R&D) activities. Please indicate to what extent you agree with each of the items 1-3 in your organization according to your perception.**

N	Questions	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	Our organization increases investment on Research and Development (R&D).					
2	Research and development is acting continually on developing new products					
3	Our organization places more emphasis on developing R&D, and advanced technology					

**2.7. Please indicate your view on barriers to product/market development in your firm. Please tick any boxes.**

	Questions	✓ Or ×
<b>Internal barriers</b>	Uncreative working environment	
	Unclear job designs	
	Managerial barriers	
	Unclear inter organizational relationships	
	Technological barriers	
<b>external barriers</b>	Shift on legislation and government policies	
	Barriers on networks access	
	Market requirements	
	Customer expectations	
	Changes on business environment	
<b>Other (please specify):</b>		

**Thank you very much for your cooperation. Please enclose your business card if you would like to receive summary of the research findings.**

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